# RESEARCH PORTFOLIO 2021-23

INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD

OFFICE OF THE VICE PRESIDENT (RESEARCH AND ENTERPRISE)

# LEGENDS

- Faculty of Engineering &Technology (FET)
- Faculty of Languages & Literature (FLL)
- Faculty of Management Sciences (FMS)
- Faculty of Shariah & Law (FSL)
- Faculty of Social Sciences (FSS)
- Faculty of Usuluddin (FU)
- Faculty of Arabic (FA)
- International Institute of Islamic Economics (IIIE)
- Faculty of Sciences (FoS)
- Faculty of Education (FoE)
- Faculty of Computing and IT (FC&IT)
- Sulaiman Bin Abdullah Aba Al-Khail – Center for Interdisciplinary Research in Basic Sciences(SA-CIRBS)
- Iqbal International institute for Research & Dialogue (IRD)
- Islamic Research Institute (IRI)
- Center for Advanced Electronics and Photovoltaic Engineering (CAEPE)
- Office of Research Innovation and Commercialization (ORIC)
- Business Incubation Center (BIC)

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# From The President IIU Desk

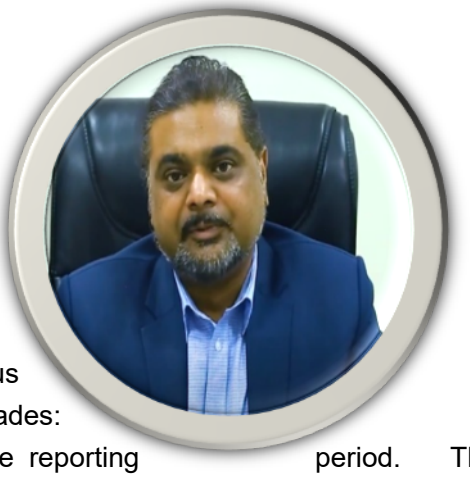
I am delighted to see this report prepared by the Office of the Vice President (Research & Enterprise) with the support of Office of Research, Innovation and Commercialization (ORIC) and Business Incubation Centre (BIC). In the last few years, University has witnessed a transformation creating a pathway to progress and accomplishments in almost all possible dimensions. Due to the development and implementation of the university's Strategic Plan (2022-26) and its operational plan, the university is turning into an institution with a clear vision and a roadmap.

University is constantly pursuing the 'Drive for the Quality', which is reflected in elevated Times Higher Education and QS international rankings in variety of categories. Establishment of new faculties; preparedness for the curricula shift to the outcome based education, launch of the post-doctoral training and fellowship programs as well as several interdisciplinary MS/Ph.D. programs; revitalization of Alumni office and establishment of the Directorate of Graduate Studies, Office of Linkages, Strategic Plan's Implementation Cell; rebranding the Office of the Research, Innovation and Commercialization and Business Incubation Centre with new avenues and programs; initiation of a pilot project of Science, Technology and Business Space; development of several frameworks and policies pertaining to academics, research, innovation, impact and sustainability, commercialization and consultancy; and holistic approach to address national and international rankings have been instrumental to pave the way to a meaningful transformation. University has raised its research profile, research income and reflection of faculty members winning international projects and competitive grants as well as their inclusion among the world leading researchers and scientists.

I am confident that the University is on the right track to achieve the best in terms of research and its larger impacts. I pray to Allah to guide us to make efforts for the prosperity and betterment of the University.

**Dr. Hathal Homoud Alotaibi**
**President**

# PREFACE



Keeping the International Islamic University's Strategic Plan (2022-2026) in perspective, University´s Research Portfolio for the year 2021-23 is in your hands. The portfolio report provides an account of the research grants awarded to the faculty members from various international and national funding agencies in three shades: research projects awarded, completed and ongoing in the reporting period. The projects are further divided into several thematic categories to project their alignment with the contemporary and futuristic social issues, scientific and technological advancements, religious and philosophical discourses and Sustainable Development Goals (SDGs). Statistical mapping of the research and research- allied outcomes and initiatives pertinent to the innovation and entrepreneurship are also part of this report.

Besides the funds, grants and projects, thousands of research students are pursuing their research degrees and are engaged in creating knowledge in the diversified areas. Faculty and students are publishing their original works in world's leading journals creating the impact and change. This has developed a rich portfolio to provide a sound intellectual foundation to raise the bar. Some faculty members, especially in the domain of Languages and Literature, Law and Social Sciences, are writing books under the banner of renowned publishers. Academies and Institutes as well as faculties in the University are also running the academic journals, some of which are counted as internationally competitive. The research conducted and disseminated in such a way is part of University's scholastic endeavors.

My office took the initiative in the reporting period and reviewed all the post-graduate programs being offered in the University, multiple times, together with a new Graduate Policy in place. We also framed numerous desirable policies to structure a systematic research activity in the University. Initiation of Inter-disciplinary MS and Ph.D. degree programs, Post-Doctoral Fellowships, Post-Doctoral Training Programs, Start-Up Drive, ORIC Forum, Research and Commercialization Seed Grant Program, Science, Technology and Business Space (Technology Park's Pilot Project) are a few examples to develop a better research infrastructure and expanding business and technology incubation to create enterprise and commercialization ecosystem. With the duly devised strategies and interventions and their key performance indicators, we are keen to effectively collaborate and grow our research in line with the University's vision and mission. We aim to develop relationships with funding agencies, social sector and industry, foster collaboration in multi-disciplinary areas, and encourage a vibrant culture of entrepreneurship and inclusiveness for

research opportunities. Our focus is to optimize our strength research areas in the broader Islamic Studies, Shariah, Law and Languages to inspire the minds for future and shape up the society. Similarly, emergence of the University on the forefronts of science, engineering, management and social sciences, as evident from this report, will be strengthened further to make the real difference.

I am grateful to the whole team of ORIC and BIC to help me shaping this portfolio.

**Prof. Dr. Ahmed Shuja Syed**
*Vice President (Research & Enterprise)*
*December, 2023*

# Director ORIC's Message

As the Director of the IIU Office of Research, Innovation, and Commercialization (ORIC), I am pleased to present this research portfolio report, which provides a comprehensive overview of the vibrant research ecosystem at IIU. ORIC serves as a catalyst for driving research excellence, fostering innovation, and promoting impactful collaborations. Our dedicated team works tirelessly to provide support and guidance to researchers, facilitate industry linkages, manage grants and funding opportunities, and ensure the protection and commercialization of intellectual property. Through a wide range of activities, including seminars, workshops, and interactive sessions, we strive to enhance the research capacity of our faculty and students, contributing to the advancement of knowledge and addressing societal challenges.

This report highlights the remarkable achievements, ongoing projects, and future aspirations of the IIU research community, showcasing our commitment to research-driven excellence and innovation.

With warm regards,

**Prof. Dr. Muhammad Amir**
Director (ORIC), IIU, Islamabad

# IIUI STRATEGIC PLAN (2022-2026) "RESEARCH & COLLABORATIONS"

# Research and Collaborations

**Goal:** To promote research and collaboration which should be translated into entrepreneurship ventures which can create a positive societal impact.

| Sub-priority Areas | Sub-goals | Strategies and Interventions | KPIs |
|---|---|---|---|
| **Research** | 1. To conduct high quality academic and applied research | 1. Will enhance already established research centers.<br>2. Will establish new focused research clusters and networks in market-driven fields.<br>3. Will establish new focused research clusters, thematic groups and networks dedicated to address contemporary problems in the Islamic perspective in order to uplift the Islamic character of the university such as De-radicalization and Tolerance, Inter-faith harmony, discourses and narratives on Islamophobia, Islam and human rights, Islam and democracy, Islam and Science etc.<br>4. Provide research-oriented environment for students & faculty.<br>5. Will enhance the quality of existing IIU Journals and publications<br>6. Will encourage to launch new journals.<br>7. Will encourage the patents filing and creation of IIU intellectual property.<br>8. Will encourage collaboration with international journals and publishers.<br>9. Will encourage faculty and research students to publish quality research in top tier national and international journals | 1. Number of seminars, conferences, publications, funding secured, and qualified faculty inducted in already established research centers per year<br>2. Number of new focused research clusters and networks in market-drivenfields established per year<br>3. Number of new focused research clusters, thematic groups and networksfocused on Islamic perspective established per year<br>4. Number of funded research projects/grants won by the faculty of the university per year<br>5. Amount of funding by the university forResearch through local and external sources per year.<br>6. Number of books, journals and high-quality papers published per year<br>7. Number of patents submitted/filed/accepted per year<br>8. Number of MS students produced peryear<br>9. Number of PhD students produced peryear |
| **Nurturing Entrepreneurship** | 1. To promote entrepreneurship among the faculty and the students | 1. Will resource ORIC, BIC, etc. to plan and arrange activities including business idea competitions and incubating a greater number of entrepreneurs.<br>2. Will introduce 'entrepreneurship' course in all the faculties and will arrange frequent workshops related to entrepreneurship. | 1. Number of business idea competitionsand job fairs conducted per year<br>2. Number of incubates per year<br>3. Number of startups which won fundingper year<br>4. Number of startups which acceleratedand leave the incubation centers per year<br>5. Number of startups which remained sustainable after 1-2 years of their departure from IIU's incubation centerper year |

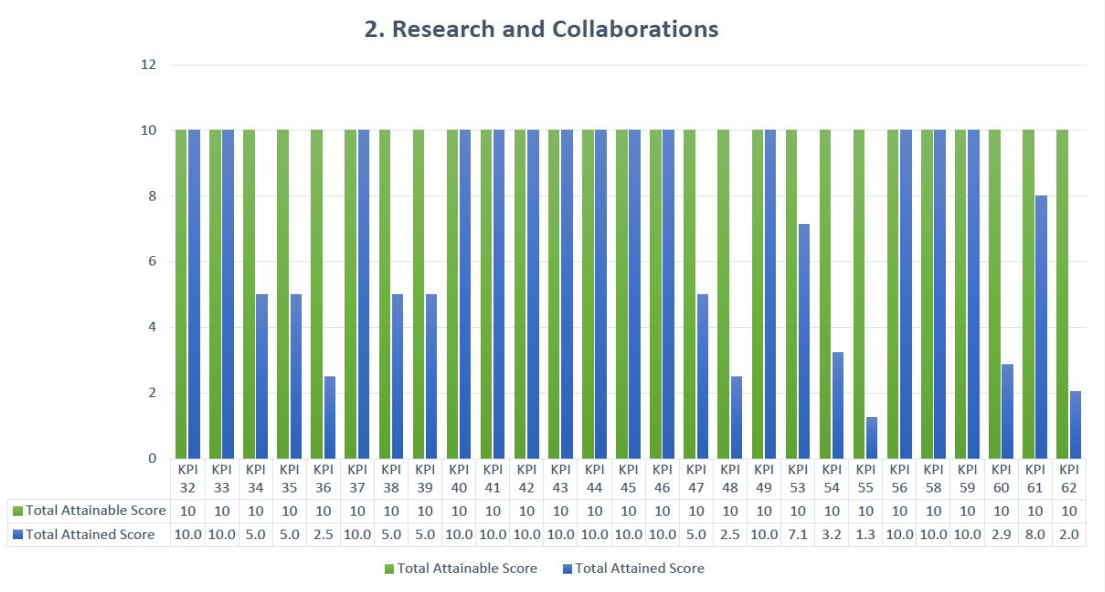
| | | | |
|---|---|---|---|
| **Collaborations** | 1. To enhance collaboration and build ties with the national and international partners and platforms | 1. Will enhance and activate the already established relationship in the form of MoUs etc. with the national and international partners and platforms<br>2. Will identify partners and platforms which can be targeted for active national and international collaborations | 1. Number of active MoUs etc.<br>2. Number of MoUs signed with nationaland international corporate, development and public sector organizations per year.<br>3. Number of students and faculty exchange program executed per year.<br>4. Number of projects/activities initiatedunder MoUs per year<br>5. Number of projects/activities completed under MoUs. |
| | 2. To serve as an extended research arm for public enterprises | 1. Will design and conduct studies for public policy making units of the government | 1. Number of policy level interventions carried out |
| | 3. To serve as national center for exhibitions, conferences, and other academic congregations | 1. Will provide venue for paid educational activities/conferences and exhibitions.<br>2. Will develop opportunities to engage more with the society | 1. Number of conferences, seminars andexhibitions organized per year<br>2. Revenue earned through organizing these conferences, seminars, and exhibitions per year |
| | 4. To contribute in the enhancement of quality of education at college/schools | 1. Will extend helping hands (including in terms of capacity building of the teachers, designing and improvement of the curriculum) to colleges/schools for the improvement of quality of education. | 1. Number of teacher trainings organizedfor colleges/schools per year<br>2. Number of College level teachers admitted in the university to accomplish the MS level qualification in their disciplines per year |
| **Societal Impact** | 1. To raise awareness on social issues | 1. Will provide educational programs to increase awareness on social issues including gender equality, tolerance, interfaith harmony, Islam and Social values, environmental challenges, etc. | 1. Number of programs launched for social awareness per year<br>2. Number of activities conducted on social awareness per year |
| | 2. To make the students responsible citizens and faculty as contributors to the society | 1. Will engage students and the faculty in social projects. | 1. Number of students engaged in social activities<br>2. Number of faculty and staff engaged insocial activities<br>3. Number of joint ventures with social sector organization |

# KPI Mapping Report of Strategic Plan Implementation

International Islamic University, Islamabad
**Strategic Plan Implementation Cell SPIC)**

**IMPLEMENTATION OF IIU STRATEGIC PLAN (2022-26)**
**KPI MAPPING REPORT (1st July 2021- 31st Dec 2022)**

| Target Priority Area | Total Number of Key Performance Indicators (KPIs) | KPIs Addressed (Active) | Total attainment | | |
|---|---|---|---|---|---|
| | | | In 2020-21 | Committed Target for 2022 | Attained in 2022 |
| 1. Growth & Academic Excellence | 31 | 28 | 34.59% | 40% | 43.4% ↑ |
| 2. Research & Collaborations | 31 | 27 | 18.37% | 20% | 62.7% ↑ |
| 3. Financial Sustainability | 15 | 7 | 1.24% | 5% | 16.9% ↑ |
| 4. Improving Quality of Life on the Campus | 9 | 9 | 36.9% | 45% | 47% ↑ |
| 5. Improving Governance & Internal Control Mechanisms | 8 | 4 | 3.13% | 15% | 17.1% ↑ |
| 6. Digitization of the University | 10 | 4 | 10.5% | 20% | 35% ↑ |




| | KPI 32 | KPI 33 | KPI 34 | KPI 35 | KPI 36 | KPI 37 | KPI 38 | KPI 39 | KPI 40 | KPI 41 | KPI 42 | KPI 43 | KPI 44 | KPI 45 | KPI 46 | KPI 47 | KPI 48 | KPI 49 | KPI 53 | KPI 54 | KPI 55 | KPI 56 | KPI 58 | KPI 59 | KPI 60 | KPI 61 | KPI 62 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Attainable Score | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Total Attained Score | 10.0 | 10.0 | 5.0 | 5.0 | 2.5 | 10.0 | 5.0 | 5.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 5.0 | 2.5 | 10.0 | 7.1 | 3.2 | 1.3 | 10.0 | 10.0 | 10.0 | 2.9 | 8.0 | 2.0 |

| Total KPIs | KPIs Addressed | Attained Score | Total Attainable Score | (%) |
|---|---|---|---|---|
| 31 | 27 | 6.27 | 10 | 62.7 |

2

# OFFICE OF RESEARCH, INNOVATION AND COMMERCIALIZATION'S PORTFOLIO

## 2.1. OFFICE OF RESEARCH, INNOVATION AND COMMERCIALIZATION'S INITIATIVES

### Introduction:

The years 2021-2023 has been remarkable for the Office of Research, Innovation, and Commercialization (ORIC) at the International Islamic University (IIU). ORIC has undertaken several significant initiatives aimed at promoting research, innovation, and sustainable development within the institution. Some initiatives are backed by the approval of the Board of Governors (BOG) while some are approved by the President IIUI and academic council. These initiatives demonstrate a strong commitment to enhancing the research ecosystem, fostering collaboration with industry, and addressing pressing environmental challenges. This portfolio report highlights the key initiatives undertaken by IIU ORIC in 2021- 2023, showcasing the institution's dedication to excellence in research and its contribution to society.

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| **Initiative 1: IIU Consultancy Policy (BOG, 18 September 2023)**<br>The IIU Consultancy Policy aims to establish a framework for engaging academic experts in consultancy services. This policy not only facilitates knowledge transfer to industry and government sectors but also promotes collaboration between academia and the wider community. By providing guidelines for consultancy projects, the policy ensures the integrity of research activities while maximizing the impact of IIU's intellectual capital. |  |
|  | **Initiative 2: SOP for IIU Consultants (President, IIUI, 07 July 2023)**<br><br>The Standard Operating Procedure (SOP) for IIU Consultants outlines the guidelines and procedures to be followed by consultants engaged by IIU. This SOP ensures transparency, professionalism, and adherence to ethical standards in the consultancy process. It emphasizes the importance of maintaining confidentiality, ensuring quality deliverables, and upholding the reputation of IIU and its consultants. |

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| **Initiative 3: SOPs for Commercial Testing at IIUI (President, IIUI, 21 November 2023)**<br>The development of SOPs for Commercial Testing at IIUI aims to streamline and regulate commercial testing services provided by the university. These SOPs ensure that testing procedures are conducted accurately, efficiently, and in compliance with national and international standards. By offering reliable and accredited testing facilities, IIUI strengthens its position as a trusted partner for industry and research organizations. |  |
|  | **Initiative 4: IIU Research Policy (BOG, 18 September 2023)**<br>The IIU Research Policy sets the strategic direction for research activities at IIU. It outlines the institutional framework, funding mechanisms, and ethical guidelines for conducting research. This policy encourages interdisciplinary collaboration, promotes research excellence, and fosters an environment conducive to innovation, discovery, and societal impact. |
| **Initiative 5: IIU IP Policy (BOG, 18 September 2023)**<br>The IIU Intellectual Property (IP) Policy aims to safeguard and promote the intellectual property rights of researchers and innovators at IIU. This policy facilitates the protection, management, and commercialization of intellectual property generated through research and innovation activities. It encourages researchers to pursue commercialization opportunities and supports the transfer of knowledge and technology to the market. |  |
|  | **Initiative 6: IIU Research Journal's Policy (BOG, 18 September 2023)**<br>The IIU Research Journal's Policy aims to enhance the quality and visibility of research publications at IIU. This policy sets guidelines for the publication process, including manuscript submission, peer review, and editorial standards. By promoting a culture of scholarly publishing, IIU encourages researchers to disseminate their work and contribute to the advancement of knowledge in their respective fields. |

**Initiative 7: IIU Travel Grant Policy (President, IIUI, 11 March 2022)**

The IIU Travel Grant Policy provides financial support to researchers and scholars for presenting their research findings at national and international conferences. This policy recognizes the importance of academic networking, knowledge exchange, and exposure to diverse intellectual perspectives. By facilitating participation in conferences, IIU promotes the dissemination of research outcomes and fosters collaboration with experts from around the world.


**Initiative 8: SOPs to Organize Academic Events (President, IIUI, 12 December 2022)**

The development of Standard Operating Procedures (SOPs) to organize academic events ensures the efficient and effective management of conferences, seminars, workshops, and other scholarly gatherings at IIU. These SOPs provide guidance on event planning, coordination, budgeting, and participant engagement. By organizing high-quality academic events, IIU promotes intellectual discourse, interdisciplinary collaboration, and knowledge sharing among researchers and scholars.

**Initiative 9: TORs for the IIU Annual University Awards (President, IIUI, 21 September 2023)**

The IIU Annual University Awards consist of the IIU Best University Teacher Award, IIU Best University Researcher Award, and IIU Best Teaching Program Award. The Terms of Reference (TORs) for these awards outline the criteria, eligibility, and selection process. A call for application submissions has been announced for the year 2023, and faculty members and teaching programs are invited to submit their applications based on the specified criteria. The TORs ensure a fair and transparent selection process, with clear guidelines on nomination, evaluation, and the composition of selection committees. These awards recognize and motivate outstanding achievements, fostering a culture of academic excellence and contributing to IIU's growth and reputation.

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|  | **Initiative 10: IIU Environmental Policy (President, IIUI, 21 November 2023)**<br>The IIU Environmental Policy reflects the institution's commitment to environmental sustainability and responsible stewardship. This policy outlines measures to conserve natural resources, reduce carbon emissions, and promote eco-friendly practices across the campus. By integrating sustainability into its operations, IIU strives to create a greener and more environmentally conscious academic environment. |
| **Initiative 11: IIU Renewable Energy Usage Policy (President, IIUI, 21 November 2023)**<br>The IIU Renewable Energy Usage Policy aims to promote the adoption of renewable energy sources and reduce the institution's carbon footprint. This policy outlines strategies for incorporating renewable energy technologies such as solar and wind power into the campus infrastructure. By embracing sustainable energy practices, IIU not only contributes to mitigating climate change but also sets an example for the wider community. |  |
|  | **Initiative 12: IIU Waste Reduction Policy (President, IIUI, 21 November 2023)**<br>The IIU Waste Reduction Policy focuses on minimizing waste generation, promoting recycling, and implementing effective waste management practices. This policy encourages the adoption of sustainable waste disposal methods and raises awareness among the IIU community about the importance of waste reduction and recycling. Through responsible waste management, IIU strives to create a cleaner and healthier environment |
| **Initiative 13: IIU Sustainable Procurement Policy (President, IIUI, 21 November 2023)**<br>The IIU Sustainable Procurement Policy emphasizes the procurement of goods and services that are environmentally friendly, socially responsible, and economically sustainable. This policy encourages the consideration of factors such as ethical sourcing, energy efficiency, and lifecycle assessments in the procurement process. By incorporating sustainability criteria into procurement decisions, IIU promotes responsible consumption and supports sustainable business practices. |  |

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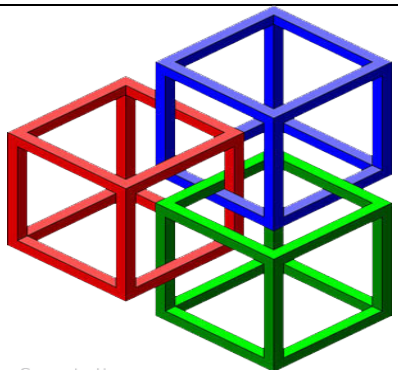
|  | **Initiative 14: IIU Ethical Standard Policy & Framework (President, IIUI, 21 November 2023)**<br>The IIU Ethical Standard Policy & Framework provides guidelines for ethical conduct in research, ensuring the integrity and credibility of research activities. This policy outlines principles and standards for research ethics, including informed consent, data privacy, and responsible publication practices. By upholding ethical standards, IIU fosters trust, promotes responsible research practices, and protects the rights and welfare of research participants. |
| **Initiative 15: IIU Climate Action Plan (President, IIUI, 21 November 2023)**<br>The IIU Climate Action Plan lays out the institution's strategy and commitments to address climate change and its impacts. This plan includes initiatives such as energy conservation, carbon footprint reduction, and climate resilience measures. By integrating climate action into its operations, IIU demonstrates its dedication to environmental stewardship and contributes to global efforts to combat climate change. |  |
|  | **Initiative 16: Books & Manuscripts Writing and Publication Framework (Academic Council, 13 September 2023)**<br>The Books & Manuscripts Writing and Publication Framework provides support and guidance to researchers and scholars at IIU in the process of writing and publishing books and manuscripts. This framework outlines best practices for manuscript preparation, editing, and submission to publishers. By encouraging and facilitating book and manuscript publications, IIU promotes scholarly contributions and knowledge dissemination in various academic disciplines |
| **Initiative 17: IIU SoPs for Research Grant Management System (President, IIUI, 2023)**<br>The development of Standard Operating Procedures (SoPs) for the Research Grant Management System ensures transparency, accountability, and efficiency in managing research grants at IIU. These SoPs define the processes and guidelines for grant application, evaluation, funding allocation, and project monitoring. By establishing a robust grant management system, IIU facilitates the administration and execution of research projects, enhancing the overall research ecosystem. |  |

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|  | **Initiative 18: Research Seed Grant Policy (President, IIUI)**<br>Following the approval of the Research Seed Grant Policy, IIUI announced its first call for seed grants, which received 17 applications. After a rigorous review process conducted by the committee, three projects were recommended for funding, collectively amounting to RS 840,000. The Research Seed Grant Policy aims to foster research excellence and innovation by providing financial support to researchers for initiating new research projects. These awarded projects represent promising avenues of research and highlight IIUI's commitment to supporting and promoting impactful research endeavors within its academic community. |
| **Initiative 19: Research Honorarium for the year 2017 onward**<br>Under the Initiative 19, the Research Honorarium has been established to recognize and reward the research publications of IIU faculty members from the years 2017 onward. This initiative is facilitated by ORIC, which processes the research publications in three categories for the honorarium. Following the recommendation of the Vice President (H&R) and the subsequent approval by the President of IIU, funding has been allocated for this purpose. The process is currently in its final stages, and in the near future, the honorarium will be disbursed to deserving faculty members as a token of appreciation for their valuable research contributions during the specified period. |  |
|  | **Initiative 20: ORIC Score Card Alignment with the Faculties Departments**<br>The alignment of the ORIC Score Card with the faculties and departments at IIU aims to establish a comprehensive and standardized evaluation system for research performance. This initiative ensures that research activities across various disciplines are assessed using consistent criteria and metrics. By aligning the score card with faculties and departments, IIU promotes fair evaluation, benchmarking, and continuous improvement in research quality and productivity. |

**Initiative 21: IIU ORIC Forum**

Under Initiative 21, the IIU ORIC Forum has been initiated by the Vice President (R&E) with the aim of providing a range of activities throughout the year. This dedicated forum serves as a platform for various engaging events, including seminars, workshops, interactive sessions, and panel discussions. These activities cover a wide array of themes and topics, focusing on areas such as proposal writing, grant management, intellectual property (IP) and patent filing, research consultancy, technology development, commercialization, and linkages. By actively participating in the ORIC Forum's activities, both IIU faculty and students stand to gain significant benefits. They can enhance their knowledge, skills, and understanding in these key areas, fostering a culture of research excellence, innovation, and collaboration within the IIU community. A number of activities has been conducted through this forum including Funding your Research: A Workshop on Writing Winning Proposals, Workshop on Intellectual Property and Patents from idea to award and Book publications: opportunities and requirements from the authors.

**Initiative 22: Initiative to Collect Data for Projects and Ideas to be Commercialized and Matchmaking with the Relevant Industry**

This initiative focuses on gathering data on research projects and innovative ideas with the potential for commercialization. By collecting and analyzing this data, IIU ORIC aims to identify opportunities for collaboration with industry partners. This initiative facilitates matchmaking between researchers and relevant industries, promoting knowledge transfer, technology commercialization, and entrepreneurship.

**Initiative 23: Completion and Closure of Long Pending Projects with HEC**

IIU ORIC has prioritized the completion and closure of long-pending projects in collaboration with the Higher Education Commission (HEC). This initiative aims to ensure the successful completion and finalization of research projects that have been in progress for an extended period. By addressing these pending projects, IIU ORIC enhances its research portfolio and strengthens its partnerships with funding agencies.

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|  | **Initiative 24: Initiation to Revamp the IIU ORIC Research Database**<br>The revamping of the IIU ORIC research database involves updating and enhancing the existing database infrastructure to streamline and optimize research data management. This initiative aims to improve data accessibility, searchability, and organization, enabling researchers to efficiently navigate and utilize research resources. By revamping the research database, IIU ORIC promotes data-driven research and facilitates collaboration among researchers. |
| **Initiative 25: Acknowledgment of Research Project Winners through Certificates**<br><br>The IIU ORIC initiated a commendable practice of acknowledging the significant contributions of IIU researchers through certificates of appreciation, as recommended by the Vice President (R&E). Starting from 2017 to 2022, the President of IIU awarded certificates of appreciation in a dedicated ceremony to faculty members who achieved research project victories during this period. These certificates serve as a tangible symbol of recognition for the hard work, dedication, and expertise demonstrated by the faculty members in their research endeavors. By acknowledging the achievements of the project winners, IIU emphasizes its commitment to promoting and appreciating research excellence, fostering a culture of innovation and academic distinction within the institution. |  |

These initiatives represent the diverse and comprehensive efforts undertaken by IIU ORIC to foster research excellence, innovation, and collaboration. Through these initiatives, IIU establishes itself as a hub of knowledge creation, dissemination, and societal impact, contributing to the growth and development of the academic community and beyond.

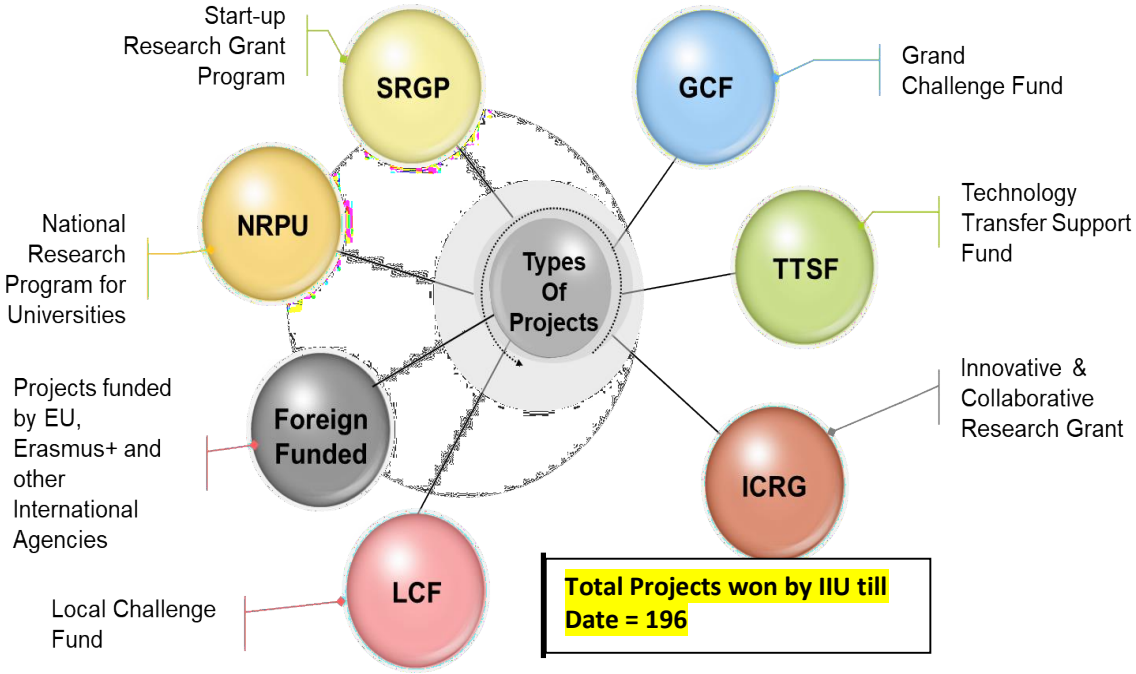



*Fig: 2.1. Types of Projects Undertaken Through ORIC-IIUI*

## 2.2 Detail of Approved and Projected Research ActivitiesResearch Project Grants

### Approved (2020, to2023)

| S. No. | Program Name | No. of Projects (2020-23) | Total Amount (PKR Million) |
|---|---|---|---|
| 1 | Competition to develop low-cost waste recycling machine (PSF) | 1 | 0.6 |
| 2 | Competitive Research Grant Program (PSF) | 1 | 7.91 |
| 3 | Enabling Grants (COVID-19) | 7 | 0.91 |
| 4 | Grand Challenge Fund (GCF) | 1 | 7.5 |
| 5 | Innovative and Collaborative Research Grant (ICRG) | 1 | 99.67 |
| 6 | International | 3 | 23.59 |
| 7 | Local Challenge Fund | 1 | 29.02 |
| 8 | National Centre of GIS and Space Application (NCGSA) - HEC | 1 | 11 |
| 9 | NESCOM | 2 | 0.22 |
| 10 | National Health Challenge Grants (NHCG) | 2 | 6.7 |
| 11 | National Research Program for Universities (NRPU) | 16 | 69.47 |
| 12 | Pak-US | 1 | 15.463 |
| 13 | PSF (Survey) | 1 | 0.2 |
| 14 | PSF-COVID-19 Grants | 1 | 16.89 |
| 15 | Startup Research Grant Program | 6 | 4.18 |
| Total | | 45 | 293.323 |

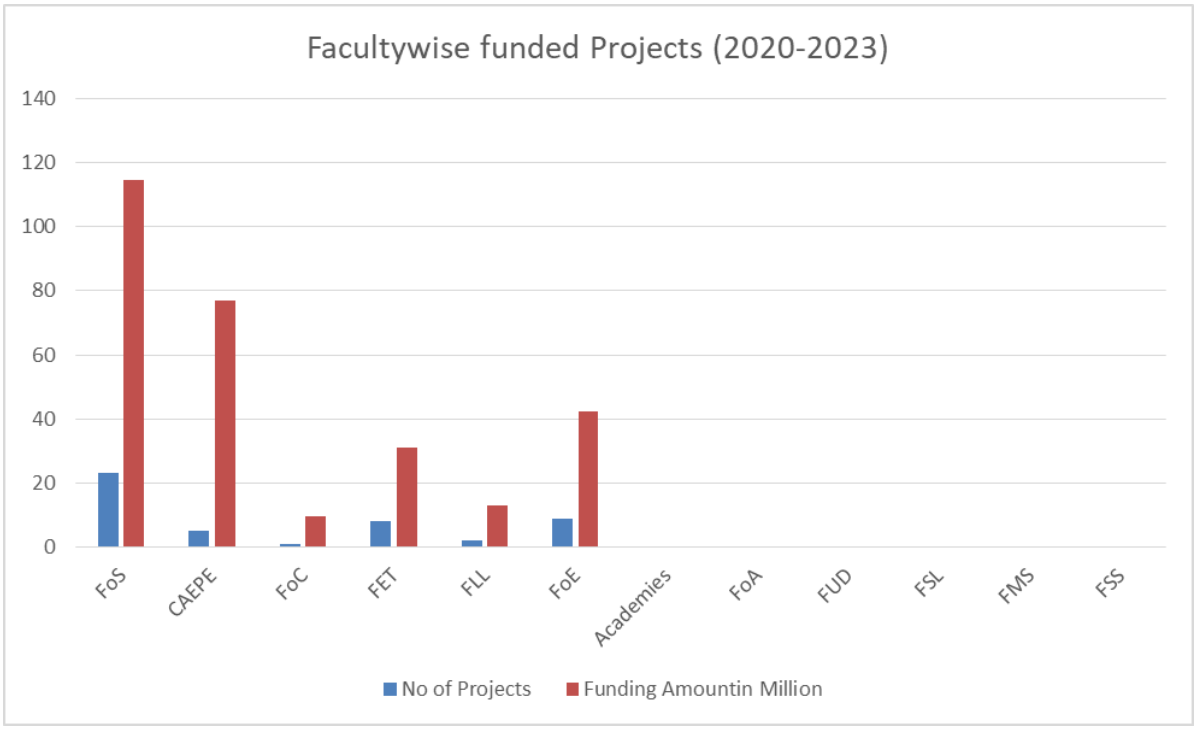
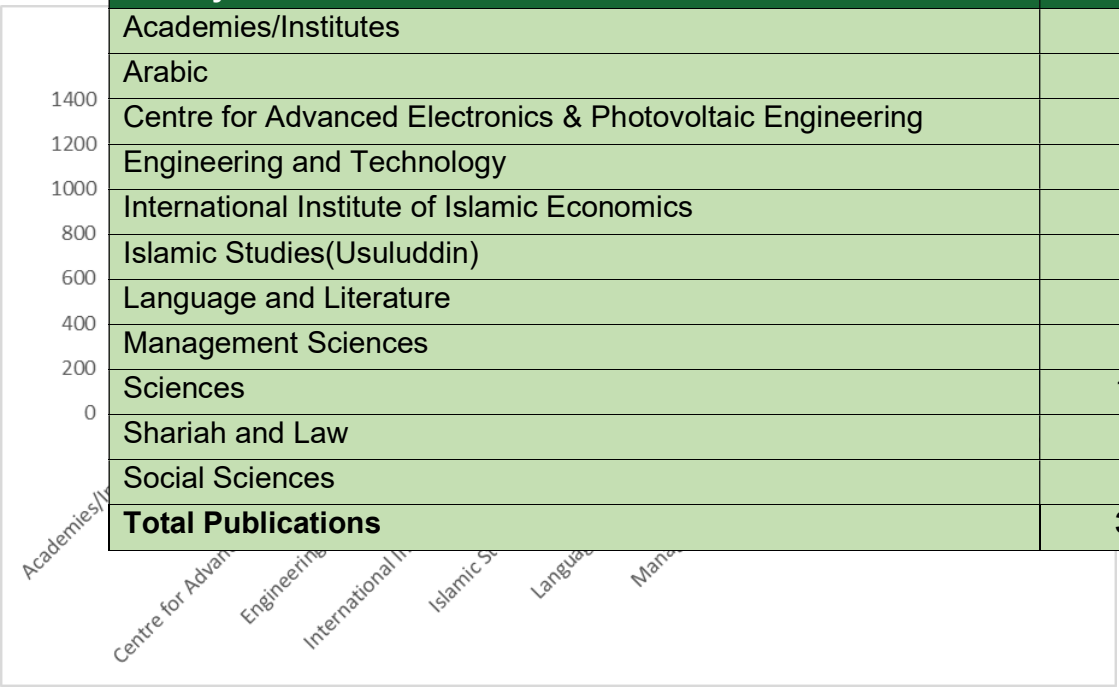



***Fig: 2.2: Total Number of Projects won and their Budget Amount in Million Rs.***

## 2.3 Number of Publications

### Published (July 01, 2020 to May 31, 2023)




| Faculty Name | 2020-2023 |
|---|---|
| Academies/Institutes | 105 |
| Arabic | 140 |
| Centre for Advanced Electronics & Photovoltaic Engineering | 81 |
| Engineering and Technology | 295 |
| International Institute of Islamic Economics | 187 |
| Islamic Studies(Usuluddin) | 212 |
| Language and Literature | 202 |
| Management Sciences | 197 |
| Sciences | 1325 |
| Shariah and Law | 193 |
| Social Sciences | 601 |
| **Total Publications** | **3538** |

*Fig: 2.3: Number of Publications*

## 2.4 Research Income in Million PKR (July 2020- May 31, 2023)

| | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|
| Department of English (FLL) | - | 5,451,689.00 | 1402122 | 457793.7 |
| Department of Literature (FA) | 136,847.00 | - | - | - |
| Department of Translation & Interpretation (FA) | 417,060.00 | - | 127408 | - |
| Department of Comparative Religions (FUI) | - | 422,900.00 | 163928 | - |
| Department of Dawah and Islamic Culture (FUI) | 728,507.00 | | - | - |
| Department of Mechanical Engineering (FET) | - | 100,000.00 | - | 7275840 |
| Department of Electrical Engineering (FET) | - | 481,098.00 | 2595780 | |
| Department of Civil (FET) | - | - | 4400000 | 5019340 |
| Centre for Advanced Electronics & Photovoltaic Engineering (CAEPE) | 14,581,417.00 | 10,013,659.00 | 7840266 | 14825932 |
| Department of Computer Science & Software Engineering (FoS) | 9,468,354.00 | - | 4623864.26 | - |
| Department of Mathematics & Statistics (FBAS) | 1,956,130.00 | 1,204,597.00 | 1089268 | 7182621 |
| Department of Physics (FBAS) | 134,627.00 | 9,634,568.00 | - | - |
| Chemistry (CIRBS-FBAS) | - | 920,000.00 | 1206470 | - |
| Department of Environmental Sciences (FBAS) | 396,042.00 | 2,367,275.00 | 720001 | - |
| Environmental Sciences (CIRBS-FBAS) | - | 60,000.00 | 1460500 | - |
| Biology (CIRBS-FBAS) | 1,233,820.00 | 24,070.00 | - | - |
| Department of Biological Sciences (FBAS) | 7,587,501.00 | 4,558,696.00 | 24330833.25 | 30247814 |
| Department of Business Administration (FMS) | 1,186,523.00 | - | 263970 | - |
| International Institution of Islamic Economics (IIIE) | - | 978,076.00 | 257155 | - |
| Department of Psychology (FSS) | 1,270,789.00 | - | 2,145,332.00 | - |
| Department of Education (FSS) | 1,966,200.00 | 950,520.00 | 22,328,903.00 | 8,618,853.00 |
| Dawah Academy | 683,370.00 | - | 199,370.00 | - |
| Politics and International Relations | - | - | - | 9,071,200.00 |
| **Grand Total** | **41,747,187.00** | **37,167,148.00** | **75,155,170.51** | **73,628,193.70** |
| **Total (2020-23)** | **227,697,699** | | | |

## 2.5. Patents (Filed)

| Sr # | Patent Application # | Inventors Name | Title |
|---|---|---|---|
| 1 | 437/2021 | Dr. Imran Murtaza<br>Dr. Ahmed Shuja SyedDr. Hong Meng | Methods of producing novel thiophene-2,5-diester super capacitive electrochromic materials for energy storage applications |
| 2 | 563/2021 | Dr. Ahmed Shuja SyedDr. Imran Murtaza<br>Dr. Hong Meng | Novel thienothiophene polymer and its synthesis method for the electrochromic and flexible supercapacitors applications |
| 3 | 846/2021 | Hafeez ur Rehman<br>Dr. Ahmed Shuja SyedEngr. Muhammad Ali | A novel method for the performance evaluation of stretchable and foldable supercapacitor for energy storage application |
| 4 | 845/2021 | Dr. Ahmed Shuja SyedEngr. Muhammad Ali | An electrical isolation induced novel method for the fabrication of GaAs and InPbased photo detectors |
| 5. | 2022 | Dr. Ahmed Shuja SyedEngr. Syed Hasan Murtaza<br>Engr. Abdul Saboor Engr. Muhammad Ali | A Method to Sense the Low Energy Photons from Aluminum Nitride (AlN) Wide Bandgap Semiconductor for Photo-detection Applications |
| 6. | 437/2021 | Dr. Imran Shabbir | Device for handling successive operationsin a chemical or biological analysis |
| 7. | 2023 | Dr. Muhammad Imran Shabbir | Wire Activated Capillary Valve Pouch Assembly for Fluid Storage and Processing |

Seed Grant proposal Evaluation Committee Meeting October 2023


Workshop on Writing winning proposals march 2023


3
STATISTICAL
OVERVIEW

## Project's Action Phase:

1. **Approved Projects:**

   Projects approved recently during the period2021-2023

2. **Completed Projects:**

   Projects Approved before the reporting period butcompleted between 2021-2023

3. **Ongoing Projects:**

   Projects approved before the reporting period and still in progress

# 3.1 Approved Research Projects (2021-23)

| S. No. | Principal Investigator | Co-Principal Investigator / Co-Grantee | Department | Faculty | Title of Project | Level of Project | Theme /Category | Fundi ng Million . (Rs) | Program | Funding Agency | Date of Approval |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Dr. Ambreen Afsar Khan | | Mathematic sand Statistics | FBAS | Heat transfer impact on compressible fluid in microchannel with Peristalsis | National | Sustainable Energy | 0.83 | NRPU | HEC | 13/01/ 2021 |
| 2. | Dr. Hafizah Fizzah Riaz | Dr. Asma Gul | Biological Sciences | FBAS | A genetic epidemiological studyof neurological disorders (NDs) and their subtypes in Pakistan | National | Health and Wellbeing | 0.99 | SRGP | HEC | 13/03/ 2021 |
| 3. | Dr. Basharat Ali | Dr. Muhammad Riaz | CIRBS | FBAS | Synthesis, Characterization and Evaluation of 1,3-Thiazole Derivativesas Antimicrobial and Bioactive Agents | National | Biotechnology, Food, Nutrition, & Human Capital | 1 | SRGP | HEC | 15/03/ 2021 |
| 4. | Dr. Fauzia Ajmal | Dr. Nabi Bux Jumani | Education | FSS | Quality Assurance for online teaching in Higher Education in Pakistan | National | Social Issues: Sociology, Education & Philosophy | 3.07 | NRPU | HEC | 24/01/ 2022 |
| 5. | Dr. Gul Hassan | r. AhmedShuja | CAEPE | CAEPE | Towards Wearable Electronic World: Smart self-healing Flexible and Ultra- Stretchable Strains Sensors | National | Emerging Science & Engineering | 9.5 | NRPU | HEC | 11/3/2 022 |
| 6. | Dr. Imran Murtaza | Dr. AhmadShuja Syed* | CAEPE & Physics | CAEPE & FBAS | investigation in Advance Energy Harvesters and Energy Storage Devices for Self-powered Flexible Systems (FlexEnergy's) | National | Sustainable Energy | 99.68 | ICRG | Pak-Uk Gateway (HEC-British Council) | 26/02/ 2021 |
| 7. | Dr. Madeeha Chaudhry | Dr. Asma Gul | Biological Sciences | FBAS | Fluorescence Immunoassay for detection of dopamine levels inpsychological disorder | National | Health & Well Being | 0.99 | SRGP | HEC | 23/02/ 2021 |
| 8. | Dr. Maha Zafar | - | Environmen talSciences | FBAS | Air Sampling and characterization of Air Pollution particulate (PM10 and PM2.5 Major Concern is 16 priority polycyclic aromatic Hydrocarbons) is Faisalabad, Lahore Sialkot, andRawalpindi" | National | Water Management, Climate Change & Environment | 0.2 | PSF | PSF | 10/2/2 021 |
| 9. | Dr. Maliha Asma | Yifu Don | Environmen talSciences | FBAS | Fabrication of MOFs/POMs composites as efficient adsorbents for Selected GaseousPollutants | National | Water Management, Climate Change & Environment | 2.92 | NRPU | HEC | 29/11/ 2021 |
| 10. | Dr. Mamoona Ismail Loona | Dr. AnilaKamal | Psychology | FSS | Development of Parent focused Child Sexual abuse prevention program: its applicabilityin the context of Pakistani Society and Law | National | Social Issues: Sociology, Education & Philosophy | 2.45 | NRPU | HEC | 25/01/ 2022 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 11. | Dr. Mamoona Munir | Syed Ali Imran Bukhari | Biological Sciences | FBAS | Sustainable Production of Biodiesel from Non-Edible Feedstock Using Green Nano-Technology | National | Biotechnology, Food, Nutrition, & Human Capital | 1 | SRGP | HEC | 20/06/2021 |
| 12. | Dr. Maryam Abbasi | Dr. ukhshandaAziz | EnvironmentalSciences | FBAS00 | Photocatalytic activityof Metal doped Zinc oxide/Graphene oxide nanocomposites for the degradation of environmental pollutants | National | Water Management, Climate Change & Environment | 1 | SRGP | HEC | 15/03/2021 |
| 13. | Dr. Muhammad Mohsin Khan | Sharjeel Abid Butt | EE | FET | Automated detectionof acute ischemic infarct on Code Stroke Head CT using deep Neural Networks | National | Information Technology and Telecom | 4.32 | NRPU | HEC | 29/11/2021 |
| 14. | Dr. Nayyar Mehmood | Niaz Ahmad | Mathematic sand Statistics | FBAS | Some Variants of Krasnoselskiis and Schauders fixed point results with applications in fractional differential equations | National | Emerging Science & Engineering | 1.41 | NRPU | HEC | 6/12/2021 |
| 15. | Dr. Saeed Badshah | Dr. Amir Badshah | Mechanical Engineering | FET | Fast Training of SOM (Self Organization Map) in Frequency Domain | National | Emerging Science & Engineering | 0.12 | NESCOM | NESCOM | 6/4/2021 |
| 16. | Javed Ahmed Khan | - | Mechanical Engineering | FET | Inter-University Competition to Develop low-cost plastic waste recycling machine | National | Emerging Science & Engineering | 0.6 | Developin glow-cost waste recycling machine | PSF | 26/10/2021 |
| 17. | Dr. Khan Zaib Jadoon | Dr. Jawad Ali Shah & Dr. Nadeem AhmedSheikh | Civil Engineering | FET | Development and Implementation of smart and resource efficient Irrigation System by Assessment of Water-Food Energy Nexus | National | Water Management, Climate Change & Environment | 9.89 | NRPU | HEC | 16/12/2021 |
| 18. | Dr. Khan Zaib Jadoon | Dr. Jawad Ali Shah and Khalil AhmedPalh | Civil Engineering | FET | Development of Smart Groundwater Monitoring System to Calibrate and Validate GRACE Data for Real-Time Assessment of Groundwater Storage Depletion | National | Water Management, Climate Change & Environment | 11 | NCGS-IST | NCGSA-IST (HEC) | 28/01/2022 |
| 19. | Dr. Rashid Farooq | Dr. Amjad Masood | Civil Engineering | FET | Flash Floods Harnessing for the Prosperity of Arid and Resources-stressed Neglected Agro- based Communities (Pro NAC) | National | Water Management, Climate Change & Environment | 4.69 | NRPU | HEC | 5/4/2022 |
| 20. | Dr. Muhammad Arshad Zia | Dr. Muhammad Nazam | Mathematic sand Statistics | FBAS | Fixed Point Based Machine Learning Optimization Algorithms and Real-World Applications | National | Emerging Science & Engineering | 5.2 | NRPU | HEC | 20/03/2022 |
| 21. | Dr. Samina Malik | Dr. Asma Mansoor andDr. Ishrat Siddiqa Lodhi | Education | FSS | Shattering the Glass Ceiling: Challenges and Opportunities for Women Academic Leaders in Pakistani Universities | National | Social Issues: Sociology, Education & Philosophy | 29.02 | LCF | HEC | 19/05/2022 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 22. | Dr. Asif Mir | Nil | Biological Sciences | FBAS | ACE2 Polymorphism Association Studies with COVID-19 | National | Health & Wellbeing | 1.70 | HRI Grants | NIH | 16/04/2022 |
| 23. | Dr. Ahmer Mehmood | Nil | Mathematics and Statistics | FoS | Generalization of the Smith and Spalding Integral Method to Boundary Layer Flows with Zero Pressure-Gradient | National | | 4.09 | NRPU | HEC | 12/06/2022 |
| 24. | Dr. Bashir Ahmad | Nil | Biological Sciences | FoS | Development, Characterization and Commercialization of the Biogenic Mosquito Repellent Oil (MRO) and Mosquito Repellent Balm (MRB) | National | Health & Wellbeing | 5.00 | HRI Grants | NHI | 19/07/2023 |
| 25. | Dr. Habib Ahmed | Nil | Centre for Advanced Electronics & Photovoltaic Engineering | CAEPE | US-Funded workshops for exposure of high school students to nanotechnology for sustainable energy in Pakistan | International | | 1 | US-Funded workshops for exposure of high school students to nanotechnology for sustainable energy in Pakistan | U.S Mission and Pakistan-U.S alumni network (PUAN) | 08/05/2023 |
| 26. | Dr. Muhammad Imran Shabbir | Nill | Biological Sciences | FoS | Development of Semiconductor Proton sensing based DNA Sequencing Method and device as an economical alternative to sanger sequencing | National | | 3.37 | NRPU | HEC | 07/07/2022 |
| 27. | Dr. Shameen Alam | Dr. Javid Shabbir | Mathematics and Statistics | FoS | Estimation of mean salary of employees working in national universities of Islamabad by using calibration technique | National | | 1.2 | NRPU | HEC | 15/06/2022 |
| 28. | Prof. Dr. Nabi Bux Jumani | Nil | Education | FSS | Optimum use of Existing Resources: A prototype model of road safety | National | | 7.5 | GCF | HEC | 23/03/2022 |
| 29. | Dr. Khadija Maqbool | Nil | Mathematics and Statistics | FoS | Thermal and concentration analysis of two-phase flow through ciliated surfaces | National | | 0.60 | NRPU | HEC | 20/04/2022 |

## 3.2 Completed Research Projects (2021-23)

| Sr.No | Principal Investigator | Co-Principal Investigator | Department | Faculty | Title of Project | Level of Project | Theme /Category | Funding Million. (Rs) | Program | Funding Agency | Date of Completion |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Dr Ahmed Shuja Syed | - | CAEPE | CAEPE | Advanced Photovoltaic Energy Engineering | International | Sustainable Energy | 60 | Technical Assistance Grant | IDB, KSA | 31/12/2021 |
| 2 | Dr. Bashir Ahmad | Dr. Elizabeth A. Hall | Bioinformatics and Biotechnology | FBAS | Studies on development, formulation, and commercialization of alkaline phosphatase inhibition-based | National | Biotechnology, Food, Nutrition,& Human Capital | 4.4 | NRPU | Higher Education Commission | 26/11/2021 |
| 3 | Dr. Jawad AliShah | Dr. Adnan Umar khan | Electronic Engineering | FET | Implementation of Recovery Techniques for Compressively Sampled Biomedical Images Using Graphical Pr | National | Emerging Science & Engineering | 6.407 | NRPU | Higher Education Commission | 25/11/2021 |
| 4 | Dr. Muhammad Arshad | Dr. Akbar Azam | Mathematics and Statistics | FBAS | Existence of fixed-point solutions of locally and globally mapping satisfying generalized contractive Conditions | National | Emerging Science & Engineering | 1.357 | NRPU | Higher Education Commission | 7/5/2021 |
| 5 | Dr. Shamaila Sajjad | Dr. Sajjad Ahmed Khan Leghari | Physics | FBAS | Development of low-cost routes for Modifications of Efficient Utilization in Photochemical Catalytic | National | Sustainable Energy | 11.799 | NRPU | Higher Education Commission | 22/09/2021 |
| 6 | Dr. Muhammad Irfan Khan | Dr. Zafeer Saqib | Environmental Sciences | FBAS | Improving Urban Environmental Performance using industrial ecological framework | National | Water Management, Climate Change & Environment | 1.708 | NRPU | Higher Education Commission | 24/03/2021 |
| 7 | Dr. M. Ibrar Shinwari | Dr. Shazia Irum | Environmental Sciences | FBAS | Assessment of Allelochemical Potential In Medicinal Plants of Pakistan and Application to Agro-Envir | National | Water Management, Climate Change & Environment | 2.78 | NRPU | Higher Education Commission | 8/9/2021 |
| 8 | Dr. Saif-ur-Rehman SaifAbbasi | Mr. Qaisar Khalid Mahmood | Sociology | FSS | Effects of Parenting Practices on youth Risk Behavior in the Punjab | National | Social Issues: Sociology, Education & Philosophy | 4 | TRGP | Higher Education Commission | 22/02/2021 |
| 9 | Dr Muhammad Akbar | Dr. Ishfaq Ahmad | Mathematics and Statistics | FBAS | Bayesian Analysis of Money Demand Function of Pakistan Economy | National | Development Economics, Innovative Governance & Reforms & Policy Interventions | 0.92 | NRPU | Higher Education Commission | 26/04/2021 |
| 10 | Dr. Muhammad Amir | Dr. Jawad AliShah | Electronic Engineering | FET | Sparsity Based Reconstruction of Medical Images | National | Emerging Science & Engineering | 7.22 | NRPU | Higher Education Commission | 9/2/2021 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | Dr. Naseem Razi | - | Shariah | FSL | Role of the constitution 1973 in Good and Human Development (A Critical Analysis in thelight of the Socio-Political and Religious Culture of Pakistan | National | **Development Economics, Innovative Governance & Reforms & Policy Interventions** | 4 | TRGP | Higher Education Commission | 3/8/ 2021 |
| 12 | Dr. Muhammd Sajid | Dr. Nasir Ali | Mathematics and Statistics | FBAS | Development and Simulations of Mathematical Models for Unsteady Pulsatile Flow of Blood in stenotica | National | **Emerging Science & Engineering** | 1.06 | NRPU | Higher Education Commission | 7/6/ 2021 |
| 13 | Dr. Ishfaq Ahmad | Dr. MuhammadAkbar | Mathematics and Statistics | FBAS | Artificial Neural Networks Modeling for Hydrological Data in Pakistan | National | **Emerging Science & Engineering** | 0.77 | NRPU | Higher Education Commission | 16/03/ 2021 |
| 14 | Dr. Shair Ali Khan | Dr. Nargis Nazir | Translation and Interpretation | Arabic | Towards Developing Parameters for Urdu Quran translation | National | **Islamic Studies** | 1.16 | NRPU | Higher Education Commission | 5/5/ 2021 |
| 15 | Dr. Asma Gul | Dr. Javed Iqbal Saggu | Bioinformatics and Biotechnology | FBAS | Evaluation of Cytotoxicity and Genotoxicity of Metal and their oxides nanostructures | National | **Health & Wellbeing** | 6.42 | NRPU | Higher Education Commission | 04/01/ 2022 |
| 16 | Dr. Ahmed Shuja Syed | Dr. Hong Meng & Dr.Imran Murtaza | CAEPE | CAEPE | Development of stretchable polymer based super capacitor for energy storage system | National | **Sustainable Energy** | 48.5 | PSF | Pakistan Science Foundation | 30/06/ 2021 |
| 17 | Dr. Asif Mir | - | Bioinformatics and Biotechnology | FBAS | Elucidating the Molecular Genetic basis of Intellectual Disability (ID) | National | **Health & Wellbeing** | 4.85 | NRPU | Higher Education Commission | 04/02/ 2021 |
| 18 | Dr. Asma Rashid | Dr. Rukhsana Tariq | Environmental Sciences | FBAS | Response of Selected Grass Species towards Plant Growth Promoting Bacteria (PGPRS) Isolated from Textile Wastewater | National | **Water Management, Climate Change & Environment** | 0.39 | SRGP | Higher Education Commission | 12/3/ 2021 |
| 19 | Dr. Syed Zulfiqar Ali Shah | Dr. Mazhar Hussain Chaudhry | Management | FMS | Drivers of SMEs Internationalization. AComparative Study of Chinese and Pakistan Entrepreneurs; CEPEC Perspective | National | **Development Economics, Innovative Governance & Reforms & Policy Interventions** | 2.86 | NRPU | Higher Education Commission | 23/02/ 2022 |
| 20 | Dr. Ambreen Afsar Khan | - | Mathematics and Statistics | FBAS | Peristaltic flow of a dusty fluid in a curvedchannel | National | **Emerging Science & Engineering** | 0.48 | NRPU | Higher Education Commission | 26/04/ 2021 |
| 21 | Dr. Samina Yasmeen Malik | Dr. Nabi B. Bux Jumani | Education | FSS | Role of National Curriculum for Moral Development in Pakistan | National | **Social Issues: Sociology, Education & Philosophy** | 2.9 | NRPU | Higher Education Commission | 28/04/ 2021 |
| 22 | Dr. Nabi BuxJumani | Dr. Samina Yasmeen Malik | Education | FSS | Evaluation of the Competencies of teacher educators in Pakistan | National | **Social Issues: Sociology, Education & Philosophy** | 1.26 | NRPU | Higher Education Commission | 28/04/ 2021 |
| 23 | Dr. Kiran Abdullah | Dr. Ghulam Mustafa | SA-CIRBS | FBAS | Fabrication of CNTs Phthalocyanine hybrid-based sensor for the detection of toxic gases | National | **Water Management, Climate Change & Environment** | 0.48 | SRGP | Higher Education Commission | 1/3/ 2021 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | Dr. Sabahat Sardar | Dr. Syeda Aaliya Shehzadi | SA-CIRBS | FBAS | Synthesis of Task Specific Protic Ionic for Co2 Separation Technology | National | **Biotechnology, Food, Nutrition,& Human Capital** | 0.5 | SRGP | Higher Education Commission | 30/08/ 2021 |
| 25 | Dr. Erum Jamil | Dr. Gul Hassan | CAEPE & Electrical Engineering | CAEPE | Upscaling of an AI Enable Data Mining Platform for Informed Decision Making (IDM) in COVID-19 and Future Pandemic Scenarios for Government of Pakistan | National | **Information Technology & Telecom** | 16.89 | PSF-COVID-19 Grants | Pakistan Science Foundation | 30/08/ 2021 |
| 26 | Dr. Basharat Ali | Dr. Muhamma d | CIRBS | FBAS | Synthesis, Characterization and Evaluation of 1,3-Thiazole Derivatives as Antimicrobial and Bioactive Agents | National | **Biotechnology, Food, Nutrition,& Human Capital** | 0.1 | SRGP | Higher Education Commission | 25/03/ 2022 |
| 27 | Dr. Naureen Ehsan Elahi | Dr. Sobia Tabassum | Bioinformatics and Biotechnology | FBAS | Detection of HPV E6 protein expression and its correlation with metastasis in HPV induced cancers | National | **Biotechnology, Food, Nutrition,& Human Capital** | 1 | SRGP | Higher Education Commission | 27/01/ 2022 |
| 28 | Dr. Maha Zafar | - | Envir. Sciences | FBAS | Air Sampling and characterization of Air Pollution particulate (PM10 and PM2.5 Major Concern is 16 priority polycyclic aromatic Hydrocarbons) is Faisalabad, Lahore Sialkot and Rawalpindi" | National | **Water Management, Climate Change & Environment** | 0.2 | Submission of Survey Proposal | Pakistan Science Foundation | 31/07/ 2021 |
| 29 | Dr. Muhammad Akram | Ayesha Qurratul Ain | Comp. Religions | Usuluddi n | The Study of Religions in Pakistan Institutions, Materials, and Approaches" | National | **Islamic Studies** | 2.207 | NRPU | HEC | 04/04/ 2022 |
| 30 | Dr. Muhammad Tahir Khalily | Nasim Chaudhry | Psychology | Social Sciences | A Randomized Controlled Trial (RCT) to Assess the Efficacy of Community Reinforcement Approach (CRA) in the Treatment of Cannabis Users | Health & Wellbeing | **National** | 3.16 | NRPU | HEC | 11/05/ 2022 |
| 31 | Dr. AbdulRashi d | | IIIE | IIIE | Perception Index for Shariah Legitimacy (PISL) of Islamic Banking in Pakistan: Analysis and Construction | | **Development Economics, Innovative Governance & Reforms & Policy Interventions** | 2.386 | NRPU | HEC | 23/11/ 2021 |
| 32 | Dr.Shaista Shehzada | | Physics | FBAS | Compositional analysis of Ternary Oxide Semi-conductors using Laser Induced Breakdown Spectroscopy | National | **Sustainable Energy** | 8.887 | NRPU | HEC | 13/04/ 2022 |
| 33 | Dr. Ihsan-Ul -Haq | - | Electronic Engineering | FET | The Design of an efficient computer aided diagnosis system for early breast | National | **Emerging Science & Engineering** | 1.64 | NRPU | HEC | 17/3/ 2023 |
| 34 | Dr. M.Shahid/ Dr. Naveed Altaf Khan | - | Dawah Acadmey | Dawah Academy | An analytical Studyof Dawah Methods of Leading Dawah Organizations in Pakistan | National | **Islamic Studies** | 1.72 | NRPU | HEC | 31/01/ 2023 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 35 | Dr. Sobia Tabassum | MuhammadMumtaz | Biological Sciences | Basic and Applied Sciences | Combination Analysis of Natural Phenolic and Palladium Nanoparticles Targeting Histone Deacetylases (HDACs): An Attractive Combinatorial Therapy for Breast Cancer Cells | National | **Health & Wellbeing** | 2.64 | NRPU | HEC | 30/11/2022 |
| 36 | Dr. Ikram Ullah | Dr. Ghulam Mustafa | CIRBS | Basic and Applied Sciences | Dietary Novel Approach Flavonoids against High Fat Diet Induced Impaired and Insulin Signaling | National | **Health & Wellbeing** | 3.07 | NRPU | HEC | 11/01/2023 |
| 37 | Dr. Syed AsadAbbas Rizvi | Najam ul Hassan Abbasi | Education | Social Sciences | Development of Culturally Responsive Teacher Education Programs for Universities of Pakistan | National | **Social Issues: Sociology, Education & Philosophy** | 0.4 | NRPU | HEC | 13/9/2022 |
| 38 | Dr.Abdul Jalil/Dr. Muhammad Amir | Nil | Electrical Engineering | E&T | Smart Feet | National | **Emerging Science & Engineering** | 1.43 | NRPU | HEC | |
| 39 | Dr. Azhar Mahmood | Dr. Nabi BuxJumani | Education | Social Sciences | Quality teaching in the Twenty-First Century Classroom | National | **Social Issues: Sociology, Education & Philosophy** | 1.55 | NRPU | HEC | 23/11/2022 |
| 40 | Dr. Nasir Ali | Nill | Mathematics and Statistics | Basic and Applied Sciences | Mathematical Models for Locomotion of Microorganisms in Complex Fluids | National | **Emerging Science & Engineering** | 1.49 | NRPU | HEC | 4/08/2023 |
| 41 | Dr. Nyla Jabeen | Nil | Biological Sciences | Basic and Applied Sciences | Development of Edible Vaccine Against Mastitis in Livestock by Transgenic Forage Grass | National | **Biotech, Food, Nutrition, & Human Capital** | 5.33 | PSF | Pakistan Science Foundation | 23/06/2023 |
| 42 | Muhammad Imran Shabbir | Haim H. Bau | Biological Sciences | Basic and Applied Sciences | Health Security: Point of Care, Multiplexed Detection Of infectious Diseases Endemic in Pakistan | National | **Health & Wellbeing** | 15.463 | PAK-US | Pak-US | 23/06/2023 |
| 43 | Dr. Fauzia Janjua | Dr. Sadia Irshad | English | Languag eand Literature | Endangered Languages of Northern Pakistan: A Study of Ethnolinguistic Minorities | National | **Social Issues: Sociology, Education & Philosophy** | 3.25 | TRGP | HEC | 7/08/2023 |
| 44 | Dr. Pervez Anwar | Dr. Zafar Mahmood | Bioinformatics and Biotechnology | Basic and Applied Sciences | Quality enhancement of Olive Oil obtained from Olea Ferruginous role in Pakistan | National | **Biotech, Food, Nutrition, & Human Capital** | 0.402 | SRGP | HEC | |
| 45 | Dr. Maryam Abbasi | Dr. RukhshandaAziz | Environmental Sciences | FBAS | Photocatalytic activity of Metal doped Zinc oxide/Graphene oxide nanocomposites for the degradation of environmental pollutants | National | **Water Management, Climate Change & Environment** | 1 | SRGP | HEC | 17/02/2023 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | Dr. Madeeha Chaudhry | Dr. Asma Gul | Biological Sciences | FBAS | Fluorescence Immunoassay for detection of dopamine levels in psychological disorder | National | **Health & Well Being** | 0.99 | SRGP | HEC | 17/02/ 2023 |
| 47 | Dr. Muhammad Ayub | Dr. Hafiz Muhamma dBashir | Center for Teaching of Arabic Language | Arabic | Illustrations and Spectaculars of Ilm Al bayan in Surah Al kahf | National | **Arabic Language** | 0.26 | SRGP | HEC | 28/11/ 2022 |

## 3.3 Ongoing Research Projects (2021-23)

| S. No. | Principal Investigator | Co- Principal Investigator | Department | Faculty | Title of Project | Theme /Category | Level of Project | Funding Million (Rs) | Program | Funding Agency | Date of Approval |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Dr. Zafeer Saqib | Dr. Syeda Maria Ali | EnvironmentalSciences | Basic and Applied Sciences | A GIS based floralAltas of NorthernPakistan | Water Management, Climate Change & Environment | National | 3.924 | NRPU | HEC | 20/01/2017 |
| 2 | Dr. Muhammad Asad Ghufran | Dr. Zafeer Saqib | EnvironmentalSciences | Basic and Applied Sciences | Appraisal of Invasive SpeciesRichness as an Environmental Threat to Native Vegetation in Islamabad and Murree Region | Water Management, Climate Change & Environment | National | 3.03 | NRPU | HEC | |
| 3 | Dr. Muhammad Riaz | Nill | CIRBS | Basic and Applied Sciences | Finding HSP90 Modulating Anticancer NaturalProducts from Daphne Oleoides | Health & Wellbeing | National | 4.21 | NRPU | HEC | 07/08/2019 |
| 4 | Dr. Muhammad Babar Akram | Dr. Saif ur rehman Abbasi | Sociology | Social Sciences | Socio Cultural RiskFactors of Thalassemia propagation in Punjab | Social Issues: Sociology, Education & Philosophy | National | 4 | TRGP | HEC | 11/05/2016 |
| 5 | Dr. Asma Gul | Dr Sohail Qureshi | Biological Sciences | Basic and Applied Sciences | A Study Elucidating Contribution of Liver Cirrhosis in Hepatocellular Carcinoma ThroughTissue-Oncogene Interaction | Health & Wellbeing | National | 7.91 | Competitive Research Grant Program | PSF | |
| 6 | Dr. Muhammad Sheeraz | Dr. AkhtarAziz, Dr. Farrukh Nadeem | English | Languag eand Literature | Digitalizing Folk Wisdom: A project of Collection, Translation, and study of Folk Literature in major Pakistani Language | Social Issues: Sociology, Education & Philosophy | National | 10.5 | NRPU | HEC | 28/12/2010 |
| 7 | Dr. Jamal Abdul Nasir | - | CS&SE | Basic and Applied Sciences | Developing Tailored Comprehensive Services for Young Migrants (INTEGRA) | Information Technology and Telecom | International | 9.457 | ERASMUS + Capacity Building in the Field ofHigher Education | EuropeanComm | |
| 8 | Dr. Javed Iqbal | Qazi MuhammadA. | Physics | Basic and Applied Sciences | Synthesis, Characterization and applications ofNovel Nanostructures | Emerging Science & Engineering | National | 0.4984 | SRGP | HEC | |
| 9 | Dr. Sara Gul | Dr. Naveeda Riaz | Bioinformaticsand Biotechnology | Basic and Applied Sciences | Mechanism of metformin action inFoxO3 over activated mice | Health & Wellbeing | National | 0.391 | SRGP | HEC | 04/01/2016 |
| 10 | Dr. Banat Gul | Dr. Mushtaq Ahmad | Physics | Basic and Applied Sciences | Simulation of Industrial plasma sources for material processing | Emerging Science & Engineering | National | 0.46 | SRGP | HEC | |
| 11 | Dr. Muhammad Arif Khan | Dr. Mushtaq Ahmad | Physics | Basic and Applied Sciences | Metal Oxide Semiconductors Nanowires for Optoelectronic and Photocatalytic Application | Emerging Science & Engineering | National | 0.497 | SRGP | HEC | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | Dr. Inayat AliKhan | Dr. Abdul Hameed | CIRBS | Basic and Applied Sciences | Palladium Nano catalysts Supportedon Nitrogen-Doped Highly Graphitic Carbon for Direct Alcohol Fuel Cell Applications | **Sustainable Energy** | National | 0.5 | SRGP | HEC | 04/06/2018 |
| 13 | Dr. Wiqar Hussain shah | Dr. Ahmad Hussain | Physics | Basic and Applied Sciences | Effect of Ca Doping on the electrical andmagnetic spin dynamics If La1-x CaxMno3 Perovskite magnates Nano-particles | **Emerging Science & Engineering** | National | 0.48 | SRGP | HEC | |
| 14 | Dr. Hina Andleeb | Dr. IkramUllah | CIRBS | Basic and Applied Sciences | Synthesis of novel heterocycles as Aldose Reductaseinhibitors in the pharmacotherapy for diabetic Complications | **Health & Wellbeing** | National | 0.5 | SRGP | HEC | 27/03/2019 |
| 15 | Dr.Aroosa Kawnal (Co-Lead) | Co-Investigator Dr. Asma Mansoor Dr. Amal Sayyid | English | FLL | Muslim WomenPopular Genre | **Social Issues: Sociology, Education, & Philosophy** | International | 1.576 | AHRC | Birmingham University, UK | 01/04/2021 |
| 16. | Dr. Ambreen Afsar Khan | | Mathematic sand Statistics | FBAS | Heat transfer impact on compressible fluid in microchannel with Peristalsis | **Sustainable Energy** | **National** | 0.83 | NRPU | HEC | 13/01/2021 |
| 17. | Dr. Hafizah Fizzah Riaz | Dr. Asma Gul | Biological Sciences | FBAS | A genetic epidemiological studyof neurological disorders (NDs) and their subtypes in Pakistan | **Health and Wellbeing** | National | 0.99 | SRGP | HEC | 13/03/2021 |
| 18. | Dr. Basharat Ali | Dr. Muhammad Riaz | CIRBS | FBAS | Synthesis, Characterization andEvaluation of 1,3-Thiazole Derivativesas Antimicrobial andBioactive Agents | **Biotechnology, Food, Nutrition,& Human Capital** | National | 1 | SRGP | HEC | 15/03/2021 |
| 19. | Dr. Fauzia Ajmal | Dr. Nabi Bux Jumani | Education | FSS | Quality Assurance foronline teaching in Higher Education in Pakistan | **Social Issues: Sociology, Education & Philosophy** | National | 3.07 | NRPU | HEC | 24/01/2022 |
| 20. | Dr. Gul Hassan | Dr. Ahmed Shuja | CAEPE | CAEPE | Towards Wearable Electronic World: Smart self-healing Flexible and Ultra- Stretchable Strains Sensors | **Emerging Science & Engineering** | National | 9.5 | NRPU | HEC | 11/3/2022 |
| 21. | Dr. Imran Murtaza | . Dr. Ahmad Shuja Syed* | CAEPE & Physics | CAEPE& FBAS | Investigation in Advance EnergyHarvesters and Energy Storage Devices for Self-powered Flexible Systems (FlexEnergy's) | **Sustainable Energy** | National | 99.68 | ICRG | Pak-Uk Gateway (HEC-British Council) | 26/02/2021 |
| 22. | Dr. Madeeha Chaudhry | Dr. Asma Gul | Biological Sciences | FBAS | Fluorescence Immunoassay for detection of dopamine levels in psychological disorder | **Health & Well Being** | National | 0.99 | SRGP | HEC | 23/02/2021 |
| 23. | Dr. Maha Zafar | - | EnvironmentalSciences | FBAS | Air Sampling and characterization of Air Pollution particulate (PM10 and PM2.5 Major Concern is 16priority | **Water Management, Climate Change & Environment** | National | 0.2 | PSF | PSF | 10/2/2021 |
| 24. | Dr. Maliha Asma | Yifu Don | EnvironmentalSciences | FBAS | Fabrication of MOFs/POMs composites as efficient adsorbents for Selected GaseousPollutants | **Water Management, Climate Change & Environment** | National | 2.92 | NRPU | HEC | 29/11/2021 |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 25. | Dr. Mamoona Ismail Loona | Dr. Anila Kamal | Psychology | FSS | Development of Parent focused Child Sexual abuse prevention program: its applicabilityin the context of Pakistani Society and Law | **Social Issues: Sociology, Education & Philosophy** | National | 2.45 | NRPU | HEC | 25/01/2022 |
| 26. | Dr. Mamoona Munir | Dr. Syed Ali Imran Bukhari | Biological Sciences | FBAS | Sustainable Production of Biodiesel from Non-Edible Feedstock Using Green Nano-Technology | **Biotechnology, Food, Nutrition,& Human Capital** | National | 1 | SRGP | HEC | 20/06/2021 |
| 27. | Dr. Maryam Abbasi | Dr. Rukhshanda Aziz | EnvironmentalSciences | FBAS00 | Photocatalytic activityof Metal doped Zinc oxide/Graphene oxide nanocomposites for the degradation of environmental pollutants | **Water Management, Climate Change & Environment** | National | 1 | SRGP | HEC | 15/03/2021 |
| 28. | Dr. Muhammad Mohsin Khan | Sharjeel Abid Butt | EE | FET | Automated detectionof acute ischemic infarct on Code Stroke Head CT using deep Neural Networks | **Information Technology and Telecom** | National | 4.32 | NRPU | HEC | 29/11/2021 |
| 29. | Dr. Nayyar Mehmood | Niaz Ahmad | Mathematic sand Statistics | FBAS | Some Variants of Krasnoselskiis and Schauders fixed point results with applications in fractional differential equations | **Emerging Science & Engineering** | National | 1.41 | NRPU | HEC | 6/12/2021 |
| 30. | Dr. Saeed Badshah | Dr. Amir Badshah | Mechanical Engineering | FET | Fast Training of SOM(Self Organization Map) in Frequency Domain | **Emerging Science & Engineering** | National | 0.12 | NESCOM | NESCOM | 6/4/2021 |
| 31. | Javed AhmedKhan | - | Mechanical Engineering | FET | Inter-University Competition to Develop low-cost plastic waste recycling machine | **Emerging Science & Engineering** | National | 0.6 | Developinglow-cost waste recycling machine | PSF | 26/10/2021 |
| 32. | Dr. Khan ZaibJadoon | Dr. Jawad Ali Shah & Dr. Nadeem AhmedSheikh | Civil Engineering | FET | Development and Implementation of smart and resourceefficient Irrigation System by Assessment of Water-Food EnergyNexus | **Water Management, Climate Change & Environment** | National | 9.89 | NRPU | HEC | 16/12/2021 |
| 33. | Dr. Khan ZaibJadoon | Dr. Jawad Ali Shah and Khalil Ahmed Palh | Civil Engineering | FET | Development of Smart Groundwater Monitoring System toCalibrate and Validate GRACE Data for Real-Time Assessment of Groundwater Storage Depletion | **Water Management, Climate Change & Environment** | National | 11 | NCGS-IST | NCGSA-IST (HEC) | 28/01/2022 |
| 34. | Dr. Rashid Farooq | Dr. Amjad Masood | Civil Engineering | FET | Flash Floods Harnessing for the Prosperity of Arid andResources-stressed Neglected Agro- based Communities (Pro NAC) | **Water Management, Climate Change & Environment** | National | 4.69 | NRPU | HEC | 5/4/2022 |
| 35. | Dr. Muhammad Arshad Zia | Dr. Muhammad Nazam | Mathematic sand Statistics | FBAS | Fixed Point Based Machine Learning Optimization Algorithms and Real-World Applications | **Emerging Science & Engineering** | National | 5.2 | NRPU | HEC | 20/03/2022 |

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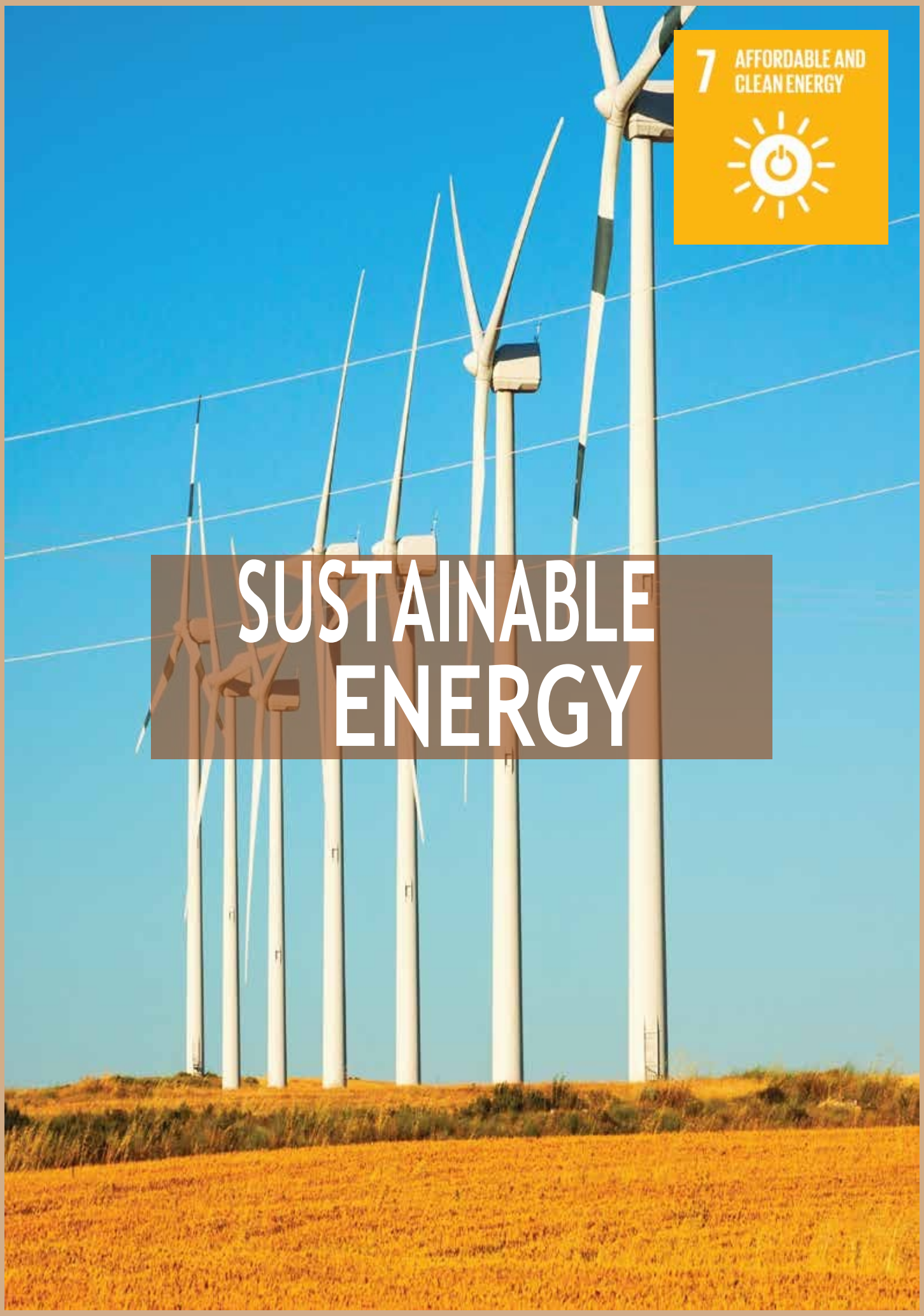
| 36. | Dr. Samina Malik | Dr. Asma Mansoor and Dr. Ishrat Siddiqa Lodhi | Education | FSS | Shattering the Glass Ceiling: Challenges and Opportunities forWomen Academic Leaders in Pakistani Universities | **Social Issues: Sociology, Education & Philosophy** | National | 29.02 | LCF | HEC | 19/05/2022 |
| 37. | Dr. Asif Mir | Nil | Biological Sciences | FBAS | ACE2 Polymorphism Association Studies with COVID-19 | **Health & Wellbeing** | National | 1.70 | HRI Grants | NIH | 16/04/2022 |
| 38. | Dr. Ahmer Mehmood | Nil | Mathematics and Statistics | FoS | Generalization of the Smith and Spalding Integral Method to Boundary Layer Flows with Zero Pressure-Gradient | | National | 4.09 | NRPU | HEC | 12/06/2022 |
| 39. | Dr. Bashir Ahmad | Nil | Biological Sciences | FoS | Development, Characterization and Commercialization of the Biogenic Mosquito Repellent Oil (MRO) and Mosquito Repellent Balm (MRB) | **Health & Wellbeing** | National | 5.00 | HRI Grants | NHI | 19/07/2023 |
| 40. | Dr. Habib Ahmed | Nil | Centre for Advanced Electronics & Photovoltaic Engineering | CAEPE | US-Funded workshops for exposure of high school students to nanotechnology for sustainable energy in Pakistan | | International | 1 | US-Funded workshops for exposure of high school students to nanotechnology for sustainable energy in Pakistan | U.S Mission and Pakistan-U.S alumni network (PUAN) | 08/05/2023 |
| 41. | Dr. Muhammad Imran Shabbir | Nill | Biological Sciences | FoS | Development of Semiconductor Proton sensing based DNA Sequencing Method and device as an economical alternative to sanger sequencing | | National | 3.37 | NRPU | HEC | 07/07/2022 |
| 42. | Dr. Shameen Alam | Dr. Javid Shabbir | Mathematics and Statistics | FoS | Estimation of mean salary of employees working in national universities of Islamabad by using calibration technique | | National | 1.2 | NRPU | HEC | 15/06/2022 |
| 43. | Prof. Dr. Nabi Bux Jumani | Nil | Education | FSS | Optimum use of Existing Resources: A prototype model of road safety | | National | 7.5 | GCF | HEC | 23/03/2022 |
| 44. | Dr. Khadija Maqbool | Nil | Mathematics and Statistics | FoS | Thermal and concentration analysis of two-phase flow through ciliated surfaces | | National | 0.60 | NRPU | HEC | 20-04-2022 |

4

# RESEARCH THEMES AND ACCOMPLISHMENTS




# SUSTAINABLE ENERGY

# Research Themes and Accomplishments

## 1. Sustainable Energy

### a. Approved Projects

**Project No. 01: Heat Transfer Impact on Compressible Fluid in Micro channel With Peristalsis**

**PI: Ambreen Afsar Khan**

Funding: Rs. 0.83 million

Date of Approval: 13/01/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

**Summary:** The aim of this proposal is to provide a mathematical modelling for a compressible non Newtonian fluid in micro channel with the influence of heat transfer. The law of conservation of momentum, the law of conservation of mass and the law of conservation of energy will be used to model the problem. The mathematical results will be obtained with the help of analytical method such as perturbation method. The perturbation parameter. Temperature mean velocity and net flow rate are examined for different governing parameters through graphs. The accuracy of the analytical solution will be checked by numerical solution.

**Project No. 02: Investigation in Advanced Energy Harvesters and Energy Storage Devices for Self-Powered Flexible Energy Systems (Flex Ener Sys)**

**PI: Dr. Imran Murtaza**

**Co-Grantee: Dr. Ahmed Shuja Syed**

Funding: Rs. 99.68 million

Department: CAEPE

Date of Approval: 26/02/2021

Program: National Research Program for Universities

Funding Agency: Pak-UK Education Gateway -ICRG

**Summary:** Advanced energy systems (AES) comprising energy harvesting storage and management components are key for the development of self-powered wearable applications. In particular, AES are expected be used for healthcare monitoring, electronic-skins, smart-coatings, and tattoo-like sensing patches, involving a large number of sensing and electronic devices distributed over large-areas and with a high energy budget demand . Likewise, other applications such as electric cars, aerial vehicles, robotics and artificial prostheses, which have higher estimated energy budgets and on-board energy sources, will benefit from the development of AES with high-performance and durability. AES aims to power electronics and sensors continuously, i.e. 24/7, reducing the human interaction to replace a vast number of batteries, and therefore making the aforementioned devices energy autonomous.

## b. Completed Projects

### Project No. 03: Advanced Photovoltaic Energy Engineering Laboratories at the International Islamic University

**PI: Dr. Ahmed Shuja Syed**

Funding: Rs. 60.00 million

Department: CAEPE

Date of Completion: 31/12/2021

Funding Agency: Islamic Development Bank, KSA

**Summary:** The project, shaped as a result of Islamic Development Bank's funded Technical Assistance International Research Grant Program, worth US$ 0.6 Million, was focused to cater the needs in the broader area of energy research with a special emphasis on Photovoltaic (PV) engineering. The Purpose of the grant was to scientifically contribute towards the advancement of PV technology through research in PV phenomena in semiconductors, Solar cell focused multi-junctions, nano-heterostructures, thin-film electronics, and Metrology and Characterization of solar cells and photovoltaic processes for subsequent fabrication and utility etc. Based on the focused research problems, the grant posed several challenges to address such as (a) to link PVs characteristics with final device performance, (b) to translate the potential of third generation PV systems into low-cost manufacturing, and (c) to look for the better metrology and efficient characterization to address the key measurement challenges for PVs processing. These targets were successfully achieved in several work packages around this grand project. Investment in human capital in form of influencing and contributing towards the university education in these highly applied and cutting-edge technology areas, the significant cadre of MS&PhD students attached to the project-specific research problems perceived as an important contribution to the national capacity, high quality publications, substantially high-quality research infrastructure for indigenous inter-disciplinary problems within the application domains and nurturing the collaborative partnerships with research groups/industry as an accessible experimental facility are the dividends of this project, which are likely to grow further as the academic part of the grant still continues.

### Project No. 04: Development of Low Cost Routes for Modifications of Nanomaterials for Efficient Utilization in Photochemical Catalytic Water Splitting

**PI: Dr. Shumaila Sajjad**

**Co PI: Dr. Sajjad Ahmed Khan Laghari**

Funding: Rs. 11.79 million

Department: Physics

Faculty: Basic and Applied Sciences

Date of Completion: 22/09/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

**Summary:** To overcome the decomposition problem, researchers looked to semiconductor nanocrystals. These are more stable, but those tested so far have produced little hydrogen.

Work on synthesis and development of such systems which are more stable and give high efficiency for hydrogen production in UV and Visible light, remained the focus of this projects.

**Project No. 05: Development of Stretchable Polymer Based Super Capacitors for Energy Storage Systems**

**PI: Dr. Ahmed Shuja Syed**

**Co-PI: Dr. Hong Meng & Dr.Imran Murtaza**

Funding: Rs. 48.5 million (bi-lateral)

Department: CAEPE

Date of Completion: 30/06/2021

Program: NSFC-PSF

Funding Agency: Pakistan Science Foundation - National Natural Science Foundation of China

**Summary:** Since the energy storage and power demand for the consumer market is in the ever-increasing trend, global electronics industry is looking for generic structures that are equally powerful in storing energy and are equally reliable and flexible for universal integration into the systems. The flexible device structure, longer life time and higher power density of the super capacitors make them better than the conventionally used lithium-based batteries particularly for miniaturized devices and systems. As compared to batteries, super capacitors are preferable and more suitable for diverse applications. Moreover, they can also extend the battery's life time. This project, which was highly cross-disciplinary in nature, mainly focused on the development of stretchable super capacitors for energy storage systems. This was thought to be achieved through process optimization of the stretchable supercapacitor devices based on conductive polymer materials with high specific capacity and good stretchability. Prototype devices, which were designed and fabricated after a range of assessments, were aimed to be exploited for systematic applications. These devices showed a potential to achieve high energy-storage ability even under high stretchability and expected to be used in diverse systems. The teams from both the sides made reportable and significant progress on the scientific problem in the form of high-impact factor journal papers and joint patents filed to IPO, Pakistan.

**Project No. 06: Compositional Analysis of Ternary Oxide Semi-Conductors Using LASER induced Breakdown Spectroscopy (LIBS)**

**PI: Dr. Shaista Shahzada**

Funding: Rs. 8.887 million

Department: Physics

Faculty: Basic and Applied Sciences

Faculty: Basic and Applied Sciences

Date of Completion: 13/04/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

**Summary:** ZnO is a wide bandgap semiconductor which has numerous applications as UV photodetector, Laser diodes, Solar cells, LEDs and Laser waveguides humidity sensor and

Nano generators. In our experiments, we prepared the targets of ZnO and MgO in weight ratio and then the nanoparticles or nano films using pulsed laser ablation or sputtering. We have noticed that bandgap increases by increasing x. A reliable and dependable technique was developed as prt of this project and utilized for compositional analysis of ternary /quaternary compounds used in semiconductor industry groups working on device engineering.

## c. Ongoing Projects

**Project No. 07: Design of Transformer-Less based Line-Interactive UPS system with 3P3W SAPF capability and Battery Energy Storage Stage**

**PI: Dr. Wajahat Ullah Khan Tareen**

Funding: Rs. 0.45 million

Department: Electrical Engineering

Faculty: Engineering and Technology

Date of Approval: 08/03/2018

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

**Summary:** In a distribution energy system, the increasing demands for nonlinear loads, such as diodes, thyristor, and rectifiers is currently increasing, especially in the context of harmonic propagation. These rectifiers result in the deterioration of waveforms and the generation of current harmonics, which affects its performance. The distortion will ultimately result in a low voltage output at the uninterruptible power supply (UPS) system, which causes power loss, high current flow, and faults in the system. Also, the main drawback of the previous stated configuration is the high number of power devices. 2.0 kVA transformer-less 3P3W SAPF with line-interactive UPS and battery energy storage equipment stage embedded into a distributed energy network is being studied in this project. The UPS configuration improves the system's poor quality problem, with reactive and harmonics power losses, by compensating for the voltage and current disturbances. The integrated shunt active power filter reduces the total harmonics distortion (THD) to mark the harmonic mitigation standard, such as IEEE 519 and IEC EN 61000-3. It helps the system provide unity input power factor with stable sinusoidal input voltage and input current.

**Project No. 08: Palladium Nanocatalysts Supported on Nitrogen-Doped Highly Graphitic Carbon for Direct Alcohol Fuel Cell Applications**

**PI: Dr. Inayat Ali Khan**

**Co-PI: Dr. Abdul Hameed**

Funding: Rs. 0.50 million

Department: Physics

Faculty: Basic and Applied Sciences

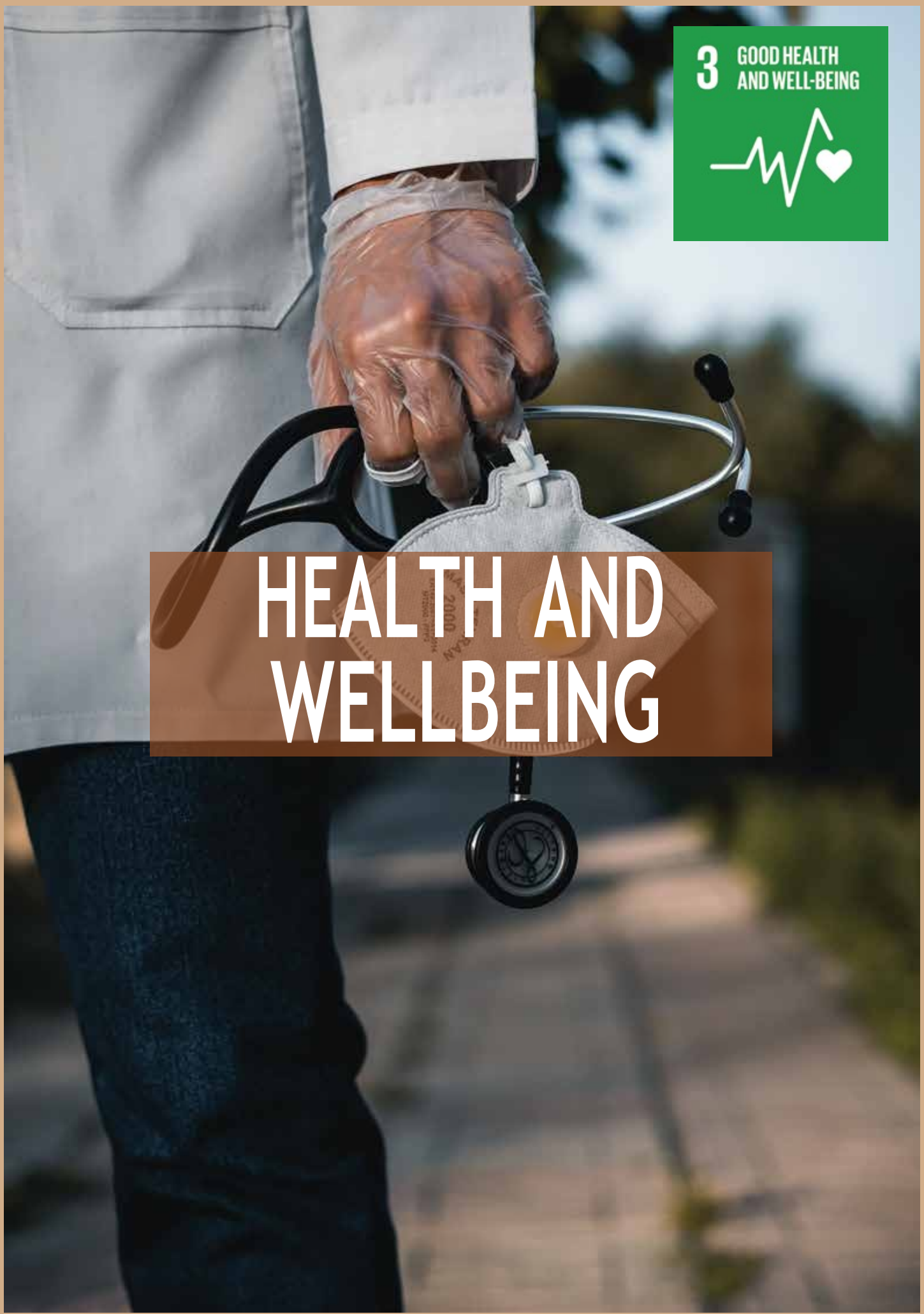
Date of Approval: 04/06/2018

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

**Summary:** It has been estimated that the global electricity demand is perhaps to double by the midcentury and triple at the end of the century, even of the effective preservative technology development. The non-renewable resources (oil and gas) are anticipated to peak-over in the next few decades while coal reserves may persist longer for the continuation of the existing electricity consumption level. In future the energy sector will be chiefly dependent on renewable energy sources like wind, solar and hydrogen energy. Energy stored in the form of chemicals (hydrogen; fuel cells) is one of the promising approach for the stabilization of the system. Palladium nano catalysts are the focus of the project for direct alcohol fuel cell applications.

Books Publication: Opportunities and Requirements for the Authors October 2023




# HEALTH AND WELLBEING

## .2. Health and Wellbeing

### A. Approved Projects

***Project No. 09:*** **A Genetic Epidemiological Study of Neurological Disorders (Nds) and Their Subtypes in Pakistan**

**PI: Dr. Hafizah Fizzah Riaz**

**Co PI: Dr. Asma Gul**

Funding: Rs. 0.99 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Date of Approval: 13/03/2021

Program: Start up Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Neurological disorders (NDS) are the leading cause of disability and death and hence impose a great burden on families and society worldwide. Owing to the unavailability of epidemiological and clinical data of these disorders appropriate planning in health care services is still missing therefore, the establishment of the prevalence frequency and prevalence pattern of NDs needs to be done to fill the gap. Although much progress has been made in the identification of genetic causes of NDs still further research is needed for the identification of various types of neurological disorders prevalent in Pakistan and their molecular basis to develop a deep understanding of the underlying pathways and for the development of diagnostic strategies measure and possible therapies. The project is aimed to achieve some of these pathways.

***Project No. 10***

**Title: ACE2 Polymorphism Association Studies with COVID-19**

**PI: Dr. Asif Mir**

Funding: Rs. 1.70 million

Date of Approval: 16/04/2022

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Program: Health Research Institute (HRI) Grants

Funding Agency: National Institute of Health (NIH)

***Summary:*** Coronavirus causes COVID-19 disease first emerged in Wuhan city, China, on Dec 8, 2019 which then was declared as pandemic by WHO. Currently more than 181 million cases have been reported worldwide and the pandemic has been increasing exponentially in many countries with different incidences and death rates among regions, ethnicities and in sexes. Coronavirus belongs to a class of Single-stranded RNA virus. ACE2 is the main receptor to which SARS-COV-2 binds and enters into the cell. Depending upon the presence and expression of Angiotensin converting enzyme 2 (ACE2) receptor SARS-COV-2 mainly infect lungs, liver, kidney and small intestine. ACE2 gene is located on X chromosome (Xp22.2).

Similarly, other factors that can influence the increase incidence, transmissibility, severity, susceptibility and resistance includes genetic variation at Viral S-protein receptor in human cells, ACE2. Polymorphism in ACE2 gene is linked to various diseases, therefore finding, studying, analyzing those genetic variants and their expression can provide detail information about these variants and can help in finding certain markers that can be used for finding susceptibility or resistance against coronavirus infection. No studies in Pakistan have been reported on Polymorphism of ACE2 to date. Thus studying the polymorphism of ACE2 gene in Pakistani population would be helpful in finding, what actually the allelic frequency of this gene is, what are the genetic variants of this gene that is related to symptomatic and asymptomatic nature of COVID-19 and why the presence of certain variants have severe outcomes.

***Project No. 11:*** **Fluorescence Immunoassay for Detection of Dopamine Levels In Psychological Disorder**

**PI: Dr. Madeeha Chaudhry**

**Co PI: Dr. Asma Gul**

Funding: Rs. 0.99 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Date of Approval: 23/02/2021

Program: Start up Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Psychological or neurological disorders have 10-13 % prevalence globally. In Pakistan the situation is equally alarming affecting 10-16% of the population. Among all the mental eases ne most prevalent one in Pakistani population are: depression (6%), schizophrenia (1.5%) and epilepsy (1-2%). The most important neurotransmitter in psychological or neurological disorder is Dopamine. A little variation in its levels can cause onset of depression and various neurological diseases like: schizophrenia, Alzheimer's and Parkinson disease Conventional dopamine detection techniques are laborious and time consuming that is less commonly practiced in Pakistani clinics. The project is focused to develop and utilize an attentive method for such detection.

## B. Completed Projects

***Project No. 12:*** **Combination Analysis of Natural Phenolics and Palladium Nanoparticles Targeting Histone Deacetylases (HDACs): An Attractive Combinatorial Therapy for Breast Cancer Cells**

**PI: Dr. Sobia Tabassum**

**Co-PI: Muhammad Mumtaz**

Funding: Rs. 2.64 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Date of Approval: 05/06/2018

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Natural compounds have played an essential role in the development of over 60% of clinically useful anti-cancer agents while a significant number of natural products and analogues their form are in clinical and pre-clinical development. Natural products have an especially imperative role in the synthesis of anticancer drugs which are more cost effective with less side effects. Pakistan has a diverse range of medicinal plants, some of which have potent anti-cancer properties, and this is an unexplored source of new oncology drugs. Breast cancer is one of the most commonly diagnosed cancer in women around the world. Currently inhibition of Histone Deacetylase (HDAC) has appeared as a potential class of anticancer targets. The aim of this study is to investigate the combination analysis of natural phenolics and palladium nanoparticles (PdNPs) in human MCF-7 breast cancer cells. This study leads to determine the molecular mechanism by which phenolic compounds along with PdNPs may control cell growth and induce apoptosis through inhibition of certain HDACS which are over expressed and hyperactive in cancer cells.

***Project No. 13:*** **Evaluation of Cytotoxicity and Genotoxicity of Metal and Their Oxides Nanostructures to Be Used As Potential Anticancer Therapeutics**

**PI: Dr. Asma Gul**

**Co PI: Dr. Javed Iqbal Saggu**

Funding: Rs. 6.42 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Date of Completion: 04/01/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** In this project, the efficacy of prepared metals and their oxides nanostructures were tested to treat the ovarian cancer to overcome global issue. The exact mechanism of intracellular interaction with nanostructures drug action were explored. The constant need for effective anti-cancer drugs has attracted the chemotherapeutic research which is based on the nanostructures. Many drugs attached with nanostructures exhibit very high toxicity towards selected cancer cells. Low water solubility which needs high concentrations of drugs to have encouraging treatment effects, existence of naturally drug resistance in mostly tumor cells, failure of several drugs to pass cellular barriers are the major limiting factors in current treatment regimes. Conventional chemotherapeutic agents are not good to distinguish among tumors and normal cells. Most of time, these agents can accumulate none selectively on the healthy tissues which results in severe clinical toxicities. In this study metals and their oxides in combination with chemotherapeutic agents exhibited less toxicity toward healthy cells and have significantly targeted anti-proliferative activity of ovarian tumors.

**Project No. 14: Elucidating the Molecular Genetic basis of Intellectual Disability (1D)**

**PI: Dr. Asif Mir**

Funding: Rs. 4.85 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Date of Completion: 04/02/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Intellectual disability with autosomal recessive condition is common but causative genes and genotype-phenotype correlations are not fully understood. Autosomal recessive Intellectual disability occurs in syndromic and no syndromic forms. Syndromic type of intellectual disability/ Intellectual disability is linked with neurologic, skeletal or some other anatomic disorder while in non syndromic intellectual disability only cause cognitive problems and learning impairment. In this study, families from Pakistan defining the clinical phenotypes of Intellectual Disability was ascertained. This work included defining the inheritance pattern, clinical phenotypes and molecular genetic studies of intellectual disability.

**Project No. 15: Detection of HPV E6 protein expression and its correlation with metastasis in HPV induced cancers**

**PI: Dr. Naureen Ehsan Elahi**

**Co PI: Dr. Sobia Tabassum**

Funding: Rs. 1.00 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Date of Completion: 27/01/2022

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Human papillo mavirus (HPV) is a key player in development of various cancers. HPV E6 protein expression is a prerequisite for the development and progression of HPV induced cancers. TI now only DNA testing is utilized for HPV suspected cases. Mostly, HPV infection are transient thus detecting the presence of viral DNA neither signify its etiologic involvement nor correlate with disease severity. E6 on coprotein detection have been evaluated in a limited number of studies, and more evidence is needed to determine its utility. This study is evaluating the significance of E6 expression as a diagnostic and prognostic marker in HPV induced cancers.

***Project No. 16:* A Randomized Controlled Trial (RCT) to Assess the Efficacy of Community Reinforcement Approach (CRA) in the Treatment of Cannabis Users**

**PI: Dr. Muhammad Tahir Khalily**

Funding: Rs. 3.16 million

Department: Psychology

Faculty: Social Sciences

Date of Completion: 11/05/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Substance abuse is a prevailing phenomenon in Pakistani Society. Its prevalence is increasing day by day due to many reasons including psychological, cultural, biological, environmental, social and personal factors However, in the recent past statistics shows an alarming increase in the use of substance. The last survey conducted indicates there are 36 million substance users in Pakistan and 3.6 percent among them are cannabis. Furthermore, cannabis is found to be the most prevalent abused drug with adverse impact on the mental health in general and particularly among universities students in Pakistan. However, there is a dearth of literature which could indicate a well-established treatment policy with proven efficacy model available in Pakistan particularly for university students. So this study is aims to demonstrate the efficacyy of Community Reinforcement Approach (CRA) as evidence based remedy for Cannabis Users.

## C. Ongoing Projects

***Project No. 17:*** **Dietary Novel Approach of Flavonoids against High Fat Diet Induced Impaired Cognitive and Insulin Signaling In Alzheimer's disease**

**PI: Dr. Ikram Ullah**

**Co-PI: Dr. Ghulam Mustafa**

Funding: Rs. 3.07 million

Department: SA-CIRBS

Faculty: Basic and Applied Sciences

Date of Approval: 04/04/2017

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** We are living in a very modern period where people love to adopt new and different lifestyle. Culture and everything. Same is in the case of food and diet. It is the recent trend of the current time to eat and drink the westernized and junk food regardless of their negative results on health. According to the world health organization health is defined is the state of being mental, physical and socially fit. The balance diet means to get right type and sufficient amount of food for the proper functioning of cells, tissues and body. For this purpose, we are using the macro-nutrients like carbohydrates, proteins and lipids. On the other hand, the micro-nutrients those are minerals, water and vitamins. The unhealthy and imbalanced diet in which the required micro and macro nutrients are greater or less than the normal required level leads to health problems such as obesity, debates and neurodegenerative disorders Ike Alzheimer. A

number of factors involved that can prevent or promote one's chances for the development of disease. These factors are genetic, environmental, life style, age and imbalanced food intake. The main theme of our work is to understand the underlying molecular mechanism of high fat diet induce cognitive impairment, insulin resistance and neurodegeneration. This second part of the proposed project was to search and discover the low risk natural bioactive compounds like flavonoids and search the attractive methods to ameliorate these abnormalities.

***Project No. 18:*** **A Study Elucidating Contribution of Liver Cirrhosis in Hepatocellular Carcinoma through Tissue-Oncogene Interaction**

**PI: Dr. Asma Gul**

**Co-PI: Dr. Suhail Qureshi**

Funding: Rs. 7.91 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Program: Competitive Research Grant

Funding Agency: Pakistan Science Foundation

***Summary:*** High throughput RNA profiling methods have revealed over 170 RNA modifications. Owing to the role of modifications in RNA metabolism and rate of translation, their dynamic functionality adds another regulatory layer of complexity to tumorigenesis. They offer mechanistic link between environment and modulation of gene-specific translation of one or several groups of tumor driver and suppressor genes. RNA modifications are involved in tumor cell adaptation to micro environmental stress, and thus linked to aggressive behavior including tumor invasion, metastasis and drug resistance. This necessitates a rigorous search for links between micro environmental stress and aggressive tumor phenotypes. This study is being accomplished by establishing in vitro models mimicking micro environmental stress stimuli. Following exposure to stress stimuli for variable concentration and amount of time, RNA modification status for the two most abundant modifications N6 -methyl adenosine (m* A) and 5-methylcytosine (m' C) assessed through high throughput method HPLC and Mass spectrometry. Data is analyzed statistically using student t test and ANOVA. The study contributes to our insight of RNA modification and their impact on regulation of genes crucial for stress response, survival and growth.

***Project No. 19:*** **Combination Analysis of Natural Phenolics and Palladium Nanoparticles Targeting Histone Deacetylases (HDACs): An Attractive Combinatorial Therapy for Breast Cancer Cells**

**PI: Dr. Sobia Tabassum**

**Co-PI: Muhammad Mumtaz**

Funding: Rs. 2.64 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Natural compounds have played an essential role in the development of over 60% of clinically useful anti-cancer agents while a significant number of natural products and analogues their form are in clinical and pre-clinical development. Natural products have an especially imperative role in the synthesis of anticancer drugs which are more cost effective with less side effects. Pakistan has a diverse range of medicinal plants, some of which have potent anti-cancer properties, and this is an unexplored source of new oncology drugs. Breast cancer is one of the most commonly diagnosed cancer in women around the world. Currently inhibition of Histone Deacetylase (HDAC) has appeared as a potential class of anticancer targets. The aim of this study is to investigate the combination analysis of natural phenolics and palladium nanoparticles (PdNPs) in human MCF-7 breast cancer cells. This study leads to determine the molecular mechanism by which phenolic compounds along with PdNPs may control cell growth and induce apoptosis through inhibition of certain HDACS which are over expressed and hyperactive in cancer cells.

### *Project No. 20:* Finding HSP90 Modulating Anticancer Natural Products from Daphne Oleoides

**PI: Dr. Muhammad Riaz**

Funding: Rs. 4.21 million

Department: SA-CIRBS

Faculty: Basic and Applied Sciences

Date of Approval: 07/08/2019

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Cancer is 2nd top killer and is the most feared, widespread and expensive diseases due to its uncontrolled multiplication and side effects of available anticancer-drugs. Anticancer drug market is expected to spike around US$ 147 in 2018. Insufficiency and side effects of available drugs along-with its increasing number patients, urgently needs research to discover new more specific (safe) effective and economical anticancer-drugs. Globally, a highest number of the scientists and funds are focused to develop and discover new anticancer-drugs through various approaches. Over 100 of cancer-proteins solely depend on HSP90 chaperone machinery for folding and translocation which make cancers essentially depends upon Hsp90 for their survival and proliferation. Importantly,Hsp90 exists in much higher concentration (4-6%) in cancer cells than normal cell (1-2%) and Hsp90 in cancer cells has much higher drugs affinity than in normal cells because it exists in multi-chaperone complex in cancer cells which provides a unique opportunity to discover and develop safer anticancer-drugs as Hsp90 inhibitors. Discovery of coumarin- core, novobiocin binding at C-terminus of Hsp90 to disrupt its chaperone machinery, opened a new direction to search, design and develop safer anticancer-drugs based upon coumarin skeleton that led to the following progress into promising anticancer-drugs in clinical trial which include a dimeric courmain glycoside..

***Project No. 21:*** **Health Security: Point of Care, Multiplexed, Molecular Detection of Infectious Diseases Endemic in Pakistan**

**PI: Dr. Muhammad Imran Shabbir**

**Co-PI: Dr. Haim H. Bau**

Funding: Rs. 15.46 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Date of Approval: 09/06/2017

Program: Pak-US Science and Technology Cooperation Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Easy to operate, inexpensive, high sensitivity and specificity, molecular diagnostic system for the co-detection of infectious diseases at the patient's side is being looked at in this project. Accurate diagnosis is critical for improving standard of care, proper disease management, and to minimize spread of infectious diseases. Currently, molecular diagnostics requires sophisticated laboratory facilities, trained personnel, and laborious procedures that are not available in remote areas and in resource-poor settings. Ideally, diagnostics should be carried at the point of care in real time to enable the health provider to make informed decisions. In this project we are implementing a newly developed, highly multiplexed, minimally instrumented platform to the detection of hepatitis C virus (HCV); malaria: Plasmodium falciparum and Plasmodium vivax; and HIV-virus in blood samples. All these pathogens are endemic in Pakistan and associated with significant morbidity, mortality, and socio-economic cost.

***Project No. 22:*** **Synthesis of novel heterocycles as Aldose Reductase inhibitors in the pharmacotherapy for diabetic Complications**

**PI: Dr. Hina Andleeb**

**Co-PI: Dr. Ikram Ullah**

Funding: Rs. 0.5 million

Department: SA-CIRBS

Faculty: Basic and Applied Sciences

Approval: 27/03/2019

Program: Start up Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Diabetes, a complex metabolic disorder, is presently perceived as a public health issue. The financial cost owing to the management of this disease extraordinarily impacts countries' health budgets, being the most astounding of any disease category. The processes related to hyperglycemia are considered to be key steps in the development of diabetic complications, including cataract formation, neuropathy, retinopathy, nephropathy and macro- as well as microma culopathies. There is a dire need of development of potent and selective ARIs as such in this project owing to the side effects of currently available ARIs not only for better activity but also for better selectivity.

***Project No. 23:*** **Mechanism of Metformin Action in Fox03 Over activated Mice**

**PI: Dr. Sara Gul**

**Co-PI: Dr. Naveed Riaz**

Funding: Rs. 0.391 million

Department: Biological Sciences

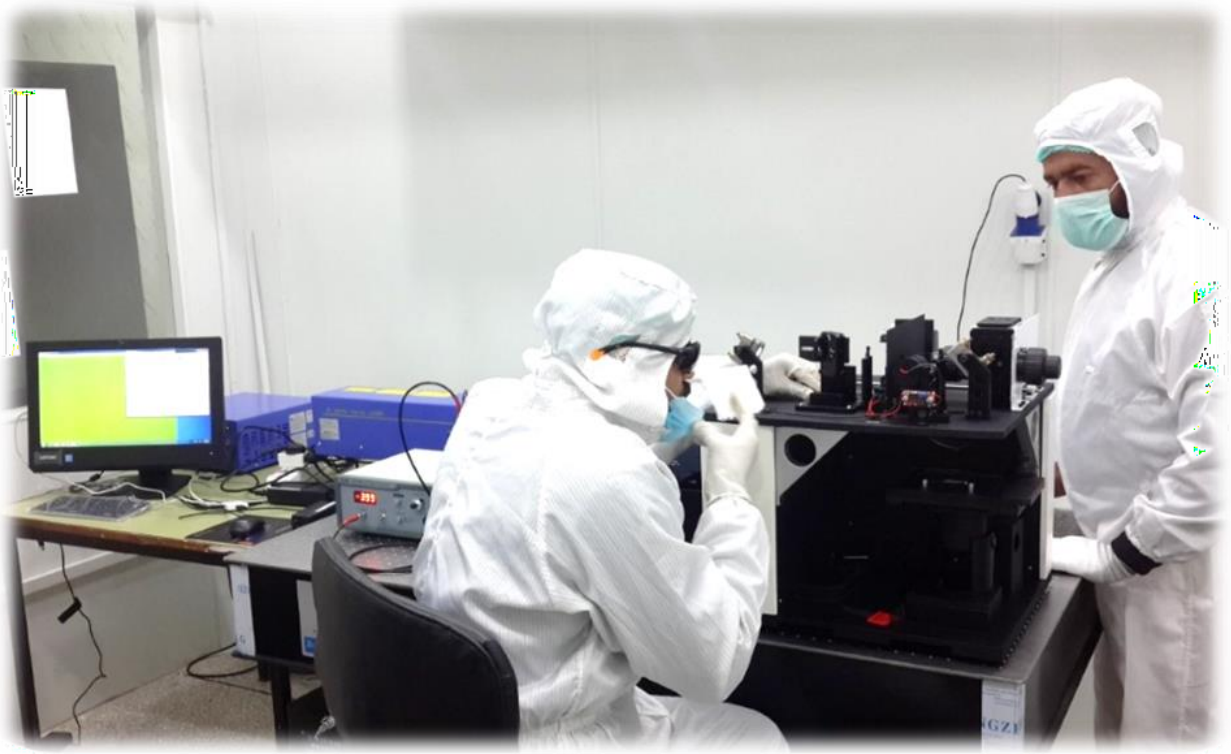
Faculty: Basic and Applied Sciences

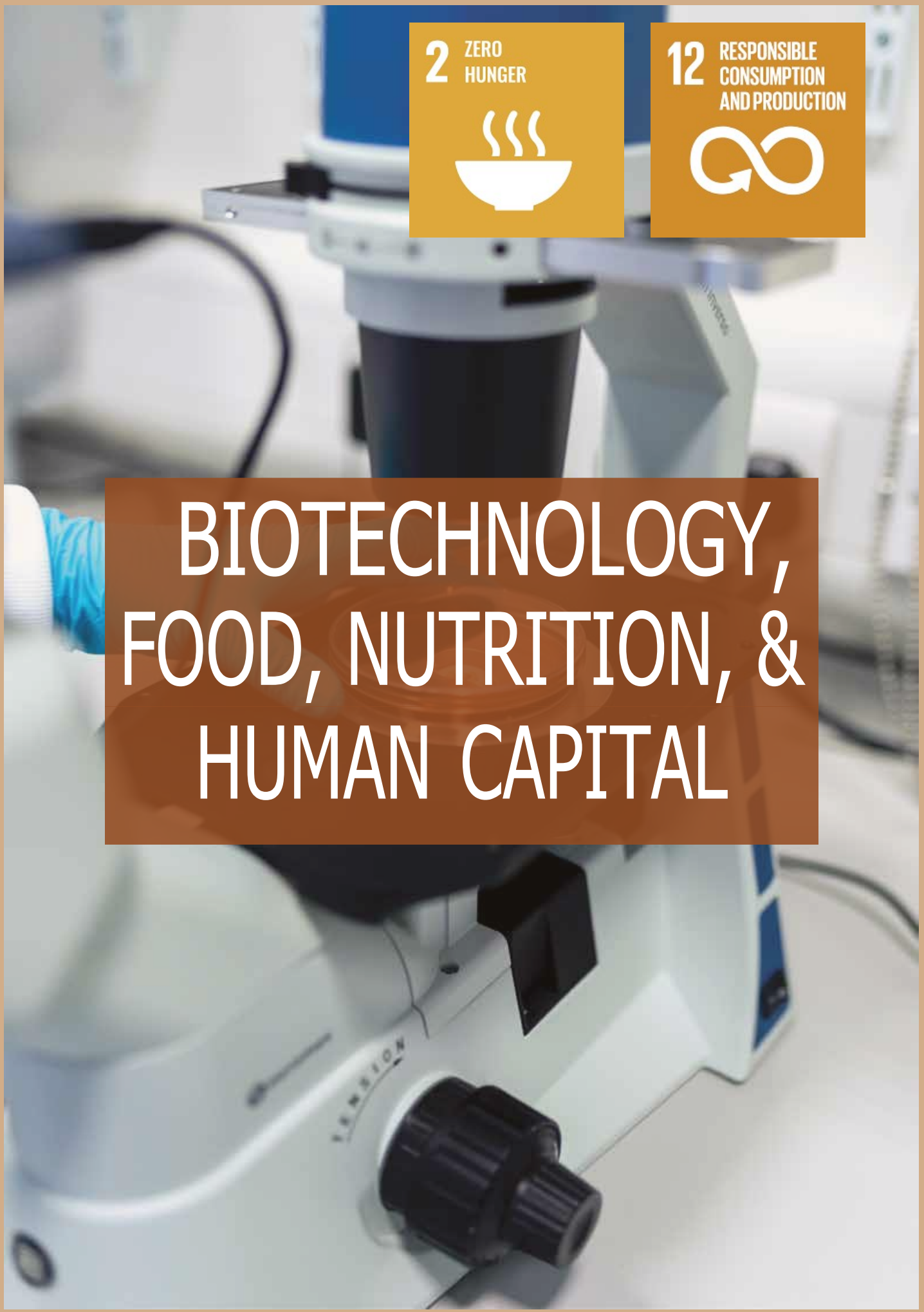
Date of Approval: 04/01/2016

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The family of fork head box proteins belongs to a major group of transcription factors present in all eukaryotes. Thus are transcriptional regulators characterized by conserved DNA-binding domain called "Fork head box". Fork head box is a 110 amino-acid region located in the central portion of Molecules and is classified as winged helix structure. This project is designed to find the mechanism of metformin action in Fox03 over activated mice.






# BIOTECHNOLOGY, FOOD, NUTRITION, & HUMAN CAPITAL

## .3. Biotechnology, Food, Nutrition, & Human Capital

### A. Approved Projects

**Project No. 24: Sustainable Production of Biodiesel from Non-Edible Feedstock Using Green Nano-Technology**

**PI: Dr. Mamoona Munir**

**Co PI: Dr. Syed Ali Imran Bokhari**

Funding: Rs. 1.00 million Department:

Biological Sciences Faculty: Basic and

Applied SciencesDate of Approval:

20/06/2021

Program: Start-up Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

**Summary:** Biodiesel has a significant position among the renewable sources, owing to its environment friendly attributes. Biodiesel (FAMEs), synthesized via diverse non-edible feed stocks such as Carthamus, Indian globe thistle etc. provides an attractive opportunity to produce sustainable fuel via green catalysts. Nowadays, green nanotechnology is the smart applicant globally for chemical transformation of oils to biodiesel due to its extraordinary properties (large pore size and high reactivity etc). In Pakistan, still outdated techniques employing homogeneous and heterogeneous catalysts are practiced. This project is the start of novel methods using green nanotechnology for producing biodiesel via non-edible feedstocks.

### Completed Projects

***Project No. 25:*** **Studies on Development, Formulation and Commercialization of Alkaline Phosphatise Inhibition based Aerometric Nano sensor for Biomedical Applications**

**PI: Dr. Bashir Ahmad**

**Co PI: Dr. Elizabeth A. Hall** Funding:

Rs. 4.4 million Department: Biological

Sciences Faculty: Basic and Applied

SciencesDate of Completion:

26/11/2021

Program: National Research Program for Universities Funding

Agency: Higher Education Commission of Pakistan

***Summary:*** The project aimed to develop the low-cost. Portable. Disposable aerometric Nano sensor exploiting the inhibition of enzymatic activity of alkaline phosphatase for in-1itro detectionof Ag-NPs in blood of model animals and human body fluids. Aerometric biosensor is a self-contained integrated device which provides specific quantitative and analytical information for the health security. Chemical or biological analysis. Contamination monitoring. Food and agriculture product processing on the basis of measurement of the current resulting from the oxidation or reduction of electroactive biological element (enzyme) was also found to be a possible application.

***Project No. 26:*** **Synthesis, Characterization, and Evaluation of 1-3-Thiazole Derivatives as Antimicrobial and Bioactive Agents**

**PI: Dr. Basharat Ali**

**Co PI: Dr. Muhammad Riaz** Funding:

Rs. 1.00 million Department: Biological

Sciences Faculty: Basic and Applied

SciencesDate of Completion:

25/03/2022

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant Enterococcus (VRE) and NDM-1 Escherichia coli strains are resistant to most of the conventional antibiotics Alternative approaches i.e. new chemical entities with low toxicity, and high specificity to treat antimicrobial resistance are direly needed to overcome the drug- resistance. Thus this project is designed to synthesize 1,3-thiazole derivatives by rationaldesigning based upon marketed drugs having 1,3-thiazole moiety such as penicillin, cefixime, nizatidine, meloxicam, tiazofurin, and ritonavir. Chemical modification to thiazide moiety may result to discover a lead molecule for the development of antimicrobial and other drug candidates.

## B. Ongoing Projects

***Project No. 27:*** **Development of Edible Vaccine against Mastitis in Livestock by Transgenic Forage Grass**

**PI: Dr. Nyla Jabeen**

Funding Rs. 5.33 million Department:

Biological Sciences Faculty: Basic

and Applied SciencesDate of

Approval: 09/06/2017

Program: Natural Sciences Linkage Program

Funding Agency: Pakistan Science Foundation

***Summary:*** In Pakistan livestock includes cattle, buffalo, and sheep. Goat, camels, horses, asses and mules. Livestock is an important Sector in Pakistan's economy and pays about 11.9 percent in the GDP of Pakistan. Infectious diseases are the serious threat to livestock production worldwide including Pakistan. Mastitis is the most dangerous disease of livestock throughout the world. Mastitis is caused by infectious agents like bacteria, viruses. Fungi and algae. Among these the most important are bacteria (Staphylococcus aureas and E.coli). Mastitis results when pathogenic bacteria are able to gain entrance to the udder. Overcome the cows' immune defenses, establish an infection and produce inflammation of udder secretary tissue. The increased frequency of mastitis caused by environmental streptococci has resultedin a number of attempts to produce vaccines against these pathogens. Number of vaccines are commercially available. These vaccines lessen the symptoms but don't improve the quality of milk. The development of edible vaccines is ecofriendly, cost effective and easy way to control these type of diseases especially in under development countries. Perennial ryegrass (Lolium perenne) is an important source of nutrition for ruminant livestock. By using tools of biotechnology like genetic transformation

recombinant DNA technology grasses used tor livestock fodder can be manipulated with the microbial antigens to produce vaccines against diseases such as mastitis. Among all the virulence factors, extra cellular fibrinogen binding protein (Efb) is an important one in the pathogenesis of mastitis. Plants are useful bioreactors toproduce antigens and the aim of the study is to produce Efb in forage grass as a mean to produce vaccine against d. aureus in plants. The presence and expression of transgene are analyzed by real time PCR.

***Project No. 28:*** **Quality enhancement of olive oil obtains from (Olea ferruginea Royle) in Pakistan**

**PI: Dr. Parvez Anwar Co-**

**PI: Zafar Mahmood**

Funding: Rs. 0.402 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Date of Approval: 30/06/2015

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The edible oil demand and its consumption are increasing steadily and it is very difficult to maintain balance between the oil demand and its providence. On the other hand, conventional oil resources are incapable to meet the increasing edible oil demand. Therefore, there is a dire need to explore alternative oil resources in order to meet the increasing demandof the population. In this project particular attention is on the enhancement of quality with regard to the optimal ripening degree of olives and storage conditions before milling. The results of this work will contribute to highlight indigenous source for olive oil in Pakistan.

***Project 29:*** **Prototype Development for Enzyme Based Poultry Feed Supplement And ItsUse In Poultry Industry**

**PI: Dr. Abdul Hameed**

Funding: Rs. 14 million

Department: SA-CIRBS

Faculty: Basic and Applied Sciences

Date of Approval: 24/05/2018

Program: National Research Program for Universities Funding

Agency: Higher Education Commission of Pakistan

***Summary:*** Poultry sector is one of the most vibrant segments of agriculture sector of Pakistan. Poultry meat contributes 30 percent of the total meat production in the country with productionof 87 4 Million broilers, 45 .65 Million layers and 11.24 million breeders. Total feed intake by birds enhancing the feed digestibility is 8.5M tons annually. Feed enzymes act as biocatalyst that improve feed assimilation in the broiler's body. Currently, Pakistan is importing these poultryenzymes from different countries like Korea, China, and Europe. According to an estimate atotal amount of Rs. 1500M/annum is spent for import of poultry feed enzymes from different countries. The Pakistan's current investment in Poultry Industry Is 200 Billion. The use of enzymes has been viewed as an excellent approach that will increase the digestibility of poultry feed and further improved intake and assimilation of nutrients in birds. The scope of current study is production of such hydrolytic enzymes and their application in poultry industry. The enzymes will be produced by the process of submerged fermentation.

***Project No. 30:*** **Development of Semiconductor Proton sensing based DNA Sequencing Method and Device as an Economical Alternative to Sanger Sequencing**

**PI: Dr. Imran Shabbir**
Funding: Rs. 3.37 . million
Department: Biological Sciences
Faculty: Sciences
Date of Approval: 07/07/2022
Program: National Research Program for Universities
Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The project proposes an easy to operate, label free, simple and inexpensive method of DNA sequencing using semiconductor based proton sensing and an apparatus for implementing the proposed method for use in genomics research and molecular diagnostics. DNA sequencing is one of the most important analytical techniques in biology that is used for understanding the working principles of all the life on the planet. Extensive research has been done in the development of DNA sequencing methods and this field has evolved from gold standard Sanger's di-deoxy chain termination method to current next generations of methods and still progressing. Sanger sequencing is costly, labor intensive and require trained personnel to operate. These are the reasons why most of the Sanger sequencing facilities available in Pakistan is not functional and many researchers rely on sequencing their samples from nearby foreign countries. On the other hand, the methods of next generation sequencing (NGS) focus on sequencing in massively parallel format which generally covers a relatively very large part of the genome e.g., partial exome and whole exome or otherwise complete genome etc. Currently, no device/apparatus is available that provides the ability to sequence DNA in a small scale format using NGS chemistry. In Pakistan, a large number of researchers are working on small scale sequencing projects for which they sequence their DNA samples from foreign countries. Even local companies that offer DNA sequencing facilities do not have their own DNA sequencing facilities rather they are providing their sequencing services by outsourcing to foreign countries. This is leading to flow of capital out of the country which is essentially affecting the economy of the country. However, in author's view, a very simple and cheaper method of DNA sequencing can be easily devised using a semiconductor based proton sensing third generation DNA sequencing method. This will be achieved by iterative addition of dNTPs (deoxy nucleoside triphosphate) to the growing chain of DNA and concurrent sensing of released ions. The author has very recently worked on developing methods for ions sensing during DNA synthesis/amplification as well as during enzymatic/chemical reactions. The author has a required set of skills in the areas of molecular biology (worked on some NGS technologies with the Inventors of these technologies in USA) as well as simple microcontroller based electronics using sensors (around nine years of self-taught experience with published peer reviewed research articles) and experience in additive manufacturing using 3D printing as well as laser cutting and layer by layer joining (recently submitted a patent for a sample processing device made using this technique). The described method will be implemented in the form of a small and a portable device. The developed method and device would be patentable and therefore will lead to increase in country's capability in technology development as well as improvement in existing technologies. Upon successful development of the method and device, this would be able to cater the needs of a large number of researchers in future from locally developed technology. This will also lead to reduce a significant amount of capital outflow from the country thereby contributing in strengthening the economy of the country. device made using this technique). The described method will be implemented in the form of a small and a portable device. The developed method and device would be patentable and therefore will lead to increase in country's capability in technology development as well as improvement in existing technologies. Upon successful development of the method and device, this would be able to cater the needs of a large number of researchers in future from locally developed technology. This will also lead to reduce a significant amount of

capital outflow from the country thereby contributing in strengthening the economy of the country.

***Project No. 31:*** **Development, Characterization and Commercialization of the Biogenic Mosquito Repellent Oil (MRO) and Mosquito Repellent Balm (MRB)**

**PI: Dr. Bashir Ahmad**
Funding: Rs. 5.00 million
Department: Biological Sciences
Faculty: Sciences
Date of Approval: 19/07/2023
Program: National Health Challenge Grants
Funding Agency: National Institutes of Health

***Summary:*** Due to abrasive damage and for the defense mechanisms of plants against phytophagous insects, the vegetative parts of the plants ooze out exudates containing non-fragrant chemicals and fragrant essential oils with the insect-repelling property. Some proteins like TRI) VI and Anti-OBP2A present in the head of the mosquito are sensitive to such exudate chemicals and essential oils like a biosensor. Extraction from such biogenic chemicals and essential oils may be used as mosquito repellents. Dengue is an RNA virus born fatal disease vectored through mosquitoes. Pakistan is one of the most affected countries by dengue and malaria after the flood shed of 2022. RNA viruses do not have permanent treatment due to the high rate of mutations in them. The only way is the repellency of the mosquitoes. A big challenge of existing mosquito repellents is their corrosiveness and allergenicity. There is a dire need to develop indigenous biogenic and cost-effective but sustainable mosquito repellent. In this study, we aim to develop and commercialize a biogenic Mosquito Repellent Oil and Mosquito Repellent Balm which are not present in the market specifically against the serotypes of dengue viruses and mosquitoes prevalent in Pakistan.


# INFORMATION TECHNOLOGY AND TELECOM

## .4. Information Technology and Telecom

### B. Completed Projects

***Project No. 32:*** **Upscaling of an AI Enable Data Mining Platform for Informed Decision Making (IDM) in COVID-19 and Future Pandemic Scenarios for Government of Pakistan**

**PI: Dr. Erum Jamil**

**Co PI: Dr. Gul Hassan**

Funding: Rs. 16.89 million

Department: CAEPE

Date of Completion: 30/08/2021

Program: PSF-COVID-19 Grants

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The COVID- 19 Virus had impacted the global population in grave and unsettling ways. In this scenario, Big Data, Artificial Intelligence and Mobile Computing were key to understanding the impact that Coronavirus. In this project the recent advancements in telehealth and big data technologies to move primary care services to smart environments for COVID-19 were effectively utilized. A Cloud based Multi Node Tele Health Framework Supported by AI & BIGDATA helped easily connect to "different data sources / nodes" such as Hospitals, Doctors, Patients at home, Diagnostic Labs, Sensing devices and Data centers. The COVID-19 Government/Public agencies would benefit most from the "Intelligently analyzed" data for rapid, but informed, decision making. The deliverable product is in the form of "upscaling" our developed prototype of Cloud-based Tele Health application to an Intelligent Data Mining Platform (supported by Artificial Intelligence), which would help the Government of Pakistan and Health Care Professionals to decide the line of action on the basis of numbers, analytics and Trend- forecasting in COVID-19 and similar future pandemic scenarios.

### C. Ongoing Projects

***Project No. 33:*** **Real time sensors fusion using GPUs computer vision/image processing**

**PI: Dr. Humaira Ashraf**

**Co PI: Mr. Raheel Khan**

Funding: Rs. 0.20 million

Department: Computer Science and Software Engineering

Faculty: Basic and Applied Sciences

Date of Approval: 06/10/2020

Funding Agency: NESCOM

***Summary:*** Visible and thermal image fusion is a sufficient processing task in a surveillance system, which can improve visibility of useful information by fusing meaningful details from thermal and visible images. To reduce the amount of data transferred to ground station embedded solution is necessary, for this purpose we propose a novel approach for thermal and visible images fusion using Faster R-CNN with commonly used HW Accelerators. Novel

approach leads to implementation in NVIDIA TX1 (GPU). Efficient image fusion can lead to better target detection.

***Project No. 34:*** **Developing Tailored Comprehensive Services for Young Migrants**

**PI: Dr. Jamal Abdul Nasir,**

**CO PI : Dr. Asim Munir, Mr. Muhammad Imran, Mr. Idrees Ahmed & Mr. Muhammad Waheed Khan**

Funding: Rs. 9.45 million

Department: Computer Science and Software Engineering

Faculty: Basic and Applied Sciences

Year of Approval: 2020

Program: Erasmus+

Funding Agency: European Union

***Summary:*** INTEGRA aims at responding to the limited participation of young migrants and refugees from conflict affected countries in Higher Education in India & Pakistan, by introducing an innovative methodology that combines education on Information and Communications Technologies (ICT) with psychosocial support, for promoting the integration of vulnerable groups. The project has developed and offered without any cost to the participants – a short-term state-of-the-art course on ICT for vulnerable youth in India & Pakistan, based on the expectations of the ICT labour market in these countries, along with the establishment and operation of four psychosocial support structures, one in each Higher Education Institution (HEI), providing personalised psychosocial support. The project partners of the consortium come from Greece, India, Pakistan and Portugal.

***Project No. 35:*** **Automated Detection of Acute Ischemic Infarct on "Code Stroke" Head CT using Deep Neural Networks**

**PI: Dr. Muhammad Mohsin Khan**

**Co PI: Engr. Sharjeel Abid Butt**

Funding: Rs. 4.32 million

Department: Electrical Engineering

Faculty: Engineering and Technology

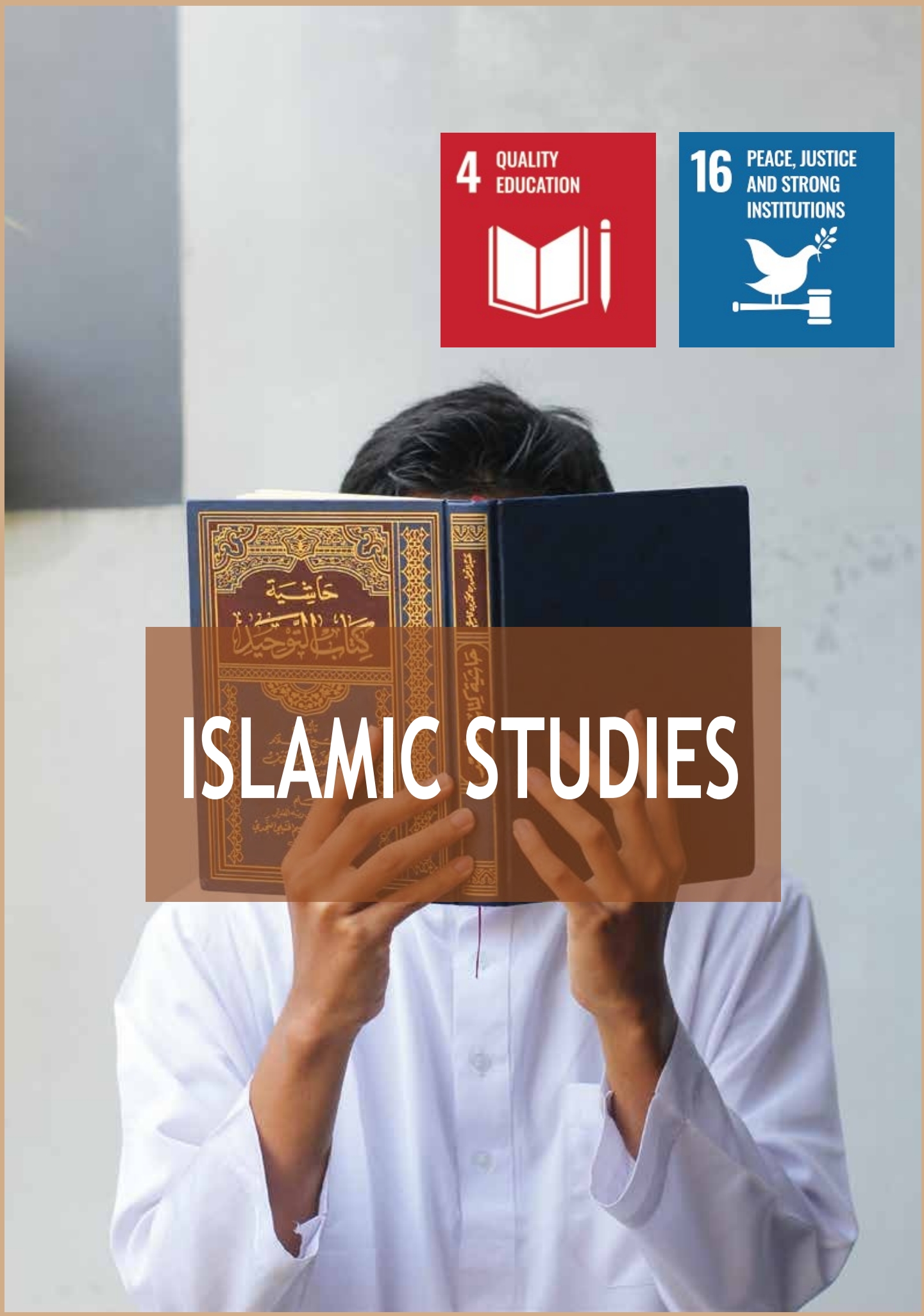
Date of Approval: 29/11/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Strokes are caused by an abrupt blockage of arteries leading to the brain (ischemic stroke), stroke is also called brain attack. Other strokes are caused by bleeding into brain tissue when a blood vessel bursts (haemorrhagic stroke). It affects the entire body, including paralysis or partial paralysis, cognitive and memory deficits, speech and visual issues, emotional difficulties, daily living challenges, and pain. Paralysis is a common outcome of stroke, often on one side of the body. Because stroke occurs rapidly and requires immediate treatment. In

Pakistan the incidence rate of stroke is very high, and it is increasing to 350,000 new cases every year. The researchers in this study will train 3D convolution neural network (CNN) for identification of acute ischemic infarct on "code-stroke" non-contrast head CTs, generate attention maps to localize infarct lesions on head CTs and examine potential benefits of integrating these automated diagnostic tools in radiologists' workflow.


4 QUALITY EDUCATION
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
ISLAMIC STUDIES

## .5. Islamic Studies

### B. Completed Projects

***Project No. 36:*** **Towards Developing Parameters for Urdu Quran Translation**

**PI: Dr. Shair Ali Khan**

**Co PI: Dr. Nargis Nazir**

Funding: Rs. 1.16 million

Department: Translation and Interpretation

Faculty: Arabic

Date of Completion: 05/05/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Quran is the last word of Creator to Humanity. It is in Arabic language in a highly metaphorical style. Its conversion to other languages is no doubt a challenging task. A faithful translation coveys the original meaning, intentionality, textuality, and intertextuality of the source text. There is a variety of Urdu Quran Translations in Pakistan with semantic ambiguities, variations, differences and meaning loss. These semantic and linguistic variations sometimes cause bloody debates among the students of public and religious educational institutions, media anchors and guests and general public. The research measured the moderate translational parameters in the light of translation theories, principles assessment tools to provide some guidelines for a faithful translation of the Holy Text acceptable to all the above mentioned beneficiaries to avoid the clashes for the long term benefit of social life of Pakistani inhabitants, for safe and sound economy, for the rule of peace in the country.

***Project No. 37:*** **The Study of Religions in Pakistan Institutions, Materials, and Approaches"**

**PI: Dr. Muhammad Akram**

**Co-PI: Dr. Ayesha Qurrat ul Ain**

Funding: Rs. 2.207 million

Department: Comparative Religions

Faculty: Usuluddin

Date of Completion: 04/04/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The project was conceived with a particular vision of the worldwide enterprise of the academic study of religions and its situation in Pakistan. According to this view, the study of religion, generally known as Tagäbl-i-Adyan in South Asia, has emerged as an academic discipline worldwide, which has gained popularity with the ever-increasing institutional and personal interactions between adherents of different religions in the contemporary world. This emerging discursive field is replete with multiple approaches, such as phenomenological. Sociological, anthropological, and psychological. The project note a marked distinction between

the works done before and alter the formation of Pakistan quantitatively and qualitatively. The new way of studying these religions that came up with the emergence of Pakistan is mainly due to the socio-historical realities more in line with the changed religious ethos of the country. The changed sociopolitical realities of the post-partition era especially affected the works on Hinduism in the Urdu language as the majority of the Muslims in the region no longer interacted with Hindus daily and lost access to the original Hindi and Sanskrit sources to a great extent. These findings imply how decisively socio-political and historical contexts bear on the pursuit of the academic study of religion. It is pertinent to note here that there is a general disregard for a more scholarly examination of minority religions other than Christianity and Hinduism.

## C. Ongoing Projects

### *Project No. 38:* An analytical Study of Dawah Methods of Leading Dawah Organization in Pakistan

**PI: Dr. M Shahid/ Dr. Naveed Altaf Khan**

Funding: Rs. 1.72 million

Department: Dawah Academy

Faculty: Dawah Academy

Date of Approval: 04/04/2017

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** There are a number of Dawah (to call people towards the teachings of Islam) organizations working in Pakistan. They all claim that according to Islamic teachings their way of preaching is the right way but all of them adopt various means and ways to call people towards the teaching of Islam. The research project has studied the Dawah Methods. Adopted by the prominent Dawah organization of Pakistan.

### *Project No. 39:* Illustrations and Spectaculars of Ilm al-Bayın in Surah al-Kahf

**PI: Dr. Muhammad Ayub**

**Co-PI: Hafiz Muhammad Bashir**

Funding: Rs. 0.280 million

Department: Centre for Teaching of Arabic Language

Faculty: Arabic

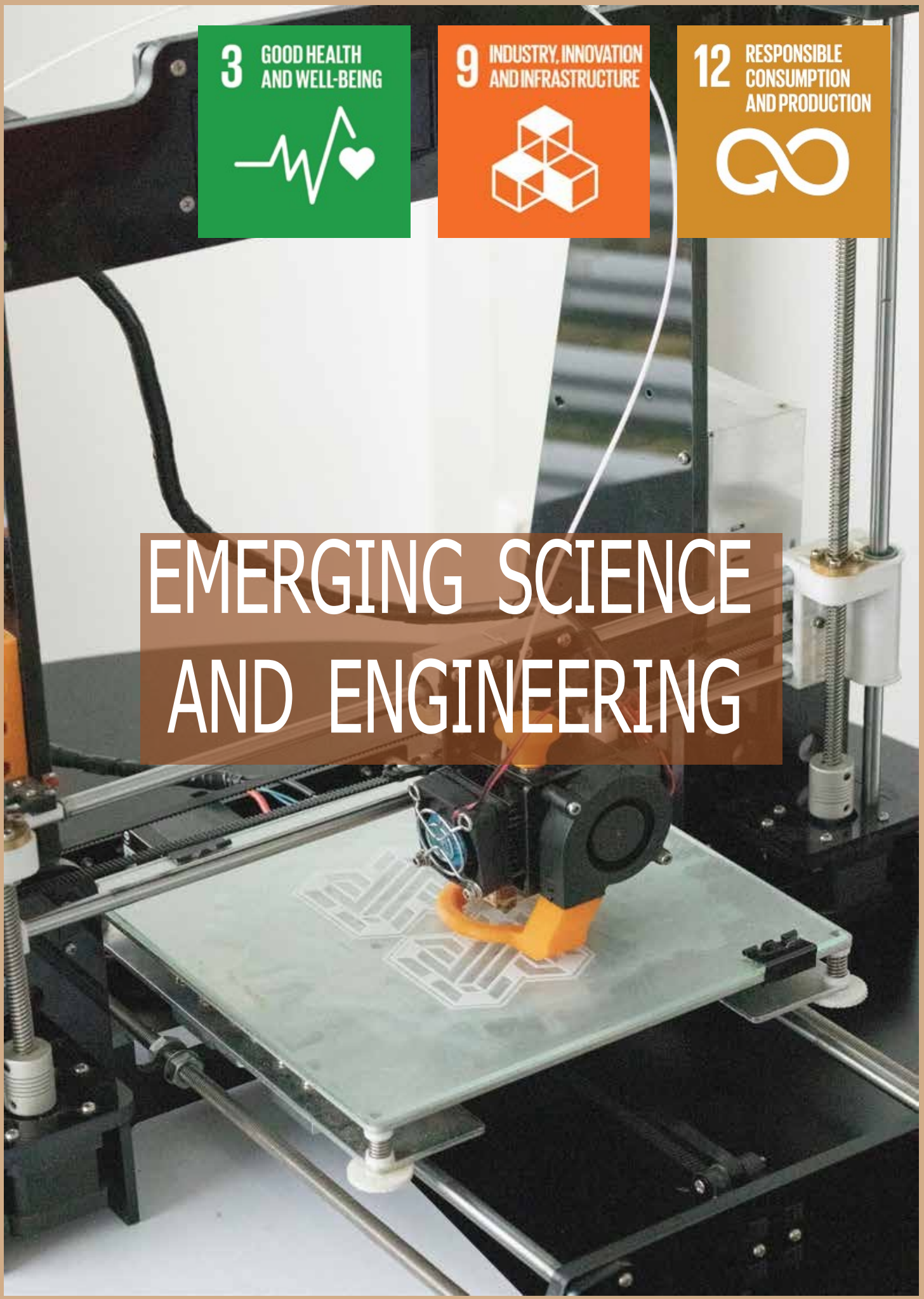
Date of Approval: 26/01/2017

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** People recite Holy Quran, even they memorize it but they cannot understand it. Many of them try to understand Quran text through reading its Urdu or English translations, despite of that they remain unable to get the meaning required from them. This is the main fact to which a lot of sects belong. Unfortunately, they believe into Holy Qur'an but the same time they do not go to understand it through proper way. Even if they know Arabic, they might not

understand what is meant because the language learning is not enough for Quran understanding. In this Research we will carry out a complete discourse analysis of the said Surah with some innovative techniques is being carried out. This Research helps in understanding the practical rhetoric because the literature of Ilm-i-Bayan only quotes some examples from Quran and no complete Surah has been analyzed. This Research enables the researchers to comprehend other Surahas of the Quran as well.



3 GOOD HEALTH AND WELL-BEING
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
EMERGING SCIENCE AND ENGINEERING

## .6. Emerging Science & Engineering

### A. Approved Projects

***Project No. 40*** **Fixed Point Based Machine Learning Optimization Algorithms and Real World Applications**

**PI: Dr. Muhammad Arshad Zia**

Funding: Rs. 5.2 million

Department: Mathematics and Statistics

Faculty: Basic and Applied Sciences

Date of Approval: 20/03/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Machine learning is becoming increasingly common in various application areas in the current Fourth Industrial Revolution (4IR) era, thanks to its ability to learn from the past and make intelligent decisions. This project is aimed at contributing some new and more accurate fixed-point iterative methods (FIMs) to optimize the convex objective functions representing machine learning, neural network and generalized split feasibility problems. We shall show that FIMs and Discrete-Time Gradient Flows (DTGFs) associated with the objective functions provide more accurate optimal solutions with fast convergence.

***Project No. 41:*** **Towards Wearable Electronic World: Smart Self-Healing Flexible and Ultra Stretchable Strain Sensors and Devices for Medical Applications**

**PI: Dr. Gul Hassan**

**Co PI: Prf. Dr. Ahmed Shuja Syed**

Funding: Rs. 9.50 million

Department: CAEPE

Date of Approval: 11/03/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** project aims at carrying out intensive research for the development of smart self-healing devices and sensors. This intensive research plan covers: Development of rational methodologies to synthesize solution processed self-healing materials, rational methodologies to control the formation of functionalized self-healing materials (doping, capping) under mild conditions, Identification of mechanisms/understanding and tailoring the specific interactions of solution processed self-healing materials, Nano composite films with induced self-healing properties Preparation of UV curable polyurethane substrate for self-healing devices, (Flexible sensors). Applications of solution processed self-healing materials in smart sensing (Strain sensors) like human motion detection, health care, damage detection, characterization of structures, exhaustion studies of materials, smart devices and many more opens a new way to next-generation printed and flexible smart electronic technologies and customized applications in Pakistan.

***Project No. 42:*** **Some Variants of Krasnoseiski's and Schauder's Fixed Point Results with Applications in Fractional Differential Equations**

**PI: Dr. Nayyar Mehmood**

**Co PI: Mr. Niaz Ahmad**

Funding: Rs. 1.41 million

Department: Mathematics and Statistics

Faculty: Basic and Applied Sciences

Date of Approval: 06/12/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Fractal fractional calculus is an emerging topic from last few decades. Fractal derivative is a natural generalization of Leibniz's derivative for discontinuous fractal media. It can be considered as a local fractional derivative. This work will provide theoretical base for the existence of solutions of fractal fractional DEs and fractal fractional IEs.

***Project No. 43:*** **Fast Training of SOM (Self Organizing Map) in Frequency Domain**

**PI: Dr. Saeed Badshah**

**Co PI: Dr. Amir Badshah**

Funding: Rs. 0.12 million

Department: Mechanical Engineering

Faculty: Engineering and Technology

Date of Approval: 06/04/2021

Funding Agency: NESCOM

***Summary:*** Facial Recognition is such an integral part of the brain's operations that it has a separate section dedicated just for this task. Researchers in last 3 decades have tried with varying degree of success to mimic this operation of the brain. to trusts mimic the brain function for researcher has opted to use neural network . But they are computationally very expensive for training purpose. And more difficult for large population. In this work we propose alternate way of training. In this approach data of images to frequency domain has been used. In the frequency domain a segment of the frequencies are used to train the SOM. This allowed the reduction in training time while keeping accuracy high.

Time is exponentially decreased but work on accuracy is underway.

***Project No. 44:*** **Developing Low-Cost Plastic Waste Recycling Machine**

**PI: Dr. Engr. Javed Ahmed Khan Tipu**

Funding: Rs. 0.60 million

Department: Electrical Engineering

Faculty: Engineering and Technology

Date of Approval: 26/10/2021

Program: Competition to develop low-cost waste recycling machine (PSF

Funding Agency: Pakistan Science Foundation

***Summary:*** The purpose of the project was to create a plastic waste recycling machine which effectively recycles the waste plastic into the 3-D printing filament. According to UN in 2018, of all these waste in Pakistan's major cities the total contribution of Plastic is 9%. Which shares a very huge amount of non-degradable solid waste. So recycled material can be used or reduced in order to avoid creating solid waste pollution. Also 250 million tons of garbage in Pakistan primarily consists of plastic waste and food scraps according to WWF report.

## B. Completed Projects

***Project No. 45:*** **Implementation of Recovery Techniques for Compressively Sampled Biomedical Images Using Graphical Processing Unit**

**PI: Dr. Jawad Ali Shah**

**Co PI: Dr. Adnan Umer Khan**

Funding: Rs. 6.40 million

Department: Electrical Engineering

Faculty: Engineering and Technology

Date of Completion: 25/11/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Graphics Processing Units (GPU) are powerful processors for image and video processing. GPUs consists many processors that can work in parallel with each other in order to achieve large processing task in extremely small amount of time. Digital Images consist of pixels, under each pixel can by processed by a single processing in parallel with many other pixels using other processors of GPU. GPUs can greatly improve the processing speed required to accurately recover under sampled Biomedical images.

***Project No.46:*** **Existence of Fixed Point Solutions of Locally and Globally Mappings Satisfying Generalized**

**PI: Muhammad Arshad**

**Co-Pi: Dr. Akbar Azam**

Funding: Rs. 1.35 million

Department: Mathematics and Statistics

Faculty: Faculty of Basic and Applied Sciences

Date of Completion: 07/05/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** This study intended to discuss the solutions of nonlinear functional equation satisfying Contractive conditions locally and globally on a complete metric space. Practically speaking there are contractions that do not hold on the whole space but on the subspace. The existing fixed point theorems are only applicable to those contractions which hold on the entire

space and indeed fail to answer if the mapping is contractive on the subspace. Solutions of those mathematical models which have corresponding integral or differential equation represented by nonlinear functional are contractive on the whole space as well as if they are only contractive on the subspace. The fixed point solutions of multi-valued mappings satisfying the contractive conditions on the whole space and also the case if they are contractive on the closed ball (sub set of the whole space were studied in this project.

***Project 47:*** **Sparsity based reconstruction of Medical images**

**PI: Dr. Muhammad Amir**

**Co-PI: Dr. Jawad Ali Shah**

Funding: Rs. 7.22 milliion

Department: Electrical Engineering

Faculty: Engineering and Technology

Date of Completion: 09/02/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** This project was based on the compressive sensing of biomedical data and its recovery. Four modalities were selected in the proposal i.e EEG, EMG, ECG and Ultrasound. Double temporal sparsity based reconstruction algorithm was suggested and applied for the recovery of compressively sampled EEG data. EMG was made sparse by applying a 2D-Discrete Cosine Transform while Sequence Walsh Hadamard matrix 1s used as a sensing matrix to simplify the hardware implementation along with noise removal for efficient recovery. Electrocardiogram (ECG) signal was not sparse in its original form, therefore, it was made comparable for further processing. High compression ratio was achieved by using Walsh sensing matrix. Experimental results proved successful ECG recovery with good PSNR Ultrasound. ELG, MG aid ECG. In Ultrasound data the required sparsity is attained using minimization. The results obtained from the analysis proved that the suggested approach for image reconstruction offers significant improvements in terms of SNR and SSIM as compared to state of the art techniques.

***Project No. 48:*** **Peristaltic Flow of a Dusty Fluid in a Curved Channel**

**PI: Dr. Ambren Afsar Khan**

Funding: Rs. 0.48 million

Department: Mathematics and Statistics

Faculty: Basic and Applied Sciences

Date of Completion: 26/04/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The area of research in this project was relevant to the existence of peristaltic motion of a dusty fluid in a curved channel. Many glandular ducts and physiological conducts are curved in nature. Peristaltic motion in a tube/ channel can take place due to the flexibility of

the walls. Consideration of such wall proper lies like damping and tension allowed us to tackle the real world problems (in biological system and industry) more efficiently.

***Project No. 49:*** **Development and Simulations of Mathematical Models for Y Pulsatile Flow of Blood In Stenotic Arteries**

**PI: Dr. Muhammad Sajid**

**Co-PI: Dr. Nasir Ali**

Funding: Rs 1.06million

Department: Mathematics and Statistics

Faculty: Basic and Applied Sciences

Date of Completion: 07/06/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** This project was aimed to develop and simulate appropriate mathematical models for (pulsatile) time-dependent blood low in a stenotic artery which takes into account both shear-thinning and elastic properties of blood. After simulating these models the results were compared with the previous studies in the literature. The results are useful in prediction of appropriate fluid models for developing mathematical models of blood flow through stenotic arteries.

***Project No. 50:*** **Artificial Neural Networks Modelling for Hydrological Data in Pakistan**

**PI: Dr. Ishfaq Ahmad**

**Co PI: Dr. Muhammad Akbar**

Funding: Rs. 0.77 million

Department: Mathematics and Statistics

Faculty: Basic and Applied Sciences

Date of Completion: 16/03/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** For sustainable development of the societies it is of urgent need to make predictions of different environmental events including floods, earthquakes, droughts, air pollution, wind gusts and many others with more accuracy. Since last few years artificial Neural Networks (ANN) are widely applied in a different fields such as Image processing, Signal Processing, power systems, medical studies, and pattern recognition and hydrology among others. ANN modelling has the capability of learning from the data. They can be proved as time saving for development of the models and especially useful for nonlinear and complicated processes which cannot be modelled through traditional methods. Stream flow forecasting is a challenging task for water resources engineers and managers. Reliable forecasts of stream flow makes an efficient operation of water resources systems within legal, political, technical and economic priorities. A forecasting system which was considered in this project with all important

spatial and temporal variation of the whole stream flow regime, delivers a good basis for appropriate control and management of the water resources system.

## C. Ongoing Projects

### *Project No. 51:* The Design of an Efficient Computer Aided Diagnosis System for Early Breast Cancer Detection

**PI: Dr. Ihsan Ul Haq**

Funding: Rs. 1.64 million

Department: Electrical Engineering

Faculty: Engineering and Technology

Date of Approval: 29/05/2017

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Cancer is one of the leading cause of deaths around the world. There are many types of the cancer in human body. The most common types of the cancers are bladder cancer, bone Cancer, brain cancer, blood cancer, breast cancer, Kidney cancer and lungs cancer. Among the major cancers, breast cancer is the most common cancer in women all over the world. Unfortunately, Pakistan has the highest incidences of breast cancer in Asia. The only way to save the life of cancer patient is to detect the cancer at its early stage. The significance of early detection of cancer can be guessed and understood from the fact that 90% of all types of cancers including breast cancer are curable if in is detected before stage 2. It is recommended by American Cancer Society (ACS) for every woman after the age 40 years to get regular screening tests who even do not have any visible symptoms. Different Computer Aided Diagnosis (CAD) systems have been designed recently in the advanced countries. Still in these systems novelty is required and furthermore these systems are developed on the basis of local databases. It is dire need to develop a CAD system indigenously on the basis on our local database so that these systems may support the radiologist and cancer expert in the detection of early and any stage cancer efficiently with at least acceptable accuracy for Pakistani Community. Furthermore, the system proposed in this project is expected to be economical.

### *Project No. 52:* Smart Feet

**PI: Dr. Abdul Jalil / Dr. Muhammad Amir**

Funding: Rs. 1.43 million

Department: Electrical Engineering

Faculty: Engineering and Technology

Date of Approval: 27/03/2019

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The prevalence of diabetes worldwide was estimated to be 2.8% in 2000 and is projected to be 4.4% in the year 2030, with the total number of people with diabetes expected to rise from 171 million in 2000 to 366 million in 2030. Among these people, an estimated 2500

people have to face surgical limb amputations daily. As diabetic patients' loss the sensation of their feet so they are not able to fuel any type of infection/wound in their feet and with the passage of time this infection transforms into Bone Infection. There are some traditional and current solution to check sensitivity of patient like Tip them which is a bar made of polymer-metal. It tests temperature sensation of a patient to tell the level of neuropathy. Nerve Conduction Study machine which is used for the measurement of the speed of conduction of an electrical impulse through a nerve. In order to provide real time solution for patient a solution is being developed which is able to detect diabetic ulcer (neuropathy) earlier and also to quantify the level of it. This non-invasive wearable feet protection device is placed in shoe and has the ability to charge itself during walk.

***Project No. 53:*** **Mathematical Models for Locomotion of Microorganisms in Complex Fluids**

**PI: Dr. Nasir Ali**

Funding: Rs. 0.1.49 million

Department: Mathematics and Statistics

Faculty: Basic and Applied Sciences

Date of Approval: 17/06/2019

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The bulk of the living beings with their diverse cell features falls in the category of eukaryotes. Though, majority of micro-organism are eukaryotes except bacteria. Bacteria are single celled micro-organism which constitute a large domain of prokaryotes that lacks organelles. Undulating surface model are commonly used to study the locomotion of micro-organisms like bacteria and spermatozoa. An undulating sheet on a layer of slime is used for analyzing the motion of gliding bacteria. Similarly, an infinite waving sheet in unbounded liquid inside a rigid or active channel is a commonly used model for spermatozoa locomotion. However, most of these models utilize the Newtonian constitutive equation to represent the rheology of the slime (or liquid in which sperm cell move). The main objective of this project is to investigate the mathematical models of gliding bacteria or spermatozoa using non-Newtonian constitutive relations.

***Project No. 54:*** **Automatic Optical Inspection System for Fault Detection of Printed Circuit Board through Image Processing Techniques**

**PI: Dr. Ayyaz Hussain**

**Co-PI: Dr. Muhammad Kaleem**

Funding: Rs. 0.100 million

Department: Computer Science and Software Engineering

Faculty: Basic and Applied Sciences

Date of Approval: 30/01/2019

Funding Agency: NESCOM

***Summary:*** Automated inspection is becoming an integral requirement of surface mount technology (SMT) assembly process. These high technology assemblies produce printed circuit boards (PCB) with tiny and delicate electronic components. With the increase in demand for such PCBs, high-volume production has to cater for both the quantity and zero defect quality assurance. The aim of this project is to develop an automatic fault detection system. This will reduce the inspection time and increase the throughput of PCB production and enhance quality of our products.

### *Project No. 55:* Synthesis, Characterization and Applications of Novel Nanostructures

**PI: Dr. Javed Iqbal**

**Co-PI: Qazi Muhammad**

Funding: Rs. 0.498 million

Department: Physics

Faculty: Basic and Applied Sciences

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** In the recent time, nanotechnology has attracted a lot of research interest. Any Nano-scaled material offers unique and interesting properties in comparison to its micro/macro-scaled version. In this regard, researchers from different areas of science (like physics, biology, chemistry and engineering) tried to give explanation of many phenomenon occurring in these materials at nanoscale. The interdisciplinary cross section character of nanotechnology within the ranges of chemistry/materials, medicine/life sciences, electronics/information technology environmental and energy engineering, automotive manufacturing as well as optics/analytics and precision in various ways has potential applications in the science and engineering of 21$^{st}$ century. The project aims to synthesis nanostructures using different approaches. Focusing on studying the existing synthesis methods for nanostructures and optimize them to get ultra-fine and controlled sized nanomaterials. Specifically the semiconducting magnetic nanostructures and their extensions are being studied

### *Project No. 56:* Simulation of Industrial plasma sources for material processing

**PI: Dr. Banat Gul**

**Co PI: Dr. Mushtaq Ahmad**

Funding: Rs. 0.460 million

Department: Physics

Faculty: Basic and Applied Sciences

***Summary:*** Plasmas are widely used in the semiconductor industry for fabrication of integrated Circuits i.e. plasma etching and deposition of different materials. Nowadays there is an increased interest for the use of very complex gas mixtures such as CHxFy, sometimes even in combination of HBr, Cl2, Oz etc. More specifically, in the future, HBr/He or HBr/Ar in combination with Cl2, O2. CF4, CHF3 etc. will be used to obtain a better understanding of the plasma Chemistry and etch mechanism in these mixtures through modelling and simulation. As part of the project, the complete set of gas phase and surface reactions can be constructed and

can be included in our simulation model to calculate the etch rates and investigate the etch phenomena in detail.

***Project No. 57:*** **Metal Oxlde Semiconductors Nanowires for Optoelectronic Applications**

**PI: Dr. Muhammad Arif Khan**

**Co-PI: Dr. Mushtaq Ahmad**

Funding: Rs. 0.497 million

Department: Physics

Faculty: Basic and Applied Sciences

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Metal oxide semiconductor nanowires (NWs) have been the focus of Current researcher due to their unique physical properties and potential optoelectronics applications. Different techniques have been developed to grow metal oxide semiconductor NWs including chemical reactions from aqueous solutions (e.g. electrodeposition, hydrothermal growth) and chemical vapor deposition (CVD) through vapor liquid solid LS) or vapor-solid (VS) growth. However, these techniques have limitations to develop cost-effective and efficient nanomaterials al commercial levels. A new modified thermal chemical vapor deposition (CVD) method under controlled growth for the fabrication of high quality and vertically well-aligned NWs is proposed. The corresponding structural, optical and electrical properties will be expected to improve significantly.

***Project No. 58:*** **Effect of Ca Doping on the electrical and magnetic spin dynamics of La.Ca, MnO: Perovskite manganite's Nano-particles**

**PI: Dr. Wiqar Hussain Shah**

**Co-PI: Dr. Ahmad Hussain**

Funding: Rs. 0.48 million

Department: Physics

Faculty: Basic and Applied Sciences

Program: Start up Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The purpose of this research project is to assess the effects of C'a doping on magnetic spin dynamics/interactions of LaCa, MnO3 magnates nanoparticles. The theoretical studies of magnetic nano particles shows that the spin structures often differ from those of perfect bulk materials. The low symmetry around surface atoms and around defects in the interior of the particles can lead to localized spin canting. And also thermal fluctuations between almost degenerate spin states may take place even at low temperature. This can lead to anomalous magnetization behaviors of nanoparticles. Furthermore. Exchange interactions between surface atoms of neighboring nanoparticles in close proximity can result in reorientation of the sub lattice magnetization directions in the whole particles. Which affects ultimately the magnetic nature of the system. In this project, we are focusing on the possible

effects of dopant on the above mentioned properties and their temperature dependence on the magnetic spin dynamics.

***Project No. 59:*** **Generalization of the Smith and Spalding Integral Method to boundary Layer Flows with Zero Pressure-Gradient**

**PI: Dr. Ahmer Mehmood**

Funding: Rs. 4.09 million

Department: Mathematics and Statistics

Faculty: Sciences

Date of Approval: 12/06/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** In this research project it is intended to improve the existing Smith and Spalding method to investigate the transfer of heat in laminar boundary layer flows involving zero pressure gradient. The heat transfer phenomenon in laminar boundary layer flows has such an important application in engineering process that numerous techniques have been devised to study this problem. The boundary layer flow problems are modeled through Navier-Stokes equations, which are highly non-linear in nature. Therefore, the exact solution of such flow problems is not an easy task to find and one always diverts his attention towards the approximate solution such as numerical or analytic solution. ln the latter class of these solutions, integral methods are an appropriate and suitable technique to handle the complex boundary layer flow problems in very easy manner. There are several integral methods present in the literature to study the effects of heat transfer in inner boundary layers but Smith and Spalding method is considered as the most suitable method. This is because the Smith and Spalding method is based upon some correlations, which are suggested on the basis of known exact solutions, instead of assumed velocity and temperature distributions in the form of polynomials as other integral methods do. The existing Smith and Spalding integral method is very useful to predict the accurate results of the thermal boundary layer flow problems with pressure gradient. In fact, the boundary layer flows are not always dependent on the applied pressure gradient and ii sole situations boundary layer flow occurs in the absence of pressure gradient. The existing Smith and Spalding integral method, in such scenarios, is not applicable at all. Therefore, the main objective oi the project is the extension of the Smith and Spalding method so that it may be applicable to the flow situations with zero-pressure gradient. Since the Smith and Spalding integral method is based upon some correlations, therefore the extension of this method will be done by Suggesting some new correlations. These Correlations will be developed after examining the different self-similar and non-similar thermal boundary layer flows without pressure gradient. After having done this the accuracy of the extended Smith and Spalding method for thermal boundary layer flows with zero pressure will be confirmed by comparing both the results and available literature.

### *Project No. 60:* Thermal and concentration analysis of two-phase flow through ciliated surfaces

**PI: Dr. Khadija Maqbool**

Funding: Rs. 0.60 million

Department: Mathematics and Statistics

Faculty: Sciences

Date of Approval: 20/04/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** In this project the quantitative analysis of temperature gradient and transmission of the corona virus in the respiratory to model the proposed problem, non-Newtonian fluid will be considered as a mucus that js present on the ciliated epithelium and works for mucociliary clearance to avoid the lungs from the COVID-19. The proposed model Will provide the detail results for the normal functioning of cilia that is very Important in mucus secretion from.

***Project No.61:*** **Estimation of Mean Salary of Employees Working in National Universities of Islamabad by Using Calibration Technique**

**PI: Dr. Shameem Alam**

Funding: Rs. 1.2 million

Department: Mathematics and Statistics

Faculty: Sciences

Date of Approval: 15/06/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** In survey sampling, we face many problems during data collection because of non-response, measurement error, survey bias, high variations, sampling and non-sampling errors etc. All these errors originate some inappropriate estimates of the unknown population parameters. The purpose of the project is to overcome these errors by introducing some auxiliary variables which can be used to improve these survey estimates. So a general method is required for estimation in the presence of these errors, and can be helpful for a systematic use of auxiliary information. Many approaches exist in literature; one such is the calibration methodology which is used to get the optimal calibrated weights.

The project is an attempt to study the importance of calibration methodology in survey sampling. In this project, our purpose is to estimate the mean salary of employees of different universities (public and private sector) of Islamabad using calibration methodology. The higher order calibrated weights will be produced by using the linear as well as non-linear constraints of the auxiliary variable.

***Project No. 62:*** **Workshops for Exposure of High School Students to Nanotechnology for Sustainable Energy in Pakistan**

**PI: Dr. Habib Ahmad**

Funding: Rs. 1.00 million

Department: Centre for Advance Electronic and Photovoltaic Engineering

Faculty: Engineering and Technology

Date of Approval: 08/05/2023

Program: U.S Mission and Pakistan-US alumni network (PUAN)

Funding Agency: U.S Mission and Pakistan-US alumni network (PUAN)

***Summary:*** The project aims to organize scientific enrichment workshops for public and private SSC and HSSC science students across Islamabad and Rawalpindi aimed at scientific exposure to Pakistan Energy and nanotechnology requirements. These workshops will be a single day activity per week at CAEPE, IIUI. One hundred direct and thousands of indirect students at their career defining phases would benefit from these workshops. Twenty-Five students would be trained per workshop. The students would be educated through hands-on learning and scientific fun activities via state-of-the-art nanotechnology tools. They would be given take-home aid materials.

***Project No. 63:*** **Software Defend Test and Stimulus Post (SDTP) for Automated and Standardized Testing**

**PI: Dr. Jawad Ali Shah**

Funding: Rs. 0.30 million

Department: Department of Electrical and Computer Engineering

Faculty: Engineering and Technology

Date of Approval: 10/11/2022

Funding Agency: NESCOM

***Summary:*** An Electronic system design remains incomplete without comprehensive testing with a profound a standardized testing setup. Generally, the hardware test setups are designed specific to the interfaces available in a system design. For example, in a serial port RS422 testing, generally use loopback concept which is based on the principal of verifying correctness of data packet transmission and receiving. However, critical parameters like amplitude level, standard deviation of pulse width and baud-rates etc. are hardly in focus and tested. Such extended parameters are normally tested by employing oscilloscopes and logic analyzers which itself is a tedious job and can focus only few signals. Moreover, the correctness of such for such a manual testing depends upon the expertise and experience of an individual involved. The project design feasibility for an intelligent test port whose operation can be defined in software which will test different types of signals like Analog, Discrete I/O, UART, SPI and

variety of parameters. Similarly, a research will be conducted for feasibility of a stimulus port. The project will exploit basic properties of two dimensional signal – time and amplitude – by which it can be defined. Time measurement will be done between two transitions of a digital signed by precession timers while amplitude measurement will be carried out by ADC for both analog and digital signals. The signal amplitude levels may need normalization before acquisition. The acquisisted measurements data will be transferred to display and saved on the computing machine for lateral reference. A stimulus port will work in a reverse flow as reference data will be used for transmission of digital signals while analog signals will be generated using DAC and filters.


6 CLEAN WATER AND SANITATION
11 SUSTAINABLE CITIES AND COMMUNITIES
13 CLIMATE ACTION
WATER MANAGEMENT, CLIMATE CHANGE & ENVIRONMENT

## .7. Water Management, Climate Change & Environment

### A. Approved Projects

***Project No. 64:*** **Development of Smart Groundwater Monitoring System to Calibrate and Validate GRACE Data for Real-Time Assessment of Groundwater Storage Depletion**

**PI: Dr. Khan Zaib Jadoon**

**Co PI: Dr. Jawad Ali Shah and Khalil Ahmed**

Funding: Rs. 11.00 million

Department: Civil Engineering

Faculty: Engineering and Technology

Date of Approval: 28/01/2022

Funding Agency: National Centre for GIS and Space Applications (IST) - HEC

***Summary:*** The overall objective of this project is to come up with vibrant and innovative socio-technical approaches concerning development of low cost smart groundwater monitoring system to monitor real-time groundwater depletion and couple measured data with Gravity Recovery and Climate Experiment (GRACE) satellite mission data to precisely estimate groundwater storage depletion at regional scale. The smart groundwater monitoring solution will measure in-situ real-time groundwater measurement at high special and temporal resolution. Furthermore, in-situ and remote sensing data will be used as an input data for groundwater simulator MODFLOW to infer groundwater flow dynamics for future prediction. The proposed solution will enable groundwater researchers and decision makers to have real-time access to the groundwater data and models with less cost and effort for sustainable groundwater management.

***Project No. 65:*** **Flash Floods Harnessing for the Prosperity of Arid and Resources-stressed Neglected Agro-based Communities (Pro NAC)**

**PI: Dr. Rashid Farooq**

**Co PI : Dr. Amjad Masood**

Funding: Rs. 4.69 million

Department: Civil Engineering

Faculty: Engineering and Technology

Date of Approval: 05/04/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Poor management of natural resources not only deprives a community from the associated benefits but sometimes causes fatal damages. In arid mountainous areas, flash floods are the major natural disaster which as a result brings disaster management, development, and security issues to the central priority. Due to steep gradient, flood flows with high velocity, which results in damaging the standing crops, irrigation system, houses, roads, and sometime human lives as well. Such areas have the potential for agriculture to meet the shortage of food if manage wisely. The project aims at finding acceptable flood harnessing

options for the prosperity of such communities. Project 'ProNAC' is targeting damage reduction of hazard, resource development for the community, and finally proposing combined various efficient harnessing solutions for the areas suffering hill torrents

***Project No. 66:*** **Fabrication of Mofs/Poms Composites as Efficient Adsorbents for Selected Gaseous Pollutants**

**PI: Dr. Maliha Asma**

**Co PI: Dr. Yifu Don**

Funding: Rs. 2.92 million

Department: Environmental Sciences

Faculty: Basic and Applied Sciences

Date of Approval: 29/11/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The project is comprised of series of MOFs/POMs composites filters shall be synthesized and characterized by various techniques e.g. FTIR, NMR, SEM and TEM. These composites filters shall be employed for adsorption of CO2. Optimization of these newly synthesized composites shall be executed for various parameters like pH, concentration, and pressure. For execution of proposed project, first UiO-66 and functionalized UiO-66-SO3H shall be synthesized and characterized and later on these shall be reacted with various series of new synthesized POMs (Keggin-type) to obtain composites. These shall be again characterized and employed for adsorption studies of CO2.

***Project No. 67:*** **Photocatalytic activity of Metal doped Zinc ox1de/Graphene oxide nanocomposites for the degradation of environmental pollutants**

**PI: Dr. Maryam Abbasi**

**Co PI: Dr. Rukhshanda Aziz**

Funding: Rs. 1.00 million

Department: Biological Sciences

Faculty: Basic and Applied Sciences

Date of Approval: 15/03/2021

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Lack of environmental sustainability is a vital problem due to growing demand of industries which led to environmental degradation. The excessive release and accumulation of toxic chemicals is generating huge burden on the environment. In recent years. Widespread use of pharmaceutically active compounds is of great concern due to undesirable effects on human beings. The synthetic dyes are also used irrationally due to their high performance and cost effectiveness but are extremely toxic and resistant to natural degradation Efforts for the safety of environmental dispersion and sustained applied research in the area of environmental remediation are required on war footing. Therefore, this research is an attempt to synthesize

novel meal doped Zinc Oxide/Graphene oxide nanocomposites which will act as photocatalysts for the degradation of pharmaceutically active compounds and dyes.

***Project No. 68:*** **Development and Implementation of Smart and Resource Efficient Irrigation System by Assessment of Water-Food and Energy Nexus**

**PI: Dr. Khan Zaib Jadoon**

**Co PI: Jawad Ali Shah & Dr. Nadeem Ahmed Sheikh**

Funding: Rs. 9.89 million

Department: Civil Engineering

Faculty: Engineering and Technology

Date of Approval: 16/12/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The overall objective of this project is to come up with vibrant and innovative socio-technical approaches concerning development and validation of Smart and Resource Efficient Irrigation System (SREIS) by aiming at optimization of the linkages within the WFE nexus and overcome the problem of all homogeneous irrigation of entire fields. The SREIS will be based on Internet of Things (LOT) and be able to irrigate heterogeneous crop stands with optimal water supply, and therefore, reduce the total needed irrigation water and energy consumption for tube wells.

## B. Completed Projects

***Project 69:*** **Improving Urban Environmental Performance Using Industrial Ecological Framework**

**PI: Dr. Muhammad Irfan Khan**

**CO PI: Dr. Zafeer Saqib**

Funding: Rs. 1.70 million

Department: Environmental Sciences

Faculty: Basic and Applied Sciences

Date of Completion: 24/03/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Keeping in view the principles of industrial ecology this study was aimed to investigate how flows of materials can be influenced by integrating various sectors within a human settlement. In this project, case study approach was adopted by selecting Islamabad as a geographical area representing a mix of industrial, commercial and domestic sectors. Data was collected at three level of metabolism i.e. micro level (individual business activities in any of the three sectors; industrial, commercial or residential represents one unit), meso level (companies representing more than one activity within their multiple units) and macro level, representing the aggregation of activities within a sector. Outcomes would help planners and policy makers to develop system and policies tor implementation of synergies identified in this

study which would lead to minimization in resource consumption and resultant waste generation.

***Project No. 70:*** **Response of Selected Grass Species towards Plant Growth Promoting Bacteria (PGPRS) isolated from Textile Wastewater**

**PI: Asma Rashid**

**Co PI: Rukhsana Tariq**

Funding: Rs. 0.39 million

Department: Environmental Sciences

Faculty: Basic and Applied Sciences

Date of Completion: 12/03/2021

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Developing countries such as Pakistan used textile wastewater that had not been treated directly for irrigation purposes. Especially in the industrial area. Which poses a serious threat to public health. It was hypothesized that these dual-acting microorganism can be used as way to protect plants by reducing the toxicity of dyes to plants. This project found ways to increase food production, increase GDP and increase the number of animals available for control, erosion and carbon sequestration.

***Project No. 71:*** **Air Sampling and Characterization of Air Pollution Particulate PM10 and PM Major Concern Is 16 Priority Polycyclic Aromatic Hydrocarbons) In Faisalabad, Lahore, Sialkot and Rawalpindi**

**PI: Dr. Maha Zafar Qureshi**

Funding: Rs. 0.2 million

Department: Environmental Sciences

Faculty: Basic and Applied Sciences

Date of Completion: 31/07/2021

Funding Agency: Pakistan Science Foundation

***Summary:*** The higher concentrations of PM in environment are harmful for human beings and are associated with higher risks of morbidity and mortality. Moreover, the presence of PM in environment and soil will reduce the productivity and growth of plants, contributing towards the disturbance in food chain. This will be the first study in Pakistan to assess the concentrations of PM and PAHs in environment and the results will be used to analyze the impacts on human and plant (edible crops) health. Furthermore, the local plant species will be used to assess the phytoremidiation potential to control the concentration of PAHs in soil and environment.

***Project No. 72:*** **Synthesis of Task Specific Protic Ionic for Co2 Separation Technology**

**PI: Dr. Sabahat Sardar**

**Co PI: Dr. Syeda Aaliya Shehzadi**

Funding: Rs. 0.5 million

Department: SA-CIRBS

Faculty: Basic and Applied Sciences

Date of Completion: 30/08/2021

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The increasing carbon dioxide (CO2) content in natural gas reserves discovered around the world is one of the major issues facing the industry nowadays. Protic ionic liquids (ILs) and polymeric (IL.s) were proposed as promising alternatives for capturing CO2. Polymerized ILs, (PILs) which could be formed by polymerizing the IL's monomer, will incorporate macromolecular structure with ILs. This would enhance the CO2 sorption as compared lo monomer ILs. Although PILs have been known to be used as CO2 adsorbents, there had been some limitations in adsorption capacity seen for PILs. PILs in solid form were utilized in this project to address the co2 separation technology.

### *Project No. 73:* Assessment of Allelochemical Potential in Medicinal Plants of Pakistan and Application to Agro-Environmental Conservation

**PI: Muhammad Ibrar Shinwari**

**Co PI: Dr. Shazia Irum**

Funding: Rs. 2.78 million

Department: Environmental Sciences

Faculty: Basic and Applied Sciences

Date of Completion: 08/09/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Present study specific bioassays have been prepared to check the allelopathy in a natural way. Hence, the uniqueness of the present allelopathy study is that the latest methods of specific bioassays, namely, "Sandwich Method" for leaf litters evaluation and "Dish-pack method" for volatiles evaluation shall be applied that may lead towards natural and environmentally friendly way of managing weeds without herbicides. Moreover, there is a strong need to develop a national database of allelopathic medicinal plants to formulate a biological control strategy in future.

## C. Ongoing Projects

### *Project No. 74:* A GIS based floral Altas of Northern Pakistan

**PI: Dr. Zafeer Saqib**

**Co-PI: Dr. Syeda Maria Ali**

Cost: Rs. 3.924 million

Department: Environmental Sciences

Faculty: Basic and Applied Sciences

Date of Approval: 20/01/2017

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The study is focused on mapping floral diversity in northern mountainous part of the country (Rawalpindi district and northwards) that can be recognized as hotspot of biodiversity within country harboring majority of the flora reported from Pakistan. Since the effective conservation planning and sustainable use of these floral resources would demand the spatial information on their occurrence and the status of their habitat conditions. The project is an attempt to bring these data in form of an online atlas that will become a handy tool for conservation planning and management with flexibility to be extended at country or regional level. A considerable attention is paid to the restricted range (rare. endemic or threatened) species enlisted through existing literature. The resultant floral and habitat condition mapping will lead to identification of new locations of conservation interest through gap analysis and assess effectiveness of protected areas network of the country.

### *Project No. 75:* Fabrication of CNTs-Phthalocyanine Hybrid Based Sensor for the Detection of Toxic Gases

**PI: Dr. Kiran Abdullah**

**Co PI: Dr. Ghulam Mustafa**

Funding: Rs. 0.48 million

Department: SA-CRIBS

Faculty: Basic and Applied Sciences

Date of Completion: 01/03/2021

Program: Startup Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Gas CTS performance is based on several parameters namely, sensitivity, selectivity, response time energy consumption, reversibility, adsorptive capacity, fabrication cost and these parameters should be addressed properly during the fabrication of a gas sensor to achieve optimum performance. There are several factors leading to gas sensors instability like design errors, phase shifts, poisoning triggered by chemical reactions, variation of the surrounding environment etc. CNTs are well known to detect harmful gases (Such as NO2 NH3 stc.), thus plays an importance role in keeping our environment unpolluted. These hybrid materials were used to make new gas sensor devices with improved and unique characteristics.

### *Project No. 76:* Appraisal of Invasive Species Richness as an Environmental Threat to Native Vegetation in Islamabad and Murree Region

**PI: Dr. Muhammad Asad Ghufran**

**Co-PI: Dr. Zafeer Saqib**

Funding: Rs. 3.03 million

Date of Approval: 27/03/2019

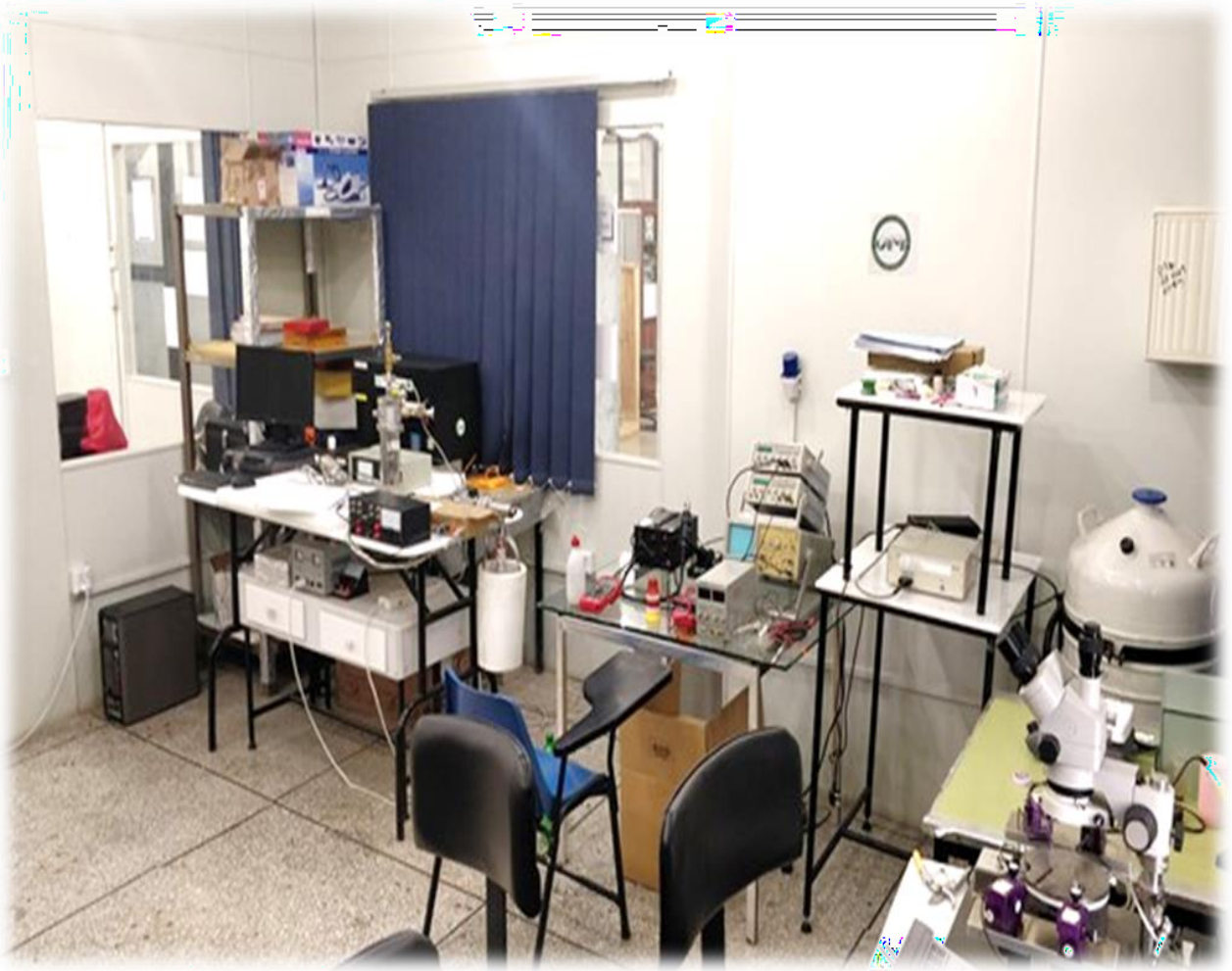
Department: Environmental Sciences

Faculty: Basic and Applied Sciences

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The proposed study targets the assessment of the invasive Plant Species in various residential and non-residential sectors of Islamabad, with an aim to assess the extent of richness of these species in the residential, industrial and institutional sectors of Islamabad and Murree bills of District Rawalpindi. The project aims towards categorizing various sectors of Islamabad to address the issue of the invasive alien plant species diversity and the percent cover of the native and non-native flora is evaluated to have a fair idea regarding the invasion phenomenon and non-native species richness in the region.



8 DECENT WORK AND ECONOMIC GROWTH

# DEVELOPMENT ECONOMICS, INNOVATIVE GOVERNANCE & REFORMS & POLICY INTERVENTIONS

## .8. Development Economics, Innovative Governance & Reforms & Policy Interventions

### b. Completed Projects

***Project No. 77:*** **Bayesian Analysis of Money Demand Function of Pakistan Economy**

**PI: Dr. Muhammad Akbar**

**Co PI: Dr. Ishfaq Ahmad**

Funding: Rs. 0.92 million

Department: Mathematics and Statistics

Faculty: Basic and Applied Sciences

Date of Completion: 26/04/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** This project was an effort to develop an econometric model of money demand for Pakistan economy using Bayesian approaches which are considered superior especially in small sample size. Hence, the proposed study will provide a more accurate model of money demand in Pakistan that might be helpful for monetary policy makers. Moreover, the study would open the door for application of Bayesian econometric techniques among research scholar of economic modeling in Pakistan.

***Project No. 78:*** **Drivers of SMEs Internationalization. A Comparative Study of Chinese and Pakistani Entrepreneurs; CPEC Perspective**

**PI: Dr. Syed Zulfiqar Ali Shah**

**Co PI: Dr. Mazhar Hussain Chaudhry**

Funding: Rs. 2.86 million

Department: Management

Faculty: Management Sciences

Date of Completion: 23/02/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Small and Medium Enterprises (SMEs) especially in emerging economies undergo through numerous challenges and lack of institutional settings which hinder their survival and growth. Thus, they always seek new opportunities for their smooth and stable operations. However, the identification and exploitation of new opportunity (i.e. international market entry) does not come itself. It requires adequate resources and capabilities to avail these opportunities. Presently, one of biggest opportunity for Chinese and Pakistani SMEs has already been introduced in the shape of "CPEC". To avail this opportunity, this research project examined the role of entrepreneurial orientation on SMEs internationalization with moderating role of financial capabilities and IT capabilities. These drivers play significant role in SMEs' success but have always been ignored by prior studies in internationalization processes. This

research aimed to explore the most significant determinants that help Chinese and Pakistani entrepreneurs to trade in international markets as well as to avail the CPEC opportunity.

***Project No. 79:*** **Role of the Constitution 1973 in Good Governance and Human Development (A Critical Analysis in the light of the Socio-Political and Religious Culture of Pakistan).**

**PI: Naseem Razi**

Funding: Rs. 4.00 million

Department: L1aw

Faculty: Shariah & Law

Date of Completion: 03/08/2021

Program: Thematic Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** This research was aimed to explore the importance of a constitution in good governance and human development, as both are among the primary objectives of the modern development of constitutionalism. In this context, this research intended to analyze critically, the roiled of the constitution of Pakistan 1973 in achieving good governance and human development in the light of the socio-political and religious culture of Pakistan. At present Pakistan is suffering from many critical socio- economic and political issues and most of them are related directly or indirectly. to the issues of good governance and human development thus, this research tried to point out some major flaws in the existing structure of the constitution due to which the constitution 1973 could not achieve its primary tasks i.e., good governance and human development

***Project No 80:*** **Title: Perception Index for Shariah Legitimacy (PISL) of Islamic Banking in Pakistan: Analysis and Construction**

**PI: Dr. Abdul Rashid**

Funding: Rs. 2.386 million

Department: IIIE

Date of Completion: 23/11/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The Islamic Finance represents one of the fastest growing industries in the world. As reported by IFSB (2015), the double digit growth (17-18%) Is supported by the Islamic financial assets around USD 1.87 trillion. Islamic banks in Pakistan, too, have progressed at growth rate around 20-24% building 10.4 share in country's banking assets and 1.2% of the global market (SBP, 2015). However, the Islamic banking practices have invited numerous concerns about their legitimacy in view of normative injunctions of Shariah, in addition to the usual compliance of the operating procedures and processes related to the products and practices. The primary focus of the research rests mainly with analyzing practices of Islamic banks in terms of their value oriented contributions to the society on one hand and evaluating Shariah compliance of these practices on the other. The research is expected to address the

issues helpful in framing future outlook of Islamic banking in the country by increasing the efficiency and impact on people as well as the economy. The Shariah index is expected to help the regulators State Bank of Pakistan and the Islamic banks to improve upon their performance, particularly in terms of normative concerns as enjoined by Shariah injunctions, as well as, to build the confidence of the stakeholders in greater interest of efficiency and sustainability of the Islamic banking industry.



# SOCIAL ISSUES: SOCIOLOGY, EDUCATION & PHILOSOPHY

## .9. Social Issues: Sociology, Education & Philosophy

### A. Approved Projects

***Project No. 81:*** **Quality Assurance for Online Teaching in Higher Education in Pakistan**

**PI: Dr. Fouzia Ajmal**

**Co PI: Dr. Nabi Bux Jumani**

Funding: Rs. 3.07

Department: Education

Faculty: Social Sciences

Date of Approval: 24/01/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** In the present pandemic cOVID-19, all the higher educational institutions had to change the modes of teaching and learning from traditional/face to face to online modes. The quality assurance in online teaching is the most important problem for the students in higher educational institutions especially in developing countries like Pakistan in the current situation. The "Quality Online Learning and Teaching (QOLT)" developed by California State University (2017) will be utilized as framework of evaluating the quality including the variables of Introduction and Courses Overview, Assessment of Pupil Learning, Students Interaction and Community, Instructional Materials and Resources, Facilitation and Instruction, Accessibility and Universal Design, Mobile Design Readiness, Technology for Teaching and Learning and Course Summary and Wrap-up.

***Project No. 82:*** **Development Of Parent Focused Child Sexual Abuse Prevention Programm: Lt's Applicability in the Context of Pakistani Society and Law**

**PI: Dr. Mamoona Ismail Loona**

**Co PI: Dr. Anila Kamal**

Funding: Rs. 2.45 million

Department: Psychology

Faculty: Social Sciences

Date of Approval: 25/01/2022

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Child sexual abuse (CSA) refers to the involvement of a child in sexual activity which is unlawful, or, although not illegal, to which a child is unable to give informed consent (World Health Organization WHOJ 1999). Sexual activity may include intercourse, attempted intercourse, sexual touching. Genital exposure, exhibitionism, or exposing children to adult

sexual activity or pornography, and the use or the child for prostitution or pornography. CSA affects children across a range of nationalities, ethnicities, and cultures and lead to subsequent mental health and behavioral consequences. Parents are vital to the successful prevention of child sexual abuse (CSA). In the present study semi structured interviews will be conducted with a sample of 100 parents of preschool- or primary school-aged children in Islamabad. Rawalpindi. Lahore having diverse gender. Age, and socioeconomic status to know their perceptions, response and practices of CSA prevention. Mainly development of parent focused CSA prevention program will be carried out.

### *Project No. 83:* Muslim Women Popular Genre

**Dr. Aroosa Kanwal (Co-Lead), (Co-Investigator) Dr. Asma Mansoor , Dr. Amal Sayyid**

Department: English, FLL
Date of Approval: 01/04/2021
Funding Agency/Institute: AHRC & Birmingham University, UK

***Summary:*** This project aims to bring together researchers to examine the global turn in popular fiction, and the concurrent 'popular turn' in Muslim women's writing through a focus on popular and genre writing by Muslim women. The network will support and further develop local centers of expertise (led by the investigating team) while simultaneously creating new and meaningful global connections between researchers through digital and publishing collaboration. Existing research on Muslim women's writing has tended to silo itself, within disciplines and language groups; it is rare that researchers working on Anglophone literature will collaborate with those researching literatures in Arabic, Urdu, and Punjabi for example. The dual local/global focus of this network is aimed at building new and lasting connections across languages, disciplines, and genres, to produce innovative and important outputs and resources that will benefit both local research groups and the global research community.

***Project No. 84:*** **Shattering the Glass Ceiling: Challenges and Opportunities for Women Academic Leaders in Pakistani Universities**

**PI: Dr. Samina Malik**

**Co PI: Dr. Asma Manosoor and Dr. Ishrat Siddiqa Lodhi**

Funding: Rs. 29.02 million

Date of Approval: 29/05/2022

Department: Education

Faculty: Social Sciences

Program: Local Challenge Fund

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** This projects aims to unpack the obstacles in the path of women academic leaders and the possibility of turning them into opportunities Pakistan's public sector universities. By leadership the project implies positions of authority that cater to an academic institution's bureaucratic and academic interests while dealing "with resistance and recalcitrance" and include Heads of Departments, Deans, Directors and Vice Chancellors. With an anticipated increase in Pakistani women academic leaders in the future, they require a more holistic approach in forging an impactful leadership while facilitating gender equity in Pakistan's public sector universities, a need to which our project caters. Once we have acquired qualitative and quantitative data, a leadership training program will be initiated in alliance with international and local experts to train Pakistani women academics, i.e., those who are already performing leadership roles as well as those will take on the mantle in the near future. This is necessary in Pakistan because internationally, trainings are provided to women in health care, civil services, hospitality industry, etc., by the University of Manitoba (Women in Academic Leadership. Likewise, the project aims to forge collaborations with international institutions and conduct workshops and webinars to impart a leadership training to Pakistani women academics that is aligned with their unique contextual requirements.

## B. Completed Projects

***Project No. 85:*** **Effects of Parenting Practices on Youth Risk Behavior in the Punjab**

**PI: Dr. Saif-Ur-Rehman Abbasi**

**Co PI: Mr. Qaisar Khalid Mehmood**

Funding: Rs. 4.00 million

Department: Sociology

Faculty: Social Sciences

Date of Completion: 22/02/2021

Program: Thematic Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Parenting practices contribute in developing risk behaviour among the children. Risk behaviour refers to the tendencies to engage in potential harmful or dangerous behaviour. Socio-psychological research studies suggest that negative parenting practices are associated with risk behaviour among children. This becomes more problematic for countries like Pakistan who have large chunk of youth as reports highlights that they are prone towards violence and risk taking. In this scenario, scientific study is required to understand the nature of relationship between parenting practices and youth risk behaviour in a Pakistani society. This study was aimed to fulfill the following research gap and develop parenting practices measurement tool for Pakistani society.

***Project No.86:*** **Role of National Curriculum for Moral Development in Pakistan**

**PI: Dr. Samina Yasmeen Malik**

**Co PI: Dr. Nabi Bux Jumani**

Funding: Rs. 2.9 Million

Department: Education

Faculty: Social Sciences

Date of Completion: 28/04/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The progress of a nation depends on the moral and integrity level of the nation. Developed and advance nations are well known in science and technology but their education system also gives weightage to moral development. It is due to the lack of moral education that people are conscious just for their benefits and for the benefits of their own family: they are not showing interest for the welfare and betterment of whole society. Although importance of value education has been highlighted by various educationist and scholars in every era but the thing that is missing is the sincere inculcation of moral education in our educational setup. The result

of his missing phenomena is that people have lost the qualities of helping other, tolerance, honesty and humanness. Intolerance, corruption, violence selfishness and cheating other have become common practice in our society. This study had focused on how the value system was developed through education system and what type of interventions were needed.

***Project No. 87:*** **Evaluation of the Competencies of Teacher Educators in Pakistan**

**PI: Dr. Nabi Bux Jumani**

**Co PI: Dr. Samina Malik**

Funding: Rs. 1.26 million

Department: Education

Faculty: Social Sciences

Date of Completion: 28/04/2021

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** In Pakistan there is no specific program of CPD for teacher educators. In teacher training colleges of Pakistan and Depths of Education in various universities B.Ed and M.Ed. etc are offered. Due to lack of CPD program for teacher educators the quality of their student-teacher (Teachers under training) remains low. Actually there is difference between the competencies of school teachers and teacher educators. Many initiatives have been taken by the Govt like launching Teacher Training Project ADB assisted and Pre-service teacher education project assisted by USAID. In Pakistan, the process of teacher preparation is not properly aligned with the real needs of teachers and students as a large gap exists between acquired and required knowledge and competencies. With this spirit this research project emphasized on the competencies of teacher educators as well as curriculum being taught to the trainee teachers.

## C. Ongoing Projects

**Project No.88: Development of Culturally Responsive Teacher Education Programs for Universities of Pakistan**

**PI: Dr. Syed Abbas Rizvi**

Funding: Rs. 0.409 million

Department: Education

Faculty: Social Sciences

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Pakistan is a good example of a multicultural country and a good example of a rich cultural mosaic. Culture is an invisible control mechanism operating in persons thoughts

whatever he/she do, think or act. It is a real example of Multicultural iceberg and multiculturalism although it is a Muslim Country but there is a big cultural and sectorial divide in the country. The problem is multiculturalism is exist, but no one is ready to accept and respect this fact. This disrespect of another culture is one of the basic reason of extremism in Pakistan. Accepting multiculturalism means acceptance of others faith, religion, dress, food, living style, thinking patterns and many other things. There are several ways to resolve the issue but education is the most appropriate tool. Within the area of education, teacher education is one of the best way. This research is designed to prepare culturally responsive teachers who are capable to teach in multicultural environment in such a way that students accept others point of view, culture and cultural difference.

***Project No. 89:*** **Quality Teaching in the Twenty - First Century Classroom**

**PI: Dr. Azhar Mahmood**

**Co-PI: Dr. Nabi Bux Jumani**

Funding: Rs. 1.55 million

Department: Education

Faculty: Social Sciences

Program: National Research Program for Universities

Funding Agency: Higher Education Commission of Pakistan

**Summary:** Students are active learners in the 21st century rather than simple listener or spectators. According to Saavedra and Offer (2012) 21 century skills and competencies are complex and often challenging to teach. Thus major objectives of this study will be to find out existing teaching practices in the classroom at secondary school level, point out gaps between existing teaching practices and demand of the quality teaching in the 21$^{st}$ century as well as to discuss quality teaching in the new era. Certain percentages of secondary school students, secondary school teachers and principals are taken as a sample from all over the Pakistan to get enrich data. Explanatory Sequential Mixed Methods Research Design are used to get data while applying mixed methods approach. Findings of the study can be used by Government sectors as well as private sectors, NGOs. Particularly by principals to improve teaching practices and enhance students learning outcomes. Teachers will be able to use these findings as a self-reflection tool to help them to understand, analyze and focus their own teaching practices for improvement of student learning.

***Project No. 90:*** **Socio Cultural Risk Factors of Thalassemia propagation in Punjab**

**PI: Dr. Muahmmad Babar Akram**

**Co-PI: Dr. Saif ur Rehman Saif Abbasi**

Funding: Rs. 4.00 million

Department: Sociology

Faculty: Social Sciences

Date of Approval: 11/05/2016

Program: Thematic Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Thalassemia is a major public health problem across the World and especially in developing countries like Pakistan. In the Middle East and Asian countries beta thalassemia predominates and have a high prevalence across the World. Thalassemia may lead to a variety of physical, psychological and social burdens in patients and their caregivers. In Pakistan approximately more than 5 to 6 million children are suffering from this disease and over 5000 Thalassemia carriers are born every year. Socio-cultural risk factors are being studied with reference to this public health problem in Punjab.

***Project No. 91:*** **Endangered Languages of Northern Pakistan: A Study of Ethnolinguistic Minorities**

**PI: Dr. Fauzia Janjua**

**Co-PI: Sadia Irshad**

Funding: Rs. 3.25 million

Department: English

Faculty: Language and Literature

Date of Approval: 04/04/2018

Program: Thematic Research Grant Program

Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Language is a dominant identity marker of any community. However, many languages spoken in Pakistan, like in many other multilingual societies around the globe, suffer a gradual death. One of the important factors Responsible for this language plight is the native speakers' negative Attitude towards their language. Sociolinguists view this negative Attitude as cultural cringe, whereby people consider their own culture Inferior and abandon it gradually. Political and utilitarian impact of Global imperialism is also an important factor leading to a change in Linguistic map of a particular region. Drawing upon these factors responsible for language death, the endangered Languages spoken in the northern of Pakistan with a comparative Methodology involving diachronic and synchronic study are being examined

***Project No. 92:*** **Digitalizing Folk Wisdom: A Project of Collection, Translation, and Study of Folk Literature in Major Pakistani Languages**

**PI: Dr. Muhammad Sheeraz Dasti**

**Co-PIs: Dr. Akhtar Aziz and Dr. Farrukh Nadeem**

Cost: Rs. 10.50 million
Funding: Rs. 10.50 million
Department: English
Faculty: Language and Literature
Date of Approval: 28/12/2010
Program: National Research Program for Universities
Funding Agency: Higher Education Commission of Pakistan

***Summary:*** The contemporary world is speedily building a cyber-megalopolis. This internet supercity will house goods from various parts of the planet. But the disadvantage of living in a fully globalized world would be that most of the omnipresent 'global' would have little or no share from our local. Unfortunately, online representation of Pakistan's cultural products is very low. In the coming years, this would not just alienate Pakistani youth in this new internet metropolis but also leave them vulnerable to foreign cultural onslaught. Therefore, it is imperative to digitalize our folk literature. Wepropose "Digitalizing Folk Wisdom: is a project of collection, translation,and study of folk literature in major Pakistani languages" to collect from the far and wide of the country 2100 items of folk literature (tales, qissas, poetic narratives, etc.). These literary pieces coming from seven major Pakistani languages (Balochi, Brahvi, Pashto, Punjabi, Saraiki, Sindhi, and Urdu) are being transcribed (if in oral form) in Perso-Arabic scripts. All of them will also be translated into English for foreign viewers/readers. Similarly, the texts available in written form will be made into audio-text. The audio texts, along with their transcription and translation (to be given as subtitles) would be placed online on the website of the Literary Society of Pakistan and its YouTube channel. The transcription and translation would also be published in book forms, with each volume consisting of the folk literary items of one language and their English translation.

***Project No. 93:*** **Optimum use of Existing Resources: A prototype model of Road Safety**

**PI: Prof. Dr. Nabi Bux Jumani**

Funding: Rs. 7.50 million
Department: Education
Faculty: Social Sciences
Date of Approval: 23/03/2022
Program: Grand Challenge Fund
Funding Agency: Higher Education Commission of Pakistan

***Summary:*** Rampant urbanization, high population density, road crashes and traffic

congestions have become serious Issue in the contemporary world. Pakistan is one of the most vulnerable countries to the road crashes with an estimated more than 2500 deaths each year. It loses 9 Billion US$ per year due to road crashes, equivalent to 4% of GDP (Ministry of Communication, 2018; Zaman, 2019), in addition to environmental degradation. These human and financial losses are higher than those in war on terror. The number of registered vehicles in Pakistan by 2018 was 18 million, which is expected to rise up to 50 million in 2025, and up to 65 million by 2030. The current unbridled pace of urbanization and motorization have worsened the situation of road safety in Pakistan. Currently, the urban population in Pakistan is 37%, which is expected to be more than 50% by 2050. Population density in Pakistan is 251 per km', whereas up to 2500 per km² in metropolitans. With a chaotic, unregulated transport system, the road safety in Pakistan has become a serious challenge, which can turn into a catastrophe if urgent steps are not taken.

This project assumes that the futuristic urban planning can become effective only by using innovative ideas and by employing smart technologies. By applying theoretical debates on human behavior, community mobilization and effective management of the existing resources, and by engaging Public Private Partnerships (PPP) if needed, this project intends to contribute to the better urban planning and safe and healthy dwelling. To address the urban planning challenges of road safety, traffic congestion, and deteriorated air quality, this mega project proposes four core objectives with multiple sub-objectives: (1) Designing of a replicable prototype model of Smart Public Transport (SPT) and Smart Parking by employing and optimizing the existing resources and infrastructure; (2) Increasing the efficiency of Electronic Surveillance System with centralized command and control unit to monitor traffic, and to maximize the road safety; (3) Developing a sustainable mechanism to gauge on-road air pollution to reduce vehicles' carbon emission; and, (4) To prepare strategies for human behavior modification for safe road usage practices through social research, and advocacy and lobbying to update legislation and transport policy.

The project will be carried out with renowned academic and sectorial partners and research collaborators from national and international public institutions, including Pakistan, UK and Canada. The research team has developed a comprehensive methodological plan to systematically identify and address the real and potential causes and patterns of road delinquency and inefficient planning, including but not limited to, the hotspots for road accidents and traffic congestions, vehicles with higher carbon emission,

lackadaisical behavior of road users, faults in vehicle manufacturing and maintenance, defective drivers' licensing mechanism, outdated legislation, and problems with ineffective public awareness and training campaigns. Data will be collected on traffic density, diversity, and magnitude on different, routes of Rawalpindi and Islamabad, which will help in developing a model or Centralized data center to manage vehicles and traffic data on the runtime. This data will be used for effective traffic monitoring, designing smart public transport and parking system, and road safety. The project deliverables include a comprehensive road usage, vehicle and commuting database: a prototype model of smart public transport and smart parking with Central Command and Control Unit for electronic surveillance; a smart licensing model; a plan to monitor on-road air quality and vehicles' carbon emission; an effective and feasible business plan for public-private partnership; effective behavior modification strategy for the commuters and road users; and, advocacy and campaign lobbying for policy and legislation to maximize the road safety. The project impact will be reduction in road accidents and traffic congestion; better health, and social and economic wellbeing of the citizens; and, environmental conservation.

5

# RESEARCH PRIZE

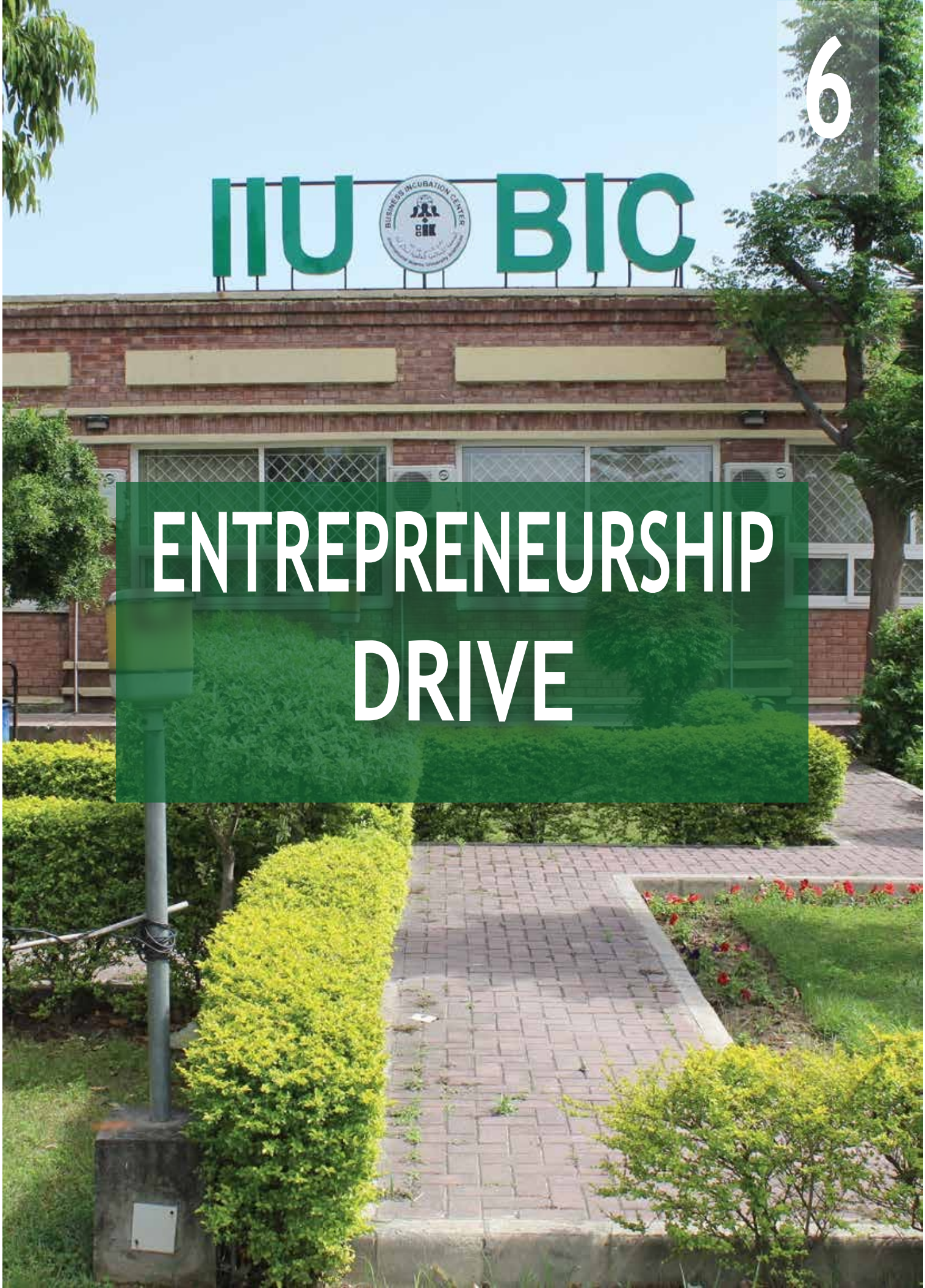
# Research Prize

A total of 7 faculty members **of** International Islamic University Islamabad (IIUI) have been ranked among the best researchers in the 'World Ranking Top 2% Scientists' list for the year 2023.

An independent study was conducted by Prof John Ioannidis and his team at Stanford University, Stanford, CA, USA. This ranking releases its global list that represents the top 2% of Scientists over 100,000 top-scientists in various disciplines in every October. The seven IIUI Professors include 6 from the Department of Mathematics and Statistics including Dr. Rahmat Ellahi, Dr. Tahir Mehmood, Dr. Ahmed Zeeshan , Dr. Muhammad Sajid, Dr. Nasir Ali and Dr. Tariq Javed. The seventh Faculty member is Dr. Abdul Rashid from International Institute of Islamic Economics (IIIE).

IIUI Rector Dr. Samina Malik and President Dr. Hathal Homoud Al-Otaibi have felicitated the faculty members on this achievement. Lauding the efforts of the faculty members, they said this milestone of university's success will help in improving ranking and it will also be a source of achieving university's lofty goal of academic excellence. IIUI leadership also assured full support for constructive research and faculty's steps for betterment in the field of academic excellence.

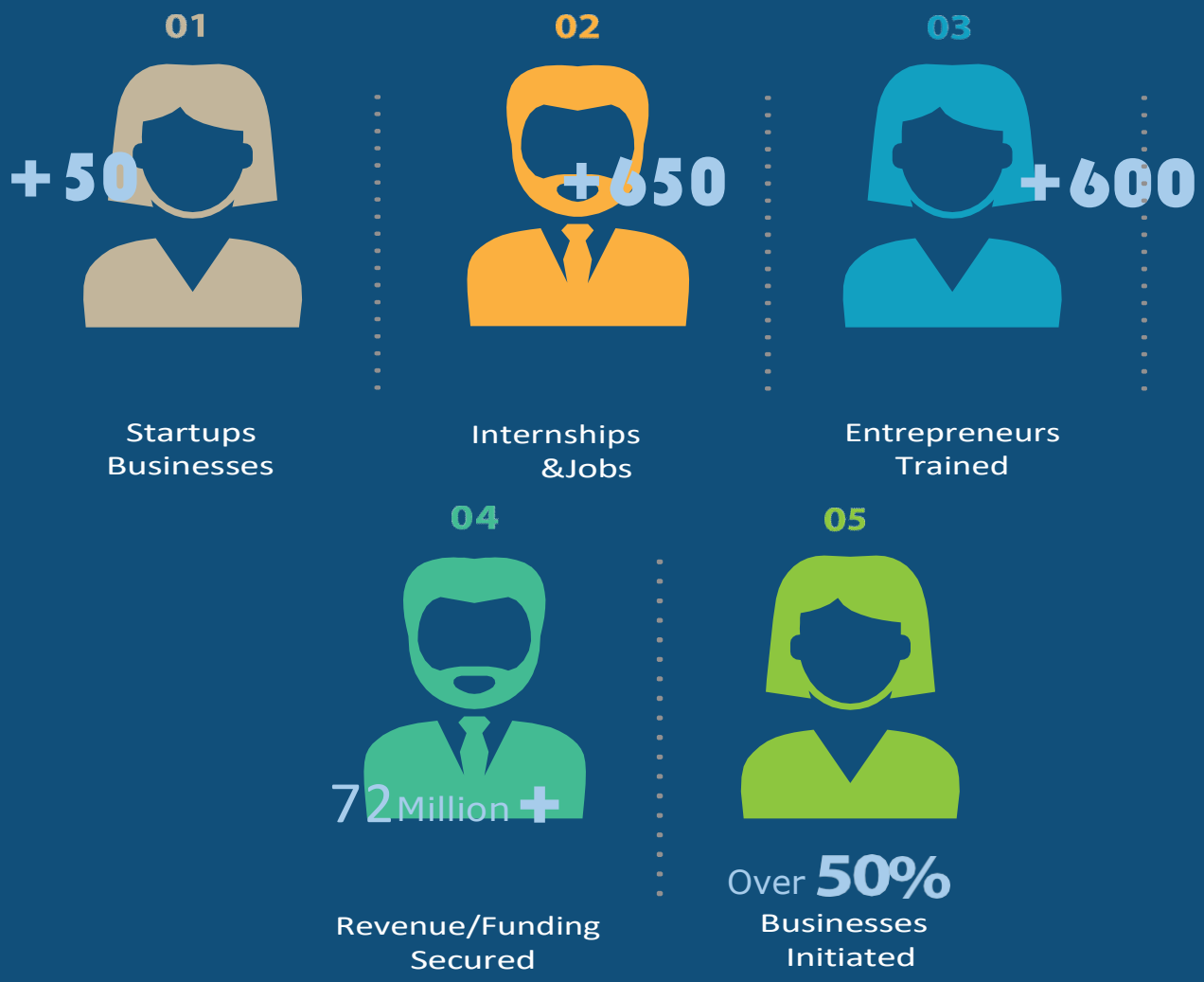
Dr.Nasir Ali has been awarded the PAS gold medal 2021 in Mathematical Sciences by the Pakistan Academy of Sciences for his outstanding contributions to research and applied Mathematics. The award was formally conferred to him during the meeting of the PAS general body on 27/11/2021 in PAS secretariat Islamabad, Pakistan.




# ENTREPRENEURSHIP DRIVE

BUSINESS INCUBATION & ENREPRENEURSHIP

Business Incubation is a business support process that helps to speed up the successful development of newly formed and emergent companies by providingaspiringentrepreneurswithselectionofpro-activeconcentrated guidance, value-added support & access tocritical tools,information, mentoring/coaching, capacity building, networking opportunities, resources & services.



## BUSINESS INCUBATION & ENREPRENEURSHIP


# Distinguished Projects

### FATA Economic Revitalization Program (FERP)

With the support from USAID, Bahria University in collaboration with International Islamic University, Islamabad and United Nations Development Program (UNDP) has impart edits incubation services to 360 entrepreneurs from the North Waziristan, South Waziristan and Khyber District as part of the UNDP's FATA Economic Revitalization Project (FERP). This program resulted in the establishment of 200 plus new businesses in FATA region.

### Dream Builder Entrepreneurship Program for Females

With the support from US State Department, IIUBIC and Lincoln's Corner, Central Library IIUI collaborated to successfully impart Women Empowerment Dream Builder Entrepreneurship program at IIUI for more than 200 participants.

### Establishment of Science , Technology & Business Space (STBS) Pilot at IIUI

BIC, IIUI has leaped to propose the establishment of Science, Technology & Business Space (STBS) Pilot which is also envisioned in the Strategic Plan of BIC, IIUI 2022-2026. In this regard several meetings under the chairmanship of the Worthy President International Islamic University Islamabad (IIUI) were held to establish a Science, Technology and Business Space (STBS) - Pilot at Al-Farabi Research Complex. The proposal was approved by the worthy President IIUI and in its first phase of completion.


**Secured Grant of Rs 31 Million under HEC's HEDP Project Initiatives**
**Project Title:** Establishment of AI & IOT Software House at International Islamic University, Islamabad

The project aims to establish a state-of-the-art software house specializing in Artificial Intelligence (AI) and Internet of Things (IoT) technologies. This project aligns with the sector objectives of promoting IT
and digital innovation in Pakistan, enhancing technological capabilities, and fostering economic growth through the IT sector to achieve the following objectives.

1. To contribute towards Financial Autonomy of International Islamic university and its reputation as a hub of technological innovation and excellence.
2. To establish a state-of-the-art software house specializing in Artificial Intelligence (AI) and Internet of Things (IoT) technologies, providing customized software solutions across diverse sectors while actively fostering innovation to drive forward technological progress.

The project will involve the construction and equipping of a modern software house facility in International Islamic University Islamabad, which will include the necessary infrastructure, hardware, and software resources. The project is justified by the growing demand for AI and IoT solutions in both domestic and international markets, which presents a significant economic opportunity for Pakistan. By providing a dedicated facility and expert team, the university will meet this demand and position itself as a hub for technological innovation and excellence.

| BIC Activities at a Glance | |
|---|---|
| **Entrepreneurial drive**<br>IIU-BIC as part of its Entrepreneurial drive joined hands with Islamabad Chamber of Small Traders and Small Industries (ICSTSI) to organize a Twin Cities Startup Competition in collaboration with COMSATS University Islamabad, where 35 startups from over 11 universities took part in this event. |  |
| **HEC Innovator Seed Fund 2021-2022**<br>ISF is a program of World Bank launched in Pakistan in collaboration with HEC Pakistan. 02 of the applicants of BIC, IIUI i.e. Arm Rehab Technologies & Savvy Engineers win the grant of Rs. $35000 each under HEC ISF Call (2021-2022). Both startups under the mentorship of BIC, IIUI pitched in the competition and win the grant. |  |
| **Meeting with the delegate from ICSTSI**<br>A delegate from Islamabad Chambers of Small Traders and Small Industries (ICSTSI) visited the office of Prof. Dr. Ahmed Shuja Syed (Vice-President (R&E), IIUI), in the presence of Engr. Muhammad Ahsen Mirza (Director BIC). Various avenues for collaborations and collective growth were discussed. VP(R&E) warmly welcomed the delegate and stated that IIUI in close collaboration with ICSTSI would like to conduct multiple activities to improve the academia – industry linkages. |  |
| **Alibaba Global Digital Talent Training 2023 under Grant of $34000**<br>An excellent training and capacity building opportunity in the field of digital transformation and E-Commerce from Alibaba Global Digital Talent Group was win by the BIC team through various online sessions of pitching held with Alibaba Global Digital Talent Group, Where more than 22 Universities from all over Pakistan applied for the grant of $34000 for the subject training. It is worth mentioning here that only 02 universities (including IIUI) have been selected for the subject training by Alibaba Global Digital Talent Group on Digital Economy. |  |

| | |
|---|---|
| **HEC Innovator Seed Fund 2022-2023**<br>Keeping the previous practices of fostering the Innovation and Entrepreneurship at IIUI. Another startups i.e. Circular Energies (Private) Limited win the grant of Rs. $35000 under HEC ISF Call (2021-2023). Where the startup under the mentorship of BIC, IIUI pitched in the competition and win the grant. |  |
| **Talk on the Entrepreneurship and Business Incubation for the Science Student**<br>Dr. Nishwa Iqbal (AD, BIC IIUI) conducted a session on "Entrepreneurship and Business Incubation for the Science Students" for the female students of Faculty of Sciences. Later on students accompanied by the faculty members also visited the Business incubation Center. |  <br>  |
| **Talk on Effective Steps to Success at Ibadat International University**<br>Director IIU BIC Engr. Muhammad Ahsen Mirza was invited for a talk on Effective Steps to Success at Ibadat International University, where he shares the key principles and certain disciplines that need to be adopted in life to ensure success as entrepreneurs and professionals. |  |
| **Talk On Importance And Role Of Entrepreneurship And Bics At HEI**<br>Business Incubation Center IIUI in collaboration with Dr. Abrar Anwar, Faculty of Management Sciences conducted one day talk on Importance and Role of Entrepreneurship and BICs at HEI. Talk was delivered by the Dr. Nishwa Iqbal (Assistant Director) BIC to the students of BBA, Students were provided/given detailed understanding of startup and Business Plan Development and value of BICs to establish a new Startup for students. Students also visited the BIC and startup offices where Mr. Jawad Saeed briefed them about the working and facilities provided by the IIU-BIC. |  |

Assistant Director BIC conducted a session for final semester female students from Faculty of Management Sciences on how a IIU BIC, supports development of female startups and ensures sustainable growth through a safe and dynamic environment with an array of business support, mentoring and networking opportunities.


**Business Plans competition for the Innovation Challenge 2022**

Assistant director IIU BIC was invited as a jury, to evaluate business plans for the Innovation Challenge 2022 organised by the MBA Department of SZABIST Islamabad Campus. 50 shortlisted applicants presented their business ideas/ plans in front of the experienced panel of jury (from IIU BIC, Bahria university innovation center, Ignite and Industry) in this national-level inter-university business plan competition.

The top three teams were selected and awarded PKR 60,000; PRK 30,000; PKR 20,000.

1st prize: Khawaja Fareed University with the project Titled “AviCulture”,

2nd Prize: International Islamic University's project Titled “Besides Wastes”

3rd Prize: Bahria University's project Titled “ Verbatro

**Fresher Fair at BIC, IIUI**

A two days Fresher’s Fair activity was organized at BIC, IIUI for male and female students in 2023. The purpose of this activity was to create awareness among the campus students about BIC and importance of entrepreneurship among the youth. The BIC Startups placed their stalls at BIC, IIUI for information to the students. In addition to this in order to promote the Kids entrepreneurship skills the kid’s food stalls were also placed at the event to promote the spirit of entrepreneurship among the school students.

Strategic Plan Implementation Cell (SPIC) was established with the approval of the Worthy President, IIUI. The newly formed office has been operational since March,2022. The core function of SPIC is:

- Periodical assessment/ measures taken to ensure swift implementation of university-wide Strategic Plan 2022-26.
- Generate KPI Attainment report for Higher Authorities (thrice a year + 1 annual report for the BoG).

The SPIC team prepared an action plan template for all functional level offices/ departments and has been able to create a conducive and congenial environment through coordination with all the offices holding various capacity building activities including meetings with individual offices as well as a week-long workshop for all academic and administrative offices, to provide guidelines on preparation of four-year Strategic Plan and an Action Plan (2022-23). SPIC has provided training to 98 functional units to develop their strategic plans and subsequent action plans.


Furthermore, two sub-committees have been constituted for the evaluation of functional level strategic plans and action plans. This effort has collectively brought everyone across the university on the same page and thus working towards a long-term vision and mission through development of departmental level strategic and action plans in line with the IIUI Strategic Plan 2022-26 and implementation of these plans.

## Implementation of IIU Strategic Plan (2022-26) and KPI Mapping (1st July 2021- 31st December 2022):

Strategic Plan Implementation Cell (SPIC) carried out IIU Strategic Plan (2022-26) KPI Mapping Exercise in the month of May 2023 for the mapping period **1st July 2021 – 31st December 2022.** To ensure effective implementation, the SPIC team prepared and shared a KPI Mapping Tool Kit. The concerned functional units (categorized as the Primary Responsible Departments (PRDs)) carried out the self-assessment scoring exercise on the Google form while looking at the criteria in the KPI Mapping document and gathered evidence/ documents as per the relevant KPIs. The results and documentary evidences were then endorsed by the concerned Implementation Focal Point (Office of the President and all Vice-Presidents) who shared them with SPIC.

Overall data collection and evaluation was done in 4 Steps shared below and presented through a detailed report Primary Responsible Departments (PRDs)

1. Five Implementation Focal Points (IFPs)
2. Six Target Priority Areas of IIU Strategic Plan
3. Overall university performance for the concerned mapping period.

7

# PUBLICATIONS FROM IIUI BANNERBY IIUI ACADEMIES & INSTITUTES

# Publications from IIUI Banner by Academies & Institutes

## 7.1. Publications from IIUI Banner by Shariah Academy (2021-2023)

| S No. | Title | Author | Year of Printing |
|---|---|---|---|
| 1. | اسلام کا خاندانی نظام | Dr. Abdul Haye Abro | **2021** |
| 2. | حضور ﷺ بحیثیت شارع و مقنن | Dr. Abdul Haye Abro/ Prof. Dr. Muhammad Yousuf Farooqi | **2021** |
| 3. | **Islamic Judicial Ethics** | Shaukat Hayat | **2021** |
| 4. | مقا صد شریعت اور جدید اسلامی بینکاری | Dr. M Tahir Mansoori | **2021** |
| 5. | دساتیر پاکستان کی اسلامی دفعات | Dr. Shahzad Iqbal Sham | **2021** |
| 6. | اہل علم کا سلیقہ اختلاف | Dr. Abdul Haye Abro | **2021** |
| 7. | میراث ووصیت کے شرعی ضوابط | Dr. Abdul Haye Abro | **2021** |
| 8. | **Bay‘ Salam** | Dr. Naeem Ahmed | **2022** |
| 9. | احکام القرآن مجلد (جلد 5 ) | Maulana Abdul Qayyum | **2022** |
| 10. | جا مع الاصول ( مجلد ) | Dr. Ahmed Hasan | **2023** |
| 11. | احکام القرآن مجلد (جلد 6 ) | Maulana Abdul Qayyum | **2023** |

## 7.2. Publications from IIUI Banner by Islamic Research Institute (2021-2023)

| Sr# | Book Title | Author Name | Co Author/Translator | Date of Publications |
|---|---|---|---|---|
| 1. | فقہ اسلامی: مسائل و دلائل (جلد6) | تالیف وہبہ زحیلی | ترجمہ : محمد طفیل ہاشمی | 27-04-2021 |
| 2. | اردو میں فنی تدوین | یم ایس ناز | معین الدین عقیل | 19-01-2022 |
| 3. | پر امن اور ہم آہنگ پاکستانی معاشرے کی تشکیل جدید : پیغام پاکستان کی روشنی میں | پروفیسرڈاکٹر محمد ضیاء الحق | | 13-04-2021 |
| 4. | معجم السفر | لابی طاہر احمد بن محمد السلفی | تحقیق: دشیرمحمدزمان | 21-06-2021 |
| 5. | مجموعہ قوانین اسلام(جلد سوم) | ڈاکٹر تنزیل الرحمن | | 23-11-2021 |
| 6. | مجموعہ قوانین اسلام(جلد چہارم) | ڈاکٹر تنزیل الرحمن | | 23-11-2021 |
| 7. | مجموعہ قوانین اسلام(جلدپنجم) | ڈاکٹر تنزیل الرحمن | | 23-11-2021 |
| 8. | دوائے شافی | امام ابن قیم الجوزیہ | رجمہ: مولانا محمد اسماعیل گودھروی | 29-10-2021 |
| 9. | احکام نکاح | ڈاکٹر محمد احمد منیر | | 21-6-22 |
| 10. | اندلس کی اسلامی میراث | ڈاکٹر صاحبزادہ ساجد الرحمان | | 13-07-23 |
| 11. | رسالہ قشیریہ | امام ابوالقاسم عبدالکریم بن ہوازن قُشیری | ترجمہ،مقدمہ و تعلیقات: ڈاکٹر پیر محمد حسن | 07-08-23 |
| 12. | Paigham-e-Pakistan training manual for parliamentarians | پروفیسرڈاکٹر محمد ضیاء الحق | | 07-12-21 |
| 13. | Paigham-e-Pakistan: training manual for master trainers | پروفیسرڈاکٹر محمد ضیاء الحق | | 07-12-21 |
| 14. | Advancing Peace, Inclusiveness, and Co-existence through Narrative Building | پروفیسرڈاکٹر محمد ضیاء الحق | | 26-09-22 |
| 15. | Principle of Islamic Jurisprudence | Ahmad Hassan | | 27-12-2021 |
| 16. | Abu Tahir Salifi: Life and works | S.M Zaman | | 14-02-23 |
| 17. | Key Concepts Related to Gender-Based Violence | پروفیسرڈاکٹر محمد ضیاء الحق | | 2023 |
| 18. | The Role of Religions in Protection from Gender-Based Violence | پروفیسرڈاکٹر محمد ضیاء الحق | | 2023 |
| 19. | International Instruments for Protection from Gender-Based Violence | پروفیسرڈاکٹر محمد ضیاء الحق | | 2023 |
| 20. | Constitutional and Legal Framework for Contesting Gender-Based Violence in Pakistan | پروفیسرڈاکٹر محمد ضیاء الحق | | 2023 |
| 21. | Current State of Gender Based Violence in Pakistan | پروفیسرڈاکٹر محمد ضیاء الحق | | 2023 |
| 22. | Islamic Studies Journal Vol-59/03 | IRI | | 12-02-2021 |

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| 23. | Islamic Studies Journal Vol-59/04 | IRI | | 05-05-2021 |
| 24. | Islamic Studies Journal Vol-60/01 | IRI | | 17-06-2021 |
| 25. | Islamic Studies Journal Vol-60/02 | IRI | | 17-08-2021 |
| 26. | Islamic Studies Journal Vol-60/03 | IRI | | 23-12-2022 |
| 27. | Islamic Studies Journal Vol-60/04 | IRI | | 20-05-2022 |
| 28. | Islamic Studies Journal Vol-61/01 | IRI | | 18-06-22 |
| 29. | Islamic Studies Journal Vol-61/02 | IRI | | 09-08-22 |
| 30. | Islamic Studies Journal Vol-61/03 | IRI | | 04-01-23 |
| 31. | Islamic Studies Journal Vol-61/04 | IRI | | 14-03-23 |
| 32. | Islamic Studies Journal Vol-62/01 | IRI | | 09-05-23 |
| 33. | Islamic Studies Journal Vol-62/02 | IRI | | 21-09-23 |
| 34. | الدراسات الاسلاميہ Vol-55/02 | IRI | | 04-03-2021 |
| 35. | الدراسات الاسلاميہ Vol-55/03 | IRI | | 10-06-2021 |
| 36. | الدراسات الاسلاميہ Vol-55/04 | IRI | | 10-6-2021 |
| 37. | الدراسات الاسلاميہ Vol-56/01 | IRI | | 18-11-2022 |
| 38 | الدراسات الاسلاميہ Vol-56/02 | IRI | | 02-03-2022 |
| 39. | الدراسات الاسلاميہ Vol-56/03 | IRI | | 08-02-23 |
| 40. | الدراسات الاسلاميہ Vol-56/04 | IRI | | 17-05-23 |
| 41. | فکر و نظر Vol-57/04 | IRI | | 12-3-2021 |
| 42. | فکر و نظر Vol-58/01 | IRI | | 31-05-2021 |
| 43. | فکر و نظر Vol-58/02 | IRI | | 31-05-2021 |
| 45. | فکر و نظر Vol-58/04 | IRI | | 24-5-2022 |
| 46. | فکر و نظر Vol-59/01 | IRI | | 09-08-22 |
| 47. | فکر و نظر Vol-59/02 | IRI | | 14-12-22 |
| 48. | فکر و نظر Vol-59/03 | IRI | | 07-02-23 |
| 49. | فکر و نظر Vol-59/04 | IRI | | 16-05-23 |
| 50. | فکر و نظر Vol-60/01 | IRI | | 21-08-23 |

## 7.3. Publications from IIUI Banner by Iqbal International Institute for Research &Dialogue (IRD) (2021-2023)

| Sr. # | Books Name | Author | Published Date |
|---|---|---|---|
| **1.** | اجتہاد: اسلامی فکر کی عصری تشکیل | بیرسٹر ظفراللہ خان | 15.11.2021 |
| **2.** | شذراتِ حکمت (Pearls of Wisdom) | *Mr. Waqas Khan/ Dr. Muhammad Al-Ghazali* | 19.11.2021 |
| **3.** | بین المسالک ہم آہنگی اور مکالمے کے بنیادی اصول | ڈاکٹر یوسف القرضاوی ترجمہ: محمّد جان اخون زادہ | 22.11.2021 |
| **4.** | اسلامی منہج فکر کا تاریخی تناظر | ڈاکٹر فضل الرحمٰن ترتیب و تدوین: محمّد یونس قاسمی | 26.11.2021 |
| **5.** | Reconstruction of Muslim Political Thought (2nd Edition) | Fateh Muhammad Malik | 06.12.2021 |
| **6.** | Science & Technology in the Muslim World: Reminisce, Present & Future Outlook | Dr. Musferah Mehfooz & Dr. Ahmed Shuja Syed | 07.12.2021 |
| **7.** | Militias as a Counterinsurgency Strategy in Pakistan | Dr. Rahman Ullah | 07.02.2022 |
| **8.** | A Beginner's Guide to *Understanding the Qur'ān* | Dr. Shehzad Saleem | 08.03.2022 |
| **9.** | Observing Variants of Post- Islamism Intellectual Discourses and Social Movements (4th Edition) | Dr. Husnul Amin | 14.03.2022 |
| **10.** | اپنی شخصیت کی تلاش میں گم ہمارے بچے | ڈاکٹر عرفان شہزاد | 05.04.2022 |
| **11.** | Ageless Qur'an Timeless Text: A Visual study of Sura 17 Across 14 Centuries & 19 Manuscripts | Muhammad Mustafa Al-Azami | 16.05.2022 |
| **12.** | Thinkers, Dreamers and Doers: People, Places and Ideas of Our Time | Dr. Arif Azad | 20.05.2022 |
| **13.** | Beyond Gender: Freedom, Jihad, Agency | Ms. Aroobah Sarfraz Lak | |
| **14.** | چودہ صدیوں پر مشتمل ) قرآن کے ابدی متن کا اعجاز قرآن کریم کے ۱۹ مخطوطات کی روشنی میں "سورہ (الاسرا،" کا بصری مطالعہ | محمّد مصطفیٰ الاعظمی | 20.05.2022 |
| **15.** | مذہب، ریاست اور سماجی تبدیلیاں: جدید فکری رجحانات | ڈاکٹر حسن الامین | 03.06.2022 |
| **16.** | بین المسالک ہم آہنگی: مشاہدات، تجربات اور تجاویز | پروفیسر ڈاکٹر معصوم یاسین زئی/ ڈاکٹر حسن الامین | 03.06.2022 |
| **17.** | Pakistan Combating Terrorism: Policies, Discourse, Strategies | Dr. Husnul Amin & Dr. Maryam Siddiqua | 08.06.2022 |
| **18.** | An Islamic Case for Religious Freedom | Dr. Ali Salman & Dr. Husnul Amin | 09.06.2022 |
| **19.** | مغربی مفکرین کا تصوّر مذہب: تعارف و تجزیہ | ڈینیل ایل- پالز | 26.08.2022 |
| **20.** | Law And Development – An Alternative Indicator for the Measurement of Development **(2nd Edition)** | Mr. Sharafat A. Chaudhry | 26.08.2022 |
| **21.** | China Pakistan Economic Corridor: Building Narratives | Dr. Husnul Amin & Dr. Maryam Siddiqa | 31.08.2022 |
| **22.** | کتابیات اقبال | ڈاکٹر رفیع الدین ہاشمی | 17.09.2023 |

## Publications from IIUI Banner by Faculty of Languages & Literature (2021-202

## Department of Urdu

| Sr. No. | Book Title | Author Name | Co-Author | Date of Publication |
|---|---|---|---|---|
| 1. | تاریخ جدید: سفر نامہ منشی اسماعیل بہ انگلستان (تحقیق و تنقید) | Dr.Najeeba Arif | ---------- | 2021 |
| 2. | انھارویں صدی کے دو سفر نامے (تحقیق و تدوین) | Dr.Najeeba Arif | -------- | 2021 |
| 3. | میٹھے نمکے (افسانے) | Dr.Najeeba Arif | ---------- | May 2022 |
| 4. | نواح کا نالہ (قصیدہ بردہ شریف منظوم اردو ترجمہ) | Dr.Najeeba Arif | -------- | Oct 2022 |
| 5. | کھوٹا (ناول) | Dr.Najeeba Arif | ---------- | 2023 |
| 6. | می سوزم (ناول) | Dr.Humera Ashfaq | ---------- | 2021 |
| 7. | اردو ناول اور عصریت (تنقید) | Dr.Kamran Abbas Kazmi | ---------- | Jan 2023 |
| 8. | رضیہ فصیح احمد کے منتخب افسانے (انتخاب) | Dr.Shiraz Fazal dad | Qaiserah M.Alvi | April 2021 |
| 9. | مسعود مفتی کے منتخب افسانے (انتخاب) | Dr.Shiraz Fazal dad | Qaiserah M.Alvi | Oct 2022 |
| 10. | جمیل الدین عالی کی سفر نامہ نگاری ایک مطالعہ (تحقیق و تنقید) | Dr.Ghulam Farida | ..... | 2021 |
| 11. | پاکستانی ادب کے معمار جمیل ملک: شخصیت اور فن (تحقیق و تنقید) | Dr.Ghulam Farida | ..... | 2022 |
| 12. | لسانیات ایک جامع تعارف | Dr.Bibi Ameena | Dr.Sheraz Dasti<br>Muhammad Numan<br>Liaqat Iqbal | 2022 |
| 13. | اردو افسانہ متنوع اسالیب و جہات (تحقیق) | Dr.Sabahat Mushtaq | ..... | Nov.2023 |
| 14. | حسن کی صورت حال خالی۔۔ جگہیں۔۔ پر۔۔ کرو مابعد جدید مطالعہ (تنقید) | Dr.Naeema Bibi | ..... | 2023 |
| 15. | بیسویں صدی کے نصف اول میں | Dr.Rubina Parveen | ..... | Dec.2021 |

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