



## **ORIC Activities**

Spring 2019

**Dated:** 7<sup>th</sup> October 2019

**Prepared by:**

Office of Research Innovation and Commercialization (ORIC)

Capital University of Science and Technology,  
Islamabad



## **Capital University of Science and Technology**

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### **I. Research Operations**

- A. Research Proposals Submission**
- B. Publication and Distribution of Annual Research Book-2017**
- C. Submission of Draft of Annual Research Book-2018 to VC Office**
- D. ORIC Research Committee Meetings**
- E. One-day Workshop on Latex**
- F. One-day Workshop on Research Methodology**
- G. Up gradation of Research Database**
- H. Up gradation of ORIC Webpage**
- I. MOU with Shanghai Jiao Tong University (SJTU), China**
- J. Design of Research Group Posters**

### **II. Technology Incubation and Innovation**

- A. Three-Days Autodesk Inventor Workshop**
- B. Three-Days Short Course on Model Predictive Control**
- C. BIM CoE Workshop on Revit Architecture Fundamentals**
- D. BIM CoE Workshop on Revit Structure Fundamentals**
- E. Seminar on Cyber Security: Next Defense Frontier**
- F. Seminar on Trends in Genomics**
- G. ORIC Business Plan Competition**
- H. Establishment of CS Incubation Lab**
- I. MOU with Ideagist Pakistan PVT Ltd**
- J. FYP Commercialization Meetings on “Smart Hospital Management System”**

### **III. Industrial Liaisons**

- A. Industrial Liaison Meeting of Dean ORIC with Dean FoE and HoDs**
- B. Joint Industrial Outreach Committee Meeting**
- C. Industrial Liaison Meeting with Conveners of EE & ME Departments**
- D. Visit Arrangement of CTO, Designx Solutions to CUST EE Labs**
- E. Meeting of Dean ORIC with HoD CE on Testing & Consultancy Policy**
- F. Draft of Initial Framework of CUST Consultancy Policy**

### **IV. Additional Activities**

- A. Publication of ORIC Newsletter Spring-2019**
- B. Publication of ORIC Activities Book Fall-2018**
- C. HEC ORIC Score Card**
- D. Initial Draft of CUST Annual Report 2018-19**



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### ORIC Progress Report Spring-2019

To make research a top priority for a sustainable economic growth and future knowledge economy at Higher Education Institutions (HEIs), HEC aimed to establish pivotal centers at universities. These centers are known as Offices of Research, Innovation and Commercialization (ORIC). At Capital University of Science and Technology (CUST) Offices of Research, Innovation and Commercialization started its working in September 2017 under the patronage of Prof. Muhammad Mansoor Ahmed, Vice Chancellor, CUST.

Mission statement for ORIC at CUST as approved from BASR is entitled as “*To motivate and facilitate the university researchers to innovate and collaborate with the stake-holders leading to resource generation through commercialization*”. Based on this mission ORIC operations have been divided into three major domains including:

- A. Research Operations (RO)
- B. Technology Incubation and Innovation (TII)
- C. Industrial Liaisons (IL)

The list of activities and events performed by ORIC in Spring-2019 based upon the stated domains is given below.

Month	Week	Events & Tasks	Domain
Feb-19	1	i. Industrial Outreach Meeting with Dean FoE and HoDs ii. Three Days Autodesk Inventor Workshop	IL & TII
	2	i. BIM CoE Workshop on Revit Structure Fundamentals ii. Poster Design for Vision and Pattern Recognition Systems Research Group	RO & TII
Mar-19	1	i. Distribution of CUST Annual Book-2017 ii. Research Poster Design for Industrial and Environmental Microbiology Group iii. Advertisement for ORIC Business Plan Competition	RO & TII
	2	i. Seventh ORIC Research Committee Meeting ii. FYP Commercialization Meetings on “Smart Hospital Management System”	RO & TII
	3	i. Poster Design for Water and Environment Research Group (WE R)	RO & TII



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		ii. BIM Workshop on Revit Architecture Fundamentals	
	4	i. FYP Commercialization Meetings on “Smart Hospital Management System” ii. Seminar on Trends in Genomics iii. Submission of Proposal for Funding of “Integrated Modeling and Simulation of High-Power Diesel Engine for the verification of Engine Design Enhancement” Research Project	RO & TII
Apr-19	1	i. Compilation of Annual Research Book-2018 ii. Three-Days Short Course on Model Predictive Control (MPC)	RO & TII
	2	i. Poster for ThermoFluids Research Group ii. Submission of Proposal for Funding of “Capacity Building of Accomplished Engine Research Group for Development of High Power Diesel Engine” Research Project	RO
	3	i. FYP Commercialization Meetings on “Smart Hospital Management System” ii. Joint Industrial Outreach Committee Meeting	IL & TII
	4	i. Professional Seminar on Cyber Security ii. Initial Assessment of ORIC Business Plan Competition iii. Proposal Submission for Funding of “Drone Detection Radar System” Research Project	RO & TII
May-19	1	i. Eighth ORIC Research Committee Meeting ii. ORIC Business Plan Competition Students’ Presentations	RO & TII
	2	i. Opening Ceremony of CS Incubation Lab ii. Industrial Outreach Meeting of Dean ORIC with Conveners of EE & ME Departments	IL & TII
	3	i. Publication of ORIC Newsletter Spring-2019 ii. Designx Solutions visit to CUST EE Labs	IL & RO
	4	Up gradation of ORIC Webpage	RO
	5	i. Up gradation of ORIC Webpage ii. Meeting of Dean ORIC with HoD CE on Testing & Consultancy Policy	IL & RO
June-19	1	<b>Eid Holidays</b>	
	2	Poster Design for Genetic and Molecular Epidemiology Research Group	RO
	3	Submission of Finalized Version of Annual Research Book-2018 to VC Office	RO





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	4	i. FYP Commercialization Meetings on “Smart Hospital Management System” ii. Submission of Proposal for Funding of “Design and Development of Energy Efficient Electric Vehicle System for UET Bus Fleet to Enhance its Fuel Efficiency” Research Project	RO & TII
July-19	1	i. Poster Design for Entrepreneurship Research Group ii. Submission of Proposal for Funding of “Molecular and Bioinformatics Analysis of Drug Resistance Strains of Mycobacterium Tuberculosis” Research Project	RO
	2	FYP Commercialization Meetings on “Smart Hospital Management System”	TII
	3	i. One-day Workshop on Latex ii. MOU with Ideagist Pakistan PVT Ltd	RO & TII
	4	i. Ninth ORIC Research Committee Meeting ii. MOU with Shanghai Jiao Tong University (SJTU), China	RO
	1	Data Collection for CUST Annual Report 2018-19	RO
Aug-19	2	i. Compilation of Initial Draft of CUST Annual Report 2018-19 ii. Submission of Proposal for Funding of “Investigation of Drug Resistant Strains of Mycobacterium Tuberculosis” Research Project	RO
	3	<b>Eid Holidays</b>	
	4	i. One-day Workshop on Research Methodology ii. Finalization of CUST Annual Report	RO
	5	i. Working on HEC ORIC Score Card ii. Compilation of Initial Draft of CUST Testing and Consultancy Policy	RO, IL & TII



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No./CUST/ORIC/2019

Dated: 7<sup>th</sup> Oct 2019

The objective of ORIC is to develop, expand, enhance and manage the university's research program and to link research activities directly to the educational, social and economic priorities of CUST and the society. ORIC at CUST have a central role in facilitating the University's research outcomes and Technology Incubation & Innovation activities. The brief overview of activities performed by ORIC in Spring-2019 is given below.

### **I. Research Operations**

ORIC has the responsibility of guaranteeing that all research programs and policies reflect the core values of academic freedom, professional integrity, ethical conduct and full compliance with all policies, legal requirements and operational standards of the university. During its short span of time ORIC has worked on facilitating its faculty and students in doing quality research publications.

#### **A. Research Proposals Submission**

##### **a) Integrated Modeling and Simulation of High-Power Diesel Engine for the verification of Engine Design Enhancement**

The proposal is submitted to Pakistan Science Foundation through Heavy Industry Taxila (HIT) and is under review process. The principal investigator for the mentioned project is Dr. Col. Faraz Ahmed Khan from HIT.

##### **b) Capacity Building of an Accomplished Engine Research Group for the Development of High Power Diesel Engine**

The proposal is submitted to Pakistan Science Foundation (PSF) in collaboration with Heavy Industry Taxila (HIT) and is under review process. Dean Research & Innovation, Prof. Aamer Iqbal Bhatti is the principal investigator for the project.

##### **c) Drone Detection Radar System**

The proposal for "Drone Detection Radar System" is submitted to Ignite in collaboration with Dr. Faisal, Associate Professor, EE Department who is also playing the role of principal investigator.

**d) Design and Development of Energy Efficient Electric Vehicle System for UET Bus Fleet to Enhance its Fuel Efficiency**

The proposal for Energy “Efficient Electric Vehicle System” has been submitted to Ignite in collaboration with Dr. Khawar Naveed, Assistant Professor, ME Department who is also principal investigator for the mentioned project.

**e) Molecular and Bioinformatics Analysis of Drug Resistance Strains of Mycobacterium Tuberculosis**

The given proposal is submitted to Shanghai Science and Technology Committee, China in collaboration with Biosciences Department (BS), CUST. Dr. Shaukat Iqbal Malik, Professor, BS Department would serve as principal investigator for the mentioned project.

**f) Investigation of Drug Resistant Strains of Mycobacterium Tuberculosis**

The given proposal is submitted to Pakistan Science Foundation in collaboration with Biosciences Department (BS), CUST. Dr. Shaukat Iqbal Malik, Professor, BS Department would serve as principal investigator for the given project.

**B. Publication and Distribution of CUST Annual Book -2017**

The Annual Research Book-2017 was published. A total of 100 copies were printed and distributed in all the university offices. The book showcases university research activities and will prove a source of narration of CUST extensive research culture.

**C. Submission of Draft of Annual Research Book-2018 to VC Office**

The finalized version of CUST Annual Research Book-2018 was compiled and its initial draft was shared with VC Office. The book comprised of research data including publications, R & D Projects and national & International collaborations accomplished by the university in 2018.

**D. ORIC Research Committee Meetings**

**a) Seventh ORIC Research Committee Meeting**

The seventh ORIC Research Committee meeting was held on March 14, 2019 and was chaired by Prof. Aamer Iqbal Bhatti, Dean Research & Innovation. The meeting took place over following agenda items:

- FYPs of Faculty of Engineering
- ORIC Activities Calendar Spring-2019
- Departmental Outreach Committees
- CUST Annual Research Book
- FYPs Funding and Associated Criteria

#### **b) Eighth ORIC Research Committee Meeting**

The Eighth ORIC Research Committee meeting was held on May 02, 2019 and was chaired by Prof. Aamer Iqbal Bhatti, Dean Research & Innovation. The meeting was held to evaluate the students' final year projects and associated business plans. The students presented their project ideas before the ORIC Research Committee. The top five projects meeting the devised criteria of ORIC were shortlisted for the particular funding of 30,000 PKR each.

#### **c) Ninth ORIC Research Committee Meeting**

The Ninth ORIC Research Committee meeting was held on July 31, 2019 and was chaired by Prof. Aamer Iqbal Bhatti, Dean Research & Innovation. The following agenda items were conversed in the particular meeting:

- Commercialization of Business Case FYPs
- Commercialization aspects of "Blindroid
- Commercialization aspects of "Off-Grid Automatic Egg Incubator"
- Pakistan Science Foundation (PSF) Competitive Research Grant

### **E. One-day Workshop on Latex**

“One-Day Workshop on Latex” was conducted on 17<sup>th</sup> July, 2019. The purpose of workshop was to equip students and faculty members with the contemporary knowledge about creation of technical and scientific documents using Latex. The workshop was conducted by Dr. Ali Arshad, Assistant Professor, COMSATS University Islamabad.

### **F. One-day Workshop on Research Methodology**

ORIC in collaboration with Quality Enhancement Cell (QEC), CUST organized “One-day Workshop on Research Methodology” on 19<sup>th</sup>-20<sup>th</sup> Aug 2019. The workshop was conducted by Dr Inam Ul Ahad, Research Development Manager, I-Form Advanced Manufacturing Research Centre, Dublin City University, Ireland.

### **G. Up gradation of Research Database**

The Research Database was updated including updation of university Publications list, MOUs signed and Research & Development Projects accomplished by faculty in the recent semester.

### **H. Up gradation of ORIC Webpage**

The webpage of ORIC was updated as per directions of Vice Chancellor. The data about Collaborations, R & D Projects, Publications and PhD Repository was updated. Two new tabs were added in the webpage about “Featured Achievements” and “Downloads”.

## **I. MOU with Shanghai Jiao Tong University (SJTU), China**

MOU was signed on 23<sup>rd</sup> July 2019 between Capital University of Science & Technology and Shanghai Jiao Tong University (SJTU), China. The parties agreed to establish Shanghai Islamabad Belgrade Joint Innovation Center.

## **J. Design of Research Group Posters**

### **a) Poster for Vision and Pattern Recognition Systems Research Group (VisPRS)**

ORIC compiled poster for Vision and Pattern Recognition Systems Research Group (VisPRS) headed by Prof. Dr. Imtiaz Ahmed Taj. The poster is displayed in front of his research lab to highlight the achievements and research areas of the group.

### **b) Poster for Industrial and Environmental Microbiology Research Group**

The poster for Industrial and Environmental Microbiology Research Group headed by Dr. Arshia Amin Butt was compiled. The poster is displayed outside her office to highlight the achievements and research areas of the group.

### **c) Poster for ThermoFluids Research Group**

The poster for ThermoFluids Research Group headed by Dr. Mahabat Khan, HoD, ME Department was compiled by ORIC. The poster is displayed outside his office to highlight the achievements and research areas of the group.

### **d) Poster for Water and Environment Research Group (WE R)**

With the aim of showcasing CUST research culture ORIC compiled poster for Water and Environment Research Group (WE R) headed by Dr. Ishtiaq Hassan, HoD CE Department. The poster is displayed outside his office.

### **e) Poster for Genetic and Molecular Epidemiology Research Group**

ORIC compiled the poster for Genetic and Molecular Epidemiology Research Group headed by Dr. Syeda Marriam Bakhtiar, Assistant Professor, BS Department.

### **f) Poster for Entrepreneurship Research Group**

The poster for Entrepreneurship Research Group was designed by ORIC which is headed by Dr. Muzaffar Asad, Assistant Professor, MS Department.

## **II. Technology Incubation and Innovation**

Office of Research, Innovation and Commercialization not only accomplishes research and development operations but also ensures continual activities in terms of technology innovation and incubation. This is the foremost domain CUST is working. In this regard numerous technical trainings, workshops and seminars are being conducted on regular



basis to provide students, faculty members and professionals with the contemporary technical tools and skills.

The university is also working on establishment of Business Incubation Centers and commercialization of research leading to resource generation.

### **A. Three-Days Autodesk Inventor Workshop**

“Autodesk Inventor Short Course” was held on 06<sup>th</sup> – 08<sup>th</sup> Feb 2019. The workshop was a part of the university collaboration with H-Cube BMG Pvt. Ltd. Office of Research Innovation and Commercialization in collaboration with the Department of Mechanical Engineering organized the workshop aiming to equip students with the contemporary engineering tools and soft wares.

### **B. Three-Days Short Course on Model Predictive Control**

Office of Research Innovation and Commercialization organized a three days workshop entitled “Model Predictive Control: Algorithms, Tools & Applications” on 4<sup>th</sup> – 6<sup>th</sup> April, 2019. The resource person for the event was Dr. Aamer Shahzad, Deputy DG, NESCOM.

### **C. BIM CoE Workshop on Revit Architecture Fundamentals**

BIM Center of Excellence (BIM CoE) at Department of Civil Engineering conducted workshop on “Revit Architecture Fundamentals” on 29<sup>th</sup>- 30<sup>th</sup> March, 2019. The workshop was arranged in collaboration with H-Cube Group of Companies. The workshop participants were provided user level AUTODESK authorized certifications.

### **D. BIM CoE Workshop on Revit Structure Fundamentals**

BIM Center of Excellence (BIM CoE) in collaboration with H-Cube Group of Companies conducted hands on Training on Revit Structure Fundamentals on 22<sup>nd</sup> Feb and 1<sup>st</sup> March 2019. The participants were provided user level AUTODESK authorized certifications.

### **E. Seminar on Cyber Security: Next Defense Frontier**

Office of Research Innovation and Commercialization organized a seminar entitled “Cyber Security: Next Defense Frontier” on 24<sup>th</sup> April, 2019. The objective of event was to create awareness about Cyber Attacks and significance of Cyber Security in modern digital world. The seminar talk was presented by Mr. Rizwan Mustafa Mir, Chief Executive Officer, Universal Services Fund, Islamabad.

### **F. Seminar on Trends in Genomics**

Office of Research Innovation and Commercialization in collaboration with the Faculty of Health and Life Sciences organized the Seminar on “Trends in Genomics” on 28<sup>th</sup> March 2019. The guest speaker at the event was Dr. Johar Ali , HoD Genomics Center, Rehman Medical Institute, Peshawar.

### **G. ORIC Business Plan Competition**

ORIC initiated financial sponsorship for selected Final Year Projects. A total of five projects were funded encompassing 30K PKR each based upon the devised criteria. The final evaluation was done in 8<sup>th</sup> ORIC Research Committee Meeting on 2<sup>nd</sup> May 2019.

### **H. Establishment of CS Incubation Lab**

The first Incubation Center of Capital University of Science & Technology was formally inaugurated on 16<sup>th</sup> May 2019. Dr. Muhammad Azhar Iqbal, Assistant Professor, CS Dept. have laid his special devotion to make this workroom possible. The purpose of given incubation center is to provide a platform to CS students where they can practice their technical, innovative and freelancing skills for comprehensible earning.

### **I. MOU with Ideagist Pakistan PVT Ltd**

To formalize collaboration between CUST and Ideagist Pakistan PVT Ltd and to make it durable and sustainable, Mr. Hassan Syed, CEO Ideagist visited ORIC Office CUST and signed an MOU on 16<sup>th</sup> July 2019. Both parties agreed to provide online entrepreneurship training to final year students, support business incubation centers, one-on-one mentoring and connecting the incubator to a global pool of investors.

### **J. FYP Commercialization Meetings on “Smart Hospital Management System”**

Several meeting with representatives of MS and CS Departments were held on Final Year Project of CS students entitle “Smart Hospital Management System” to pursue it towards commercialization.

## **III. Industrial Liaisons**

ORIC at CUST is continuously working on to build and maintain strong Academia-Industry Linkage with the focus on promoting and making CUST graduates the premium choice for the employers. ORIC is working on in collaboration with Industrial Outreach Committees (IOC) of various Departments to promote Academia-Industry Linkage.

### **A. Industrial Liaison Meeting of Dean ORIC with Dean FoE and HoDs**

An Industrial Liaison meeting was held by ORIC on 21<sup>st</sup> Feb 2019 in the Dean FoE office in which HoDs of Engineering Departments were also present. The meeting took place over the following agenda items:

- Constitution of Departmental Industrial Outreach Committees (IOC)
- Constitution of Industrial Advisory Board
- CUST Testing and Consultancy Policy

## **B. Joint Industrial Outreach Committee Meeting**

The Joint Industrial Outreach Committee Meeting of Faculty of Engineering was held on 18<sup>th</sup> April 2019. Prof. Dr. Aamer Iqbal Bhatti, Dean Research & Innovation, chaired the meeting. The following agenda items were conversed in the particular meeting:

- Industrial Outreach Demand for OBE System
- Industrial Zones of Rawalpindi & Islamabad
- Workout for Mutual Benefit of Academia & Industry
- CUST Testing and Consultancy Policy
- Faculty Visit to Pharmaceutical Companies
- Labs Up-gradation according to Industry Requirements

## **C. Industrial Liaison Meeting of Dean ORIC with Conveners of EE & ME Departments**

A small Industrial Liaison Meeting was held on 8<sup>th</sup> May 2019 in the office of Dr. Aamer Iqbal Bhatti, Dean Research & Innovation. The discussion was carried about the visit arrangements of Industry Professional to University Labs and their up-gradation in accordance with Industry Requirements.

## **D. Visit Arrangement of CTO, Designx Solutions to CUST EE Labs**

Mr. Shakaib, CTO, Designx Solutions visited Capital University of Science and Technology, Islamabad on 13<sup>th</sup> May, 2019. The objective of present visit was to show him CUST EE Department labs and seek suggestions about how we can upgrade our labs to meet modern day Industry requirements.

## **E. Meeting of Dean ORIC with HoD CE on Testing & Consultancy Policy**

A small meeting of Dean ORIC with Dr. Ishtiaq Hassan, HoD CE was held on 28<sup>th</sup> May, 2019 in ORIC Office. The discussion mainly focused on Design/Supervision/Consultancy Framework for CUST Faculty Members.

## **F. Draft of Initial Framework of CUST Consultancy Policy**

The initial draft of CUST Testing and Consultancy policy has been compiled and sent to VC Office for approval or any further action. The document proposes the Design/Supervision/Consultancy Framework for CUST Faculty Members.

## **IV. Additional Tasks**

### **A. Publication of ORIC Newsletter Spring-2019**

The first volume of ORIC Newsletter was published and distributed in all the university academic and administrative offices. The Newsletter briefly showcases the progress report of ORIC in terms of its stated domains i.e. Research Operations, Technology Incubation & Innovation and Industrial Liaisons. It also highlights workshops, seminars and other similar events accomplished by ORIC.

### **B. Publication of ORIC Activities Book Fall-2018**

The ORIC Activities Book for Fall-2018 semester was published and shared with VC Office. The book showcases the activities and events proceeded by ORIC as per its stated domains in the particular semester.

### **C. HEC ORIC Score Card**

The HEC ORIC Score Card is filled as per available data. The report presents the detailed progress report of CUST ORIC department. It also highlights the key areas to be worked on for further betterment.

### **D. Initial draft of CUST Annual Report 2018-19**

Office of Research, Innovation and Commercialization has compiled and shared the initial draft of CUST Annual Report 2018-19 for further recommendations. The document showcases recent progress report and provides a detailed overview about every single aspect of the university.



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation



Proposal Identification No

(To be allotted by PSF)

PSF-1

## Submission of Research Proposal for PSF Financial Assistance under Research Support Programme

### 1. Title of the Project:

Integrated modelling and Simulation of High –Power Diesel Engine for the verification of engine design enhancement.

### 2. Field of Study: Automotive System Engineering

### 3. Specialized Area of Research: Diesel Engine Modeling and Simulation

### 4. Principal Investigator:

Full Name	Dr. Col. Kanwar Faraz Ahmed Khan	Name of Department	ARDIC
Present Position	Managing Director	Name of Organization	HIT
Present Job Status	<b>Regular</b> /TTS/Contract/Adhoc	Date of Birth	
Highest Qualification	PhD	Nationality	Pakistani
Field of Specialization		e-mail address	
Postal Address	Heavy Industries Taxila (HIT), Project Directorate ARDIC, Taxila Cantt		
Fax	051-9315151	Telephone	051-9315333
Cell			

### 5. Co-Principal Investigator, if any:

The project has two CO-PIs:

#### a) Co-PI 01

Full Name	Dr. Khawar Naveed	Name of Dept	Mechanical Engg.
Present Position	Assistant Professor	Name of Organization	CUST
Present Job Status	<b>Regular</b> /TTS/Contract/Adhoc	Date of Birth	28-07-1956
Highest Qualification	PhD	Nationality	Pakistani
Field of Specialization	Thermal Hydraulics	Email address	dr.khawar@cust.edu.pk
Postal Address	Capital University of Science and Technology, Kahota Road Zone 5, Islamabad		
Fax		Tel.	+92-51-111-555-666 Ext. 268
Cell	03458566902		

#### b) Co-PI 02

Full Name	Dr. Aamer Iqbal Bhatti	Name of Department	Electrical
Present Position	Faculty Member	Name of Organization	CUST
Present Job Status	Faculty Member	Date of Birth	23-09-1969
Highest Qualification	PhD	Nationality	Pakistani
Field of Specialization	Automotive Control	Email address	aib@cust.edu.pk
Postal Address	Capital University of Science and Technology, Kahota Road Zone 5, Islamabad		
Fax		Tel.	+92-51-111-555-666 Ext. 181
Cell	0300 8568722		

### 6. Proposed Location of the project:

Heavy Industries Taxila (HIT) Taxila Cantt

7. **Estimated Cost of the Project:** PKR 30,745,126

8. **Project Duration:** 03 Years

9. **Key Words of the Project:**

Diesel Engine	Design Improvement	Mathematical Modeling	Design Verification	Combustion	Numerical Simulations
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10. **Declaration:**

It is declared that the information provided is correct. The project will be completed in stipulated time frame and budget provided. The outcome mentioned in the project will be delivered to PSF/parent organization.

Signature of Principal Investigator_____	Signature of Co-Principal Investigator_____
Date:_____	Date:_____
Official Stamp:_____	Official Stamp:_____

11. **Endorsements:**

I have read this application thoroughly and endorse that:

- The facilities of the institution including personnel, infrastructure, equipment, utilities etc. will be available to the applicant as per requirement laid down in the proposal.
- The above named Principal Investigator is working in this institution as mentioned at serial No 4.

Signature of Head of Institution: \_\_\_\_\_

Date: \_\_\_\_\_

Official Stamp: \_\_\_\_\_

# Research Proposal PSF Finance Assistance Under Research Support Program

## 1. Title of the Project

Capacity Building of an Accomplished Engine Research Group for the Development High Power Diesel Engine.

## 2. Field of Study

Automotive System Engineering

## 3. Specialization Area of Research

Diesel Engine Modelling and Simulation.

## 4. Principal Investigator (Honorary)

Full Name	Prof. Aamer Iqbal Bhatti	Name of Dept	Electrical Engineering		
Present Position	Faculty Member	Name of Organization	CUST		
Present Job Status	Faculty Member	Date of Birth	23-09-1969		
Highest Qualification	PhD	Nationality	Pakistani		
Field of Specialization	Controls System	Email address	<a href="mailto:aamer987@gmail.com">aamer987@gmail.com</a>		
Postal Address	Capital University of Science and Technology, Kahota Road Zone 5, Islamabad				
Fax		Tel.	+92-51-111-555-666 Ext. 181	Cell	03008568722

## 5. Co-Principal Investigators

2×CO-PIs

### a) Co-PI-1

<b>Full Name</b>		Col. Umair		<b>Name of Department</b>		ARDIC	
<b>Present Position</b>		-		<b>Name of Organization</b>		HIT	
<b>Present Job Status</b>		On Job		<b>Date of Birth</b>		-	
<b>Highest Qualification</b>		-		<b>Nationality</b>		Pakistani	
<b>Field of Specialization</b>		-		<b>Email address</b>		-	
<b>-Postal Address</b>		Heavy Industries Taxila (HIT), Project Directorate ARDIC, Taxila Cantt					
<b>Fax</b>	-	<b>Tel</b>	-		<b>Cell</b>	-	



**b) Co-PI-2**

<b>Full Name</b>	Dr. Col. Kanwar Faraz Ahmed Khan	<b>Name of Department</b>	ARDIC
<b>Present Position</b>	Managing Director	<b>Name of Organization</b>	HIT
<b>Present Job Status</b>	On Job	<b>Date of Birth</b>	-
<b>Highest Qualification</b>	PhD	<b>Nationality</b>	Pakistani
<b>Field of Specialization</b>	-	<b>Email address</b>	kfaraz@gmail.com
<b>Postal Address</b>	Heavy Industries Taxila (HIT), Project Directorate ARDIC, TaxilaCantt		
<b>Fax</b>	051-9315151	<b>Telephone</b>	051-9315333
		<b>Cell</b>	???

**6. Proposed Location of the Project**

Capital University of Science and Technology

**7. Estimated Cost of the Project**

The total estimated cost of the Project is Rs. 108,886,400 (excluding GST)

**8. Project Duration**

The project duration is two and half years.

**9. Keywords of the Project**

- a. Diesel Engine
- b. Design Improvement
- c. Mathematical Modeling
- d. Design Verification
- e. Numerical Simulations
- f. Combustion
- g. Exhaust System

## Application for ICT-Related Grant for Innovative Product Development

### Section – 1

#### 1.1 Project Identification

**Reference Number:**

(for office use only)

**Project Title:**

Indigenous Development of Drone Detection Radar

**Short title of the Project:**

(Short title or name of the project in one or two words e.g. "YouTube".)

Drone Detection Radar

**Slogan of the Project:**

(Please describe the project in one sentence e.g. "The world's leading video-sharing service".)

Safe Skies.

**Project Director (PD):**

Name:	<b>Dr. Muhammad Faisal Iqbal</b>		
Designation:	Associate Professor		
Organization:	Capital University of Science and Technology, Islamabad		
Mobile # :	03218577222	Tel. # :	051-111555666-126
Email:	<a href="mailto:faisal.iqbal@cust.edu.pk">faisal.iqbal@cust.edu.pk</a>		

**Project Manager(PM):**

Name:	<b>Prof. Aamer Iqbal Bhatti</b>
Designation:	Professor

Organization:	Capital University of Science and Technology, Islamabad		
Mobile # :	03008568722	Tel. # :	051-111555666-181
Email:	<a href="mailto:aib@cust.edu.pk">aib@cust.edu.pk</a> , <a href="mailto:aamer987@gmail.com">aamer987@gmail.com</a>		
<b>Contact Person:</b> (If different from PD.)			
Name:			
Designation:			
Organization:			
Mobile # :		Tel. # :	
Email:			
<b>Project Director's Organization (PDO):</b>			
<i>(Please indicate the name, address, telephone and fax of the Project Director's Organization. The Project Director should belong to this organization.)</i>			
Name:	Capital University of Science and Technology		
Address:	Kahuta Road Zone-V , Sihala, Islamabad		
Legal Status	<input type="checkbox"/> Public Ltd. Co. <input checked="" type="checkbox"/> Pvt. Ltd. Co. <input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> NGO <input type="checkbox"/> Other (please specify):		
Registration #:	(Please attach certified copy)		
National Tax #:	7153859-2	(Please attach certified copy)	
Tel. # :	+92-051-111555666	Fax # :	+92-0514486705
Website:	<a href="http://www.cust.edu.pk">www.cust.edu.pk</a>		

# Application for ICT-Related Grant for Innovative Product Development

## Section – 1

### 1.1 Project Identification

**Reference Number:**

(for office use only)

**Project Title:**

Design and Development of Energy Efficient Electric Vehicle with On-Board BMS and Motor Control

**Short title of the Project:**

(Short title or name of the project in one or two words e.g. "YouTube".)

Electric Bus

**Slogan of the Project:**

(Please describe the project in one sentence e.g. "The world's leading video-sharing service".)

Green Ways

**Project Director (PD):**

Name: **Dr. Khawar Naveed**

Designation: Assistant Professor

Organization: Capital university of Science and Technology

Mobile # : 03458566902 Tel. #:

Email: [dr.khawar@cust.edu.pk](mailto:dr.khawar@cust.edu.pk)

**Project Manager (PM):**

Name: **Prof. Dr. Waqar Mehmood**

Designation: Director

Organization: CERAD, UET, Lahore

Mobile # : +92 3214155919 Tel. # : 051-111555666-445

Email: [director@kics.edu.pk](mailto:director@kics.edu.pk)

### Team Lead (TL):

Name:	Prof. Aamer Iqbal Bhatti		
Designation:	Professor		
Organization:	Capital university of Science and Technology		
Mobile # :	03008568722	Tel #:	051-111555666-181
Email:	<a href="mailto:aamer987@gmail.com">aamer987@gmail.com</a>		

### Contact Person: (If different from PD.)

Name:	Muhammad Farhan		
Designation:	Assistant Director		
Organization:	Capital university of Science and Technology		
Mobile # :	03435821180	Tel #:	
Email:	<a href="mailto:muhammad.farhan@cust.edu.pk">muhammad.farhan@cust.edu.pk</a>		

### Project Director's Organization (PDO):

*(Please indicate the name, address, telephone and fax of the Project Director's Organization. The Project Director should belong to this organization.)*

Name:	Capital University of Science and Technology		
Address:	Kahuta Road Zone-V , Sihala, Islamabad		
Legal Status	<input type="checkbox"/> Public Ltd. Co. <input checked="" type="checkbox"/> Pvt. Ltd. Co. <input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> NGO <input type="checkbox"/> Other (please specify):		
Registration #:			<i>(Please attach certified copy)</i>
National Tax #:	7153859-2		<i>(Please attach certified copy)</i>
Tel. # :	+92-051-111555666	Fax # :	+92-0514486705
Website:	<a href="http://www.cust.edu.pk">www.cust.edu.pk</a>		

**What technology is core to your product?** *(Please mark X where applicable.)*

附件

## Collaborative Research Agreement

Basic parts (but not limited to these parts):

### 1. Collaborative Research Title

Molecular and bioinformatics analysis of drug resistance strains of *Mycobacterium tuberculosis*

### 2. Principal Investigators and Main Participants from Both Sides

#### List principal investigators and participants of each side

##### Pakistani Team: Partner A

Shaukat Iqbal Malik – PI  
Aamer Iqbal Bhatti - Co-PI  
Sahar Fazal. – participant  
Muhammad Tahir Khan - participant

##### Chinese team: Partner B

Dongqing Wei, PI  
Qin Xu - participant  
Yi Xiong - participant  
Aman Kaushik - participant  
Heng Wang - participant  
Ran Huang - participant  
Fang Li - participant  
Yanjing Wang - participant  
Chengdong Li - participant

### **3. Research Plan, Division of Labor and Timetable**

Briefly describe the scientific objectives, methodologies and approaches of the research. State clearly which part is “Partner A” s work and which part is “Partner B”s. Include time frames in this part if necessary.

#### **2020 - Partner A**

1. To conduct a full screening of literature sources (~ 100 thousand publications over 30 years) and make a list of mutations associated with TB first line and second line drug resistance.
2. Samples collections from TB suspects.
3. Culturing of samples for identification

#### **2021 - Partner A**

4. Screening of drug resistance isolates.
5. Drug susceptibility testing of samples

#### **2022 - Partner A**

6. Isolation and purification of DNA from drug resistance strains
7. Investigation of prevalence of anti-tuberculosis drug resistance
8. Statistical analysis of TB suspects data



## **Year 2020 - Partner B**

### **1. 1 Whole genome sequencing of DNA**

- i Whole genome sequencing will expose mutations associated with drug resistance.
- ii Sequence data purification
- iii Screening of mutations in the drug targets and their associations with drug resistance TB.

## **Year 2021- Partner B**

### **1.2 Molecular dynamic (MD) Simulation of mutants (MTs) and Wild type (WT) first-line drug targets.**

- i Docking of drug with MTs and WT target proteins
- ii Shape complementarity computation
- iii MD simulation of WT and MTs first-line drug targets
- iv Principal Component Analysis
- v The Gibbs free energy
- vi Free energy calculation
- vii Drug binding pocket measurement

## **Year 2022-Partner B**

### **1.3 Molecular dynamic (MD) Simulation of mutants (MTs) and Wild type (WT) second-line drug targets.**

- i Docking of drug with MTs and WT second-line drug targets
- ii Shape complementarity computation
- iii MD simulation of WT and MTs second-line drug targets
- iv Principal Component Analysis
- v The Gibbs free energy
- vi Free energy calculation
- vii Drug binding pocket measurement

**Approach.**

DNA sequencing will be carried out through latest sequencing technologies. Molecular dynamic simulations will be run through high performance supercomputing.

**4. Sources of Funding and Its Use**

Whereas there is a high level of complementarity between works of two teams, and whereas funding opportunities have been identified that could advance research of both teams,

Professor Aamer Iqbal Bhatti and Wei do hereby agree to:

1. explore opportunities for research collaboration that will build on their complementary expertise,
2. funding permitting, establish a program of scientific exchanges involving Principal Investigators, Postdoctoral Fellows and Graduate Students,
3. explore joint distribution and commercialization opportunities for any scientific discovery as a result of this collaboration.

**5. Ownership, Use and Transfer of the Intellectual Property**

Each team owns intellectual properties developed through this collaboration, should joint patents be filed the order of authorship be made according to contribution of each team, which will be shared ownership.

**6. Duration, Amendment and Withdrawal**

This agreement becomes effective as of July 10, 2019, is valid for 5 years, could be extended upon mutual agreement of both teams.

**7. Legal Validity**

This agreement is governed by law of both Pakistan and China. Any disputes should be solved by friendly discussions of two teams.

**8. Signature by Principal Investigators of Both Parties, Date and Place**

**Signed by Dongqing Wei**

At College of Life Science, Shanghai Jiaotong University, 800 Dongchuan Road

Minhang, Shanghai, China 200240  
Tel/Fax 86-21-3420-4573  
dqwei@sjtu.edu.cn  
April 10, 2019

**Signed by Aamer Iqbal Bhatti**

Professor at Department of Electrical Engineering

Capital University of Science and Technology 44000 Islamabad Expressway, Kahuta  
Road, Zone-V Islamabad

+92-51-4486700-4.

[aib@cust.edu.pk](mailto:aib@cust.edu.pk)

**July 10, 2019**



Proposal Identification No  
(To be allotted by PSF)

## Submission of Research Proposal for PSF Financial Assistance under Competitive Research Programme

**Type of Grant:** Consortium Research Grants

### 1. Title of the Project:

Investigation of Drug Resistant Strains of Mycobacterium Tuberculosis

### 2. Field of Study: Microbiology

### 3. Specialized Area of Research: Drug Resistance Tuberculosis

### 4. Relevant Industry onboard: Provincial TB Control Program KPK

(Once the project is recommended by the Technical Committee; an MoU/Letter of Intent/agreement will be signed between the Foundation, industry and the Principal Investigator with mutual consent and agreed level of contribution in cash or kind from the private sector industry/partner)

### 5. Principal Investigator:

Full Name	Prof. Shaukat Iqbal Malik	Name of Department	Department of Bioinformatics and Biosciences
Present Position	Professor	Name of Organization	Capital University of Science and Technology
Present Job Status (Regular/TTS/Contract/Adhoc)	Regular	Date of Birth	25-11-1963
Highest Qualification	PhD	Nationality	Pakistani
Field of Specialization	Molecular Biology & Bio. Chemistry	e-mail address	<a href="mailto:drshaukat@cust.edu.pk">drshaukat@cust.edu.pk</a>
Postal Address	Capital University of Science and Technology, Kahota Road Zone 5, Islamabad		
Fax	NA	Telephone	+92-51-111-555-666 Ext. 380
		Cell	03325472974

### 6. Co-Principal Investigator, if any:

Full Name	Dr. Sahar Fazal	Name of Department	Department of Bioinformatics and Biosciences
Present Position	Associate Professor	Name of Organization	Capital University of Science and Technology
Present Job Status (Regular/TTS/Contract/Adhoc)	Regular	Date of Birth	28-10-1972
Highest Qualification	PhD	Nationality	Pakistani
Field of Specialization	Entomology & Microbiology	e-mail address	<a href="mailto:sahar@cust.edu.pk">sahar@cust.edu.pk</a>
Postal Address	Capital University of Science and Technology, Kahota Road Zone 5, Islamabad		
Fax	NA	Telephone	+92-51-111-555-666 Ext. 296
		Cell	03345222518



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Email: info@cust.edu.pk, Website: http://www.cust.edu.pk

No.23/CUST/ORIC/2019

March 27, 2019

### 7<sup>th</sup> ORIC Research Committee Meeting

#### **Minutes of the meeting held on 14<sup>th</sup> March, 2019**

The 7<sup>th</sup> ORIC Research Committee meeting was held on Thursday March 14, 2019 in the Workshop Room, B-Block at 2:00 PM.

Prof. Aamer Iqbal Bhatti, Dean Research & Innovation, chaired the meeting.

The following members attended the meeting.

Dr. Majid Ali	Associate Professor (CE Dept)	Member
Dr. Sahar Fazal	Associate Professor (BI Dept)	Member
Dr. Abdul Rehman Khasif	Associate Professor (Math Dept)	Member
Dr. Khawar Naveed	Assistant Professor (ME Dept)	Member
Dr. Muhammad Azhar	Associate Professor (CS Dept)	Member
Dr. Muzaffar Asad	Assistant Professor (MS Dept)	Member
Dr. Mahboob Alam	Assistant Professor (Pharmacy Dept)	Member

Dr. Umer Amir Khan was engaged in departmental activities. Dr. Muhammad Mahabat Khan took part in the meeting as an observer.

Dean Research and Innovation, Prof. Dr. Aamer Iqbal Bhatti welcomed the committee members and presented them "Annual Research Book 2017", the first formal publication of ORIC. Subsequently, the meeting progressed as per agenda items listed below.

<b>Item 01</b>	<b>Confirmation of Previous Minutes of Meeting</b>	<b>Action By</b>
	1.1 It was notified that no observations were received on the decisions taken in the 6 <sup>th</sup> ORIC Research Committee meeting held on October 18, 2018. Therefore, the minutes of meeting were confirmed.	
<b>Item 02</b>	<b>FYPs Of Faculty of Engineering</b>	
	2.1 The Final Year Projects of Faculty of Engineering were briefly discussed. Dean Research & Innovation asked Dr. Muzaffar Asad to identify the specific business case projects that have particular commercialization aptitude and marketing potential.	Dr. Muzaffar Asad
<b>Item 03</b>	<b>ORIC Activities Calendar Spring 2019</b>	
	3.1 Dean Research & Innovation briefed the Committee members about the proposed list of activities for Spring 2019 Semester.	Dr. Azhar / Dr. Majid

- 3.2 Dean Research & Innovation updated the committee members about the opening ceremony of Incubation lab which is planned to be held by the end of April this year. He added that there should be an incubation centre in every department. Dr Muhammad Azhar presented the recent progress report and significance of proposed Incubation Centre with regard to the possibility of free lancing and prolific work.
- 3.3 BIM Centre of Excellence is a joint venture by ORIC Office and Department of Civil Engineering, CUST. Dr Majid Ali briefed the members about the implication of BIM Centre where diverse professional level trainings and certifications are being arranged for students and industry professionals. The respected members agreed upon that professional experts within the university faculty should be encouraged and entertained. In this regard policy would be conferred with the concerned authorities.
- 3.4 Dr Mahboob Alam and Dr Muzaffer Asad presented the idea that university research work especially PhD posters, Research Papers and Thesis needs to be publicized on Official University website in separate section. The members also agreed upon the financial encouragement in terms of travel grants to the students & faculty who intend to present their research work in some conference, seminar etc. This would lead towards exposure and joint betterment of faculty, students and University in the long run.
- 3.5 Dr Mahboob Alam proposed that we should pay emphasis on ordinary level MOUs and agreements. He said that nothing exceptional is needed in signing MOUs with nearby Universities and institutes in terms of lab facilities usage, joint Research work, credit hours transfer etc. Dean Research & Innovation assured that if any one from the Research Committee members can play his role in doing any such agreement, ORIC office would fully support him.

### **Item 03**

#### **Departmental Outreach Committees**

- 3.1 Dean Research & Innovation apprised the members about the constitution of first Industrial Outreach Committee of Civil Engineering Department in response to Industrial Liaisons Meeting held on Feb 21, 2019. He underlined the significance of such type of committees for each department and requested the members to play their productive role.

**Item 04      Annual Research book**

- 4.1 Annual Research Book 2017 was delivered to each board member. Dean Research & Innovation informed the members that book is being distributed to all the offices & faculty members of university and would also be shared on mailboxes. The respective members recommended that the Research book should be available on the University website. Research Committee / ORIC
- 4.2 Dean ORIC further added that the subsequent volume of the book is being worked on and would be finalized soon. It was agreed upon by all the board members that a specific ceremony should be arranged for launch of next version. Dean ORIC asked the members to submit recommendations about Annual Research book 2018.

**Item 06      FYPs Funding & Associated Criteria**

- 6.1 Dean Research & Innovation briefed the Committee Members that ORIC Office intends to financially sponsor selected Final Year Projects. A total of six projects would be funded encompassing 30,000 PKR each. In this regard formal invitations comprising application form and flyer are sent to all the respected Deans and HoDs. He further informed the members about particular criteria standardized by ORIC. Application forms are available in ORIC Office and are also shared online. After a systematic assessment particular projects meeting the standard criteria would be shortlisted for the funding. ORIC

Being no further item for discussion the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**



Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Registrar
- ORIC Committee Members
- File





# Capital University of Science & Technology

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Email: info@cust.edu.pk, Website: http://www.cust.edu.pk

No.15/CUST/ORIC/2019

Sep 02, 2019

## 9<sup>th</sup> ORIC Research Committee Meeting

### **Minutes of the meeting held on 31<sup>st</sup> July, 2019**

The 9<sup>th</sup> ORIC Research Committee meeting was held on Wednesday July 31, 2019 in the Workshop Room, B-Block at 2:00 PM.

Prof. Aamer Iqbal Bhatti, Dean Research & Innovation, chaired the meeting.

The following members attended the meeting.

Dr. Abdul Rahman Kashif	Associate Professor (Math Dept)	Member
Dr. Majid Ali	Associate Professor (CE Dept)	Member
Dr. Sahar Fazal	Associate Professor (BI Dept)	Member
Dr. Khawar Naveed	Assistant Professor (ME Dept)	Member
Dr. Muhammad Azhar	Associate Professor (CS Dept)	Member
Dr. Muzaffar Asad	Assistant Professor (MS Dept)	Member

Dr. Umer Amir Khan didn't attend the meeting due to personal commitments while Dr. Mahboob Alam was on Hajj leave.

Dr. Lakhi Muhammad also attended the meeting for a discussion over the commercialization aspects of students final year projects.

Dean Research & Innovation welcomed the committee members. Subsequently, the meeting progressed as per agenda items listed below.

<b>Item 01</b>	<b>Commercialization of Business Case FYPs</b>	<b>Action By</b>
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1.1 Dean Research & Innovation apprised the members about the commercialization aspects of five business case FYPs funded by university in a competition organized by ORIC. The following projects were conversed in detail taking in consideration their commercial aspects.

- (a) Off-Grid Automatic Egg Incubator
- (b) Design & Fabrication of Automatic Solar Tracker with Panel Cleaning and Cooling System
- (c) Blindroid
- (d) AL-FUNOON
- (e) Prosthetic Hand Using Brain Pulses

1.2 After a detailed discussion following two projects were considered to be pursued further.

- Blindroid
- Off-Grid Automatic Egg Incubator

**Item 02      Commercialization aspects of "Blindroid"**

2.1 The discussion started over the commercialization prospects of Blindroid which is a system developed by CS students for blind and visually impaired people. Dean Research & Innovation said that the particular system should be designed with minimum hardware requirements to facilitate the vision impaired people in maximum.

2.2 Dr. Muzaffar Asad proposed that we can involve NGOs for free launch of our product in the market which would also fulfill social cause.

2.3 Dr. Lakhi Muhammad gave suggestions about the promotional aspects of the project. He told that initially we can provide it free of cost to the people but can also earn money through online advertisements at the same time.

2.4 It was decided that the particular students working on the given project would be called through ORIC for a small demonstration to address the ambiguities.

**Item 03      Commercialization aspects of "Off-Grid Automatic Egg Incubator"**

3.1 Dean Research & Innovation updated the members that the given project is designed for the cottage industry and is quite affordable for the target customers costing around 56,000 PKR each unit with high hatching rate due to homogenous conditions provided by the system.

3.2 It was decided that the particular students working on the given project would be called through ORIC for a small demonstration for further understanding of technical and commercial aspects of their project.

**Item 04      Pakistan Science Foundation (PSF) Competitive Research Grant**

- 4.1 Dean Research & Innovation informed the committee members about the "Competitive Research Programme" initiated by Pakistan Science Foundation (PSF) for research proposals of engineers, scientists and technopreneurs. He provided the details of the particular programme and asked the members to submit at least one proposal from their respective department in PSF Research Grant Programme. Research Committee Members/ORIC
- 4.2 Dean Research & Innovation suggested Dr. Majid Ali to compose a research proposal for their "Light Weight Plastic based Project" and assured that ORIC would fully assist it. Dr Majid informed the members that an MS research thesis has already been done on the particular project. Dean ORIC proposed that the mentioned thesis can be helpful in proposal write up. It was agreed to continue the work on the given project.

Being no further item for discussion the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**



Muhammad Raheel Anjum

Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Registrar
- ORIC Committee Members
- File



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No.23/CUST/ORIC/2019

23<sup>rd</sup> July, 2019

### One-Day Workshop on Latex



Capital University of Science and Technology hosted “**One-Day Workshop on Latex**” dated 17<sup>th</sup> July, 2019 in A-1 from 10:00 AM to 3:30 PM. Office of Research Innovation and Commercialization (ORIC) organized the particular workshop aiming to equip students and faculty members with the contemporary knowledge about creation of technical and scientific documents using Latex with practical illustrations.

LaTeX is a typesetting system suitable for producing scientific and mathematical documents which enables authors to typeset and print their work at the highest typographical quality. The first session covered the basic topics about Latex Overview & Installation, Document Write up (Sections and paragraphs), Packages Installation, Figures & Tables Insertion, Mathematical Operations, Table of Contents and Bibliography. The second session encompassed the practical illustrations of Latex about creating structured documents like research thesis, research paper, project presentation etc.

A total of 80 participants attended the workshop including MS & PhD students and faculty members from CUST, FAST NUCES, IST, FIJWU etc. The resource person for the particular workshop was Dr. Ali Arshad, Assistant Professor, COMSATS University Islamabad. The respected instructor was acknowledged with university memento by Dr. Javed Hyder, Professor ME Department. Dean Research & Innovation was also present at the auspicious occasion.



**Prepared by:**

Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**

Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation



## Capital University of Science and Technology

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No.23/CUST/ORIC/2019

Sep 02, 2019

### **Workshop on Research Methodology (19<sup>th</sup> -20<sup>th</sup> August 2019)**



Capital University of Science and Technology hosted a two days workshop entitled “**Research Methodology**” in Workshop Room, B-Block on 19<sup>th</sup> – 20<sup>th</sup> August 2019. Office of Research Innovation and Commercialization (ORIC) in collaboration with Dr. Amir Qayyum, Dean Quality Enhancement Cell (QEC) organized the particular workshop. The objective of given activity was to enlighten the faculty members and active researchers with the present knowledge about Research Methodology and its associated tools.

Research methodology is a set of systematic procedures by which researchers go about their work of describing, explaining and predicting phenomena, and developing the work plan of their particular research. The workshop was intended to present the basic introductory material and most recent knowledge about Research Tools, Technical & Proposal Writing, Research Planning and Literature Review.

The event was attended by graduate students, researchers and faculty members of CUST. The workshop resource person, Dr Inam Ul Ahad works as Research Development Manager in I-Form Advanced Manufacturing Research Centre and as Senior Materials Research Scientist in the Advanced Processing Technology Research Centre, Dublin City University, Ireland. The respected presenter was acknowledged by Dean QEC for deliverance of provocative knowledge and successful conduct of a workshop.

**Prepared by:**

Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**

Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation



**Memorandum of Understanding relating to collaborate on establishing the  
"Shanghai-Islamabad-Belgrade joint innovation center on Antibacterial  
Resistance" by Shanghai Jiao Tong University, China, and the Capital  
University of Science and Technology, Pakistan**

The Shanghai Jiao Tong University, China (SJTU) and the Capital University of Science and Technology, Pakistan (CUST) share a common interest in research on bacterial antibiotic resistance (ABR), an urgent global problem. SJTU and CUST intend to collaborate on establishing the "Shanghai-Islamabad-Belgrade joint innovation center on Antibacterial Resistance" (Center) via application for the funding from by the Shanghai Science and Technology Committee in 2019. The Center is scheduled to commence on the date of 1st January 2020 and shall terminate on 31st December 2022, and the Memorandum of Understanding (MOU) will remain during this period. The purpose of this MOU is only to express the intentions of the parties and shall not to be legally binding and imposes no financial implications on either party.

In the Center, it is anticipated that the following general forms of cooperation will be pursued: Academic visits, Joint research activities and publications, Exchange of academic materials and other information as appropriate, and Potential commercialisation of arising Intellectual Property (IP). With the focus on bacterial pathogens with ABR, we will aim to perform the molecular and bioinformatics analysis of drug resistance strains of *Mycobacterium tuberculosis*.

In the Center, each Party shall use reasonable endeavours to ensure the accuracy of any information or materials that it supplies to any of the other Parties hereunder and promptly to correct any error therein of which it is notified. The recipient party shall be entirely responsible for the use to which it puts such information and materials. In the event of the publication of the results from the Center, it is deemed that co-authored papers will be shared by both parties. In the event that IP arises from the Center it will be deemed that ownership of IP will follow inventorship and that the commercialization of jointly invented IP shall be agreed in writing, on fair and reasonable terms between SJTU and CUST. Neither SJTU nor CUST shall unreasonably prevent the commercialisation of any arising IP.



Signed for and on behalf of SJTU

林忠钦

Name: Zhongqin Lin  
Title/Position: **President**  
Shanghai Jiao Tong University  
China

Date:



Zixin Deng

Name: Zixin Deng  
Title/Position: **Principal Investigator**  
School of Life Sciences & Biotechnology  
Shanghai Jiao Tong University  
China

Date:

Signed for and on behalf of CUST

Muhammad Mansoor Ahmed

Name: Muhammad Mansoor Ahmed  
Title/Position: **Vice Chancellor**  
Capital University of Science & Technology  
Pakistan

Date: 23-07-2019



Dr. Shaukat Iqbal  
Professor  
Department of Biosciences  
Capital University of Science & Technology  
Islamabad, Pakistan

Shaukat Iqbal Malik

Name: Shaukat Iqbal Malik  
Title/Position: **Principal Investigator**  
Faculty of Health & Life Sciences, Capital  
University of Science and Technology Pakistan

Date: 23-07-2019



上海交通大学  
SHANGHAI JIAO TONG UNIVERSITY



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11000 BELGRADE  
Republic of SERBIA  
Tel: +381 11 2186 635  
Fax: +381 11 2638 500  
E-mail: dekanat@bio.bg.ac.rs

**Memorandum of Understanding relating to collaborate on establishing the  
"Shanghai-Islamabad-Belgrade joint innovation center on Antibacterial  
Resistance" by Shanghai Jiao Tong University, China, and the University of  
Belgrade-Faculty of Biology, Serbia**

The Shanghai Jiao Tong University, China (SJTU) and the University of Belgrade-Faculty of Biology, Serbia (UB-FB) share a common interest in research on bacterial antibiotic resistance (ABR), an urgent global problem. SJTU and UB-FB intend to collaborate on establishing the "Shanghai-Islamabad-Belgrade joint innovation center on Antibacterial Resistance" (Center) via application for the funding from by the Shanghai Science and Technology Committee in 2019. The Center is scheduled to commence on the date of 1st January 2020 and shall terminate on 31st December 2022, and the Memorandum of Understanding (MOU) will remain during this period. The purpose of this MOU is only to express the intentions of the parties and shall not to be legally binding and imposes no financial implications on either party.

In the Center, it is anticipated that the following general forms of cooperation will be pursued: Academic visits, Joint research activities and publications, Exchange of academic materials and other information as appropriate, and Potential commercialisation of arising Intellectual Property (IP). With the focus on *ESCAPE* bacterial pathogens with ABR, we will aim to (1) examine ABR dissemination via mobile genetic elements (by SJTU); (2) explore bacterial defense systems (CRISPR/Cas and toxin-antitoxin system) related to ABR dissemination (by SJTU and UB-FB); (3) employ novel synthetic routes for new antibiotics discovery (by SJTU).

In the Center, each Party shall use reasonable endeavours to ensure the accuracy of any information or materials that it supplies to any of the other Parties hereunder and promptly to correct any error therein of which it is notified. The recipient party shall be entirely responsible for the use to which it puts such information and materials. In the event of the publication of the results from the Center, it is deemed that co-authored papers will be shared by both parties. In the event that IP arises from the Center it will be deemed that ownership of IP will follow inventorship and that the commercialization of jointly invented IP shall be agreed in writing, on fair and reasonable terms between SJTU and UB-FB. Neither SJTU nor UB-FB shall unreasonably prevent the commercialisation of any arising IP.



Signed for and on behalf of SJTU

林忠钦

Name: Zhongqin Lin  
Title/Position: President  
Shanghai Jiao Tong University

Date:



Zixing Deng

Name: Zixing Deng  
Title/Position: Principal Investigator  
School of Life Sciences & Biotechnology  
Shanghai Jiao Tong University

Date:

Signed for and on behalf of UB-FB

Name: Željko Tomanovic  
Title/Position: Dean  
University of Belgrade-Faculty of Biology

Date: 7/19/2019

Marko Djordjevic

Name: Marko Djordjevic  
Title/Position: Principal Investigator  
University of Belgrade – Faculty of  
Biology

Date: 7/19/2019



上海交通大学  
SHANGHAI JIAO TONG UNIVERSITY



上海交通大学和巴基斯坦首都科技大学关于共建  
“上海-伊斯兰堡-贝尔格莱德抗生素耐药研究联合创新中心”  
的谅解备忘录

上海交通大学和巴基斯坦首都科技大学对细菌耐药性有共同的研究兴趣，将联合申报上海市 2019 年度“科技创新行动计划”“一带一路”国际合作项目“一带一路”国际联合实验室建设的项目，拟共建“上海-伊斯兰堡-贝尔格莱德抗生素耐药研究联合创新中心”（以下简称“本中心”）。本中心预计开始建设日期为 2020 年 1 月 1 日，结束时间为 2022 年 12 月 31 日。本谅解备忘录在中心建设期内生效。本谅解备忘录的目的是表达双方的合作共建意愿，对任何一方财务不具备法律约束力。

通过本中心，双方将广泛开展以下合作：学术访问、合作研究、学术材料和数据交流，以及潜在的知识产权商业化。本中心将从耐药菌的可移动基因组、细菌的防御系统（CRISPR/Cas 和毒素-抗毒素系统）、药物靶蛋白突变、新抗生素的发现等四个内容开展合作研究。依托单位上海交通大学将和合作单位巴基斯坦首都科技大学将就研究内容三的结核分枝杆菌的药物靶蛋白突变和耐药形成开展合作。

在本中心，双方应尽其所能确保其提供给对方的数据和材料的准确性，并及时通知和纠正发现的错误；受托方对这些数据和资料的使用负有完全责任。通过本中心合作产出的论文，双方将共同署名。对合作获得的知识产权，双方应以书面形式通过公平和合理条款达成商业化的一致；任何一方不应阻止知识产权的合理商业化。

## 依托单位

单位法人：林忠钦

上海交通大学 校长

2019 年 7 月 26 日

项目负责人：邓子新

上海交通大学生命科学技术学院

2019 年 7 月 26 日

## 合作单位

单位法人：Muhammad Mansoor Ahmed

巴基斯坦首都科技大学 校长

2019 年 7 月 23 日

项目负责人：Shaukat Iqbal Malik

巴基斯坦首都科技大学卫生和生命学部

2019 年 7 月 23 日



上海交通大学  
SHANGHAI JIAO TONG UNIVERSITY



UNIVERSITY OF BELGRADE  
FACULTY OF BIOLOGY

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Republic of SERBIA  
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## 上海交通大学和塞尔维亚贝尔格莱德大学生物学部关于共建 “上海-伊斯兰堡-贝尔格莱德抗生素耐药研究联合创新中心” 的谅解备忘录

上海交通大学和塞尔维亚贝尔格莱德大学生物学部对细菌耐药性有共同的研究兴趣，将联合申报上海市 2019 年度“科技创新行动计划”“一带一路”国际合作项目“一带一路”国际联合实验室建设的项目，拟共建“上海-伊斯兰堡-贝尔格莱德抗生素耐药研究联合创新中心”（以下简称“本中心”）。本中心预计开始建设日期为 2020 年 1 月 1 日，结束时间为 2022 年 12 月 31 日。本谅解备忘录在中心建设期内生效。本谅解备忘录的目的是表达双方的合作共建意愿，对任何一方财务不具备法律约束力。

通过本中心，双方将广泛开展以下合作：学术访问、合作研究、学术材料和数据交流，以及潜在的知识产权商业化。本中心将从耐药菌的可移动基因组、细菌的防御系统（CRISPR/Cas 和毒素-抗毒素系统）、药物靶蛋白突变、新抗生素的发现等四个内容开展合作研究。依托单位上海交通大学将和合作单位贝尔格莱德大学生物学部将就研究内容二的细菌防御系统建模开展合作。

在本中心，双方应尽其所能确保其提供给对方的数据和材料的准确性，并及时通知和纠正发现的错误；受托方对这些数据和资料的使用负有完全责任。通过本中心合作产出的论文，双方将共同署名。对合作获得的知识产权，双方应以书面形式通过公平和合理条款达成商业化的一致；任何一方不应阻止知识产权的合理商业化。

### 依托单位

单位法人：林忠钦

上海交通大学 校长

2019 年 7 月 26 日

项目负责人：邓子新

上海交通大学生命科学技术学院

2019 年 7 月 26 日

### 合作单位

单位法人：Zeljko Tomanovic

贝尔格莱德大学生物学部 主任

2019 年 7 月 19 日

项目负责人：Marko Djordjevic

贝尔格莱德大学生物学部

2019 年 7 月 19 日





# Research Group of Vision and Pattern Recognition Systems (VisPRS)



## GROUP INTRODUCTION

Vision and Pattern Recognition Group of Capital University of Science & Technology is actively involved in basic and applied research in the fields of Image Processing, Machine/Computer Vision and Pattern Recognition/Classification. The scope of research not only includes the algorithm development and analysis but also system development and the optimizations involved. Presently this group has more than 20 members including 6 MS students, 12 PhD scholars and 3 post doctoral researchers belonging to different organizations.

## GROUP HEAD

### Dr. Imtiaz Ahmad Taj

Dr. Imtiaz Ahmad Taj received his PhD degree in Electronics and Information Engineering from Hokkaido University, Sapporo, Japan where he was endowed with Outstanding Young Researcher Award by IEICE Japan. He is actively involved in Teaching, Research and Academic Management. Currently he holds the Office of Dean Faculty of Engineering at Capital University of Science and Technology, Islamabad. He also remained on key positions in various R&D companies notably CET and CARE. Dr. Imtiaz Ahmad has been teaching and doing research in Machine vision, Pattern Recognition & Biometrics, Optical Networking, Nonlinear Optics, Photorefractive Wave Mixing, Free-space Optical Switching etc. He introduced several graduate level academic courses for the first time in Pakistan including Computer Vision, Pattern Recognition and Machine learning. Under his supervision, more than 20 students have successfully completed their research thesis at MS and PhD level and still a number of students are pursuing their research with him. He has accomplished more than 60 Publications in national and international Journals & Conferences of highest repute. He has served in organizing and technical committees of many international Journals & Conferences. He has successfully completed three national level research projects in the capacity of Project director leading a team of more than 15 researchers in each project. He also remained member and chaired various Professional and Non Professional bodies and organizations.



## RESEARCH AREAS

- Biometrics: Fingerprint, Iris, Face, Palm print and Signature
- Video Encoding and Processing
- Machine Learning and Deep Neural Networks
- Super Resolution Imaging
- Vision Based Navigation & Registration, Vision Based Tracking
- Time Frequency Analysis of Dynamic Signals
- Automatic Activity Detection and Vision Based Security Systems
- Medical Diagnosis using Pattern Classification Algorithms
- Algorithm Development & Hardware Design

## R&D Projects

1. Design and Development of on-board Image Registration and Position Estimation System for Autonomous Vehicle Navigation
2. Automatic Personal Identification Biometrics System (APIBS) for Large Scale Applications
3. Real Time Implementation of H.264 Decoder for Heterogeneous Multicore Architectures

## PhD ALUMNI

### Dr. Muhammad Naeem Ratyal

**Thesis Title:** 3d Face Recognition Based On Pose And Expression Invariant Alignment  
**Year:** 2016

### Dr. Muhammad Sajid

**Thesis Title:** Towards Facial Asymmetry Based Face Recognition  
**Year:** 2016

### Dr. Muhammad Asif

**Thesis Title:** Efficient Framework For Macroblock Prediction And Parallel Task Assignment In Video Coding  
**Year:** 2016

### Dr. Mubeen Ghafoor

**Thesis Title:** Fingerprint Enhancement and Nonlinear Distortion Removal by effective use of Contextual filtering  
**Year:** 2014

### Dr. Muhammad Ajab

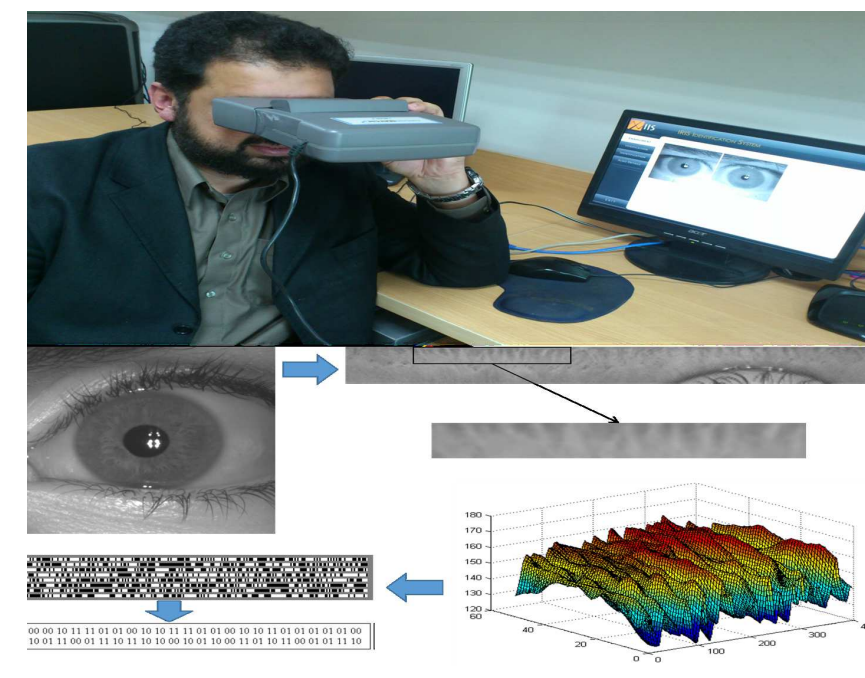
**Thesis Title:** A Combination of Linear and Quadratic Time- Frequency Techniques for Time-Varying Signals  
**Year:** 2013

### Dr. Usama Ijaz Bajwa

**Thesis Title:** Performance Enhancement of Subspace Learning Face Recognition by Effective Use of Classifiers  
**Year:** 2013

### Dr. Nabeel Ali Khan

**Thesis Title:** Cross-term Suppression in Wigner Distribution **Year:** 2010



## Current PhD Students

1. Mr. Ahmad Bilal Mehmood
2. Ms. Samana Batool
3. Mr. Aamir Javed
4. Ms. Keenjhar Ayoob Chandio
5. Mr. Muhammad Tahir Awan

## Selected Publications

### Journal Publications

- T. Zia, M. Ghafoor, S. A. Tariq, and I. A. Taj, "Robust Fingerprint Classification with Bayesian Convolutional Networks", **IET Image Processing**, vol. 13, no. 3, pp. 1–10, 2019, (I.F: 1.401).
- M. Tahir, I. A. Taj, P. A. Assuncao, and M. Asif, "Fast Video Encoding based on Random Forests", **Journal of Real-Time Image Processing**, vol. 16, no. 10, pp. 1–21, 2019, (I.F: 1.574).
- M. Sajid, I. A. Taj, U. I. Bajwa, and N. I. Ratyal, "Facial asymmetry based Age Group Estimation: Role in Recognizing Age-Separated Face Images", **Journal of Forensic Sciences**, vol. 63, no. 6, pp. 1727–1749, 2018, (I.F: 1.184).
- N. I. Ratyal, I. A. Taj, U. I. Bajwa, and M. Sajid, "Pose and expression invariant alignment based multi-view 3D face recognition", **KSII Transactions on Internet and Information Systems**, vol. 12, no. 10, pp. 4903–4929, 2018, (I.F: 0.601).
- M. Asif, I. A. Taj, S. M. Ziauddin, M. B. Ahmad, and M. Tahir, "An efficient framework for prediction parameters selection in advanced video coding", **IEEE Access**, vol. 6, pp. 25277–25291, 2018, (I.F: 3.557).
- M. Ghafoor, S. Iqbal, S. A. Tariq, I. A. Taj, and N. M. Jafri, "Efficient Fingerprint Matching Using Graphical Processing Unit", **IET Image Processing**, vol. 12, no. 2, pp. 274–284, 2018, (I.F: 1.401).
- S. A. Tariq, S. Iqbal, M. Ghafoor, I. A. Taj, N. M. Jafri, S. Razzar, and T. Zia, "Massively parallel palmprint identification system using GPU", **Cluster Computing Springer**, vol. 20, no. 3, pp. 1–16, 2017, (I.F: 1.602).
- M. Ghafoor, I. A. Taj, and N. M. Jafri, "Fingerprint Frequency Normalization and Enhancement using 2-D STFT Analysis", **IET Computer Vision**, vol. 10, no. 8, pp. 806–816, 2016, (I.F: 1.087).
- M. Sajid, I. A. Taj, U. I. Bajwa, and N. I. Ratyal, "The Role of Facial Asymmetry towards Recognizing Age-Separated Face Images", **Computers & Electrical Engineering (Elsevier)**, vol. 54, pp. 255–270, 2016, (I.F: 1.747).
- M. Asif, Imtiaz A. Taj, S.M. Ziauddin, M.B. Ahmad, M. Tahir, "A Hybrid Scheme Based on Pipelining and Multitasking in Mobile Application Processors for Advanced Video Coding", **Scientific Programming, Hindawi Publishing Corporation**, vol. 2015, no. 2, pp. 1–16, 2015, (I.F: 1.344).
- N. I. Ratyal, I. A. Taj, U. I. Bajwa, and M. Sajid, "3D face recognition based on pose and expression invariant alignment", **Computers & Electrical Engineering (Elsevier)**, vol. 46, pp. 241–255, 2015, (I.F: 1.747).
- M. Ghafoor, I. A. Taj, W. Ahmad, and N. M. Jafri, "Efficient 2-fold contextual filtering approach for fingerprint enhancement", **IET Image Processing**, vol. 8, no. 7, pp. 417–425, 2014, (I.F: 1.401).
- U. I. Bajwa, I. A. Taj, M. W. Anwar, and X. Wang, "A Multifaceted Independent Performance Analysis of Facial Subspace Recognition Algorithms", **PLOS ONE**, vol. 8, no. 2, pp.e56510, 2013, (I.F: 2.766).



# ThermoFluids Research Group



## GROUP INTRODUCTION

The Thermo-Fluids Research Group at Capital University of Science and Technology involves multidisciplinary researchers with a clear focus on both fundamental and applied research in thermo-fluids including Multiphase Flows, HVAC, Sprays and Combustion, Computational Fluid Dynamics, Aerodynamics, Turbulence, Renewable Energy and Thermal & Hydraulic Augmentation.

## GROUP HEAD

### Dr. Muhammad Mahabat Khan

Dr. Muhammad Mahabat Khan has done his Ph.D. in Computational Fluid Dynamics from Ecole Centrale de Lyon, France. He has worked as Advanced Development Engineer in Continental Automotive, France for more than five years. He was rewarded with research grant worth £20,000 at University of Leeds for developing Post Processing Methodology for Turbulent Flows in engines. He is also recipient of research award worth €2.3 million from Continental Automotive, France. His research interests include; Large Eddy Simulation of Turbulent Flows, Modeling and Simulation of Fuel Injection Systems, Multiphase Flows, Heat Transfer Enhancement etc. He is also reviewer of famous International Journals like:



1. International Journal of Heat and Mass Transfer, Elsevier
2. Energy Conversion and Management, Elsevier
3. Atomisation and Sprays, Begellhouse.

Currently he is serving as Assistant Professor in department of Mechanical Engineering at Capital University of Science & Technology, Islamabad.

## RESEARCH AREAS

- Atomization and sprays
- Large Eddy Simulation of Turbulent Flows
- Coherent Structures in Turbulent Flows
- Multiphase Flows, Free Surface Flows and Particulate Flows
- Combustion and Heat transfer Enhancement
- Ejector Refrigeration
- Phase Behavior and Phase Change
- Heat Exchangers
- Refrigeration and Air Conditioning

## Group Members

1. Dr. M. Mahabat Khan
2. Dr. Saif ur Rahman
3. Dr. Khawar Naveed
4. Dr. Muhammad Irfan
5. Mr. Saif Ullah
6. Mr. Atif Bin Asghar
7. Engr. Muhammad Ahmed
8. Engr. Madeeha Khan

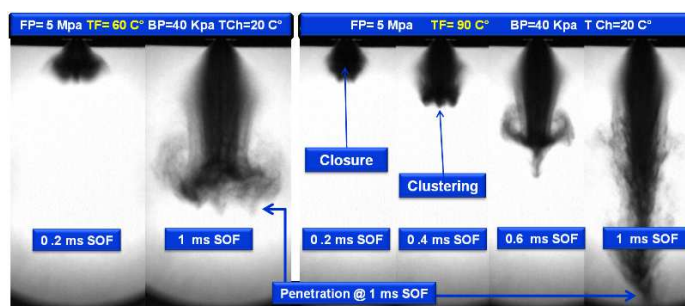
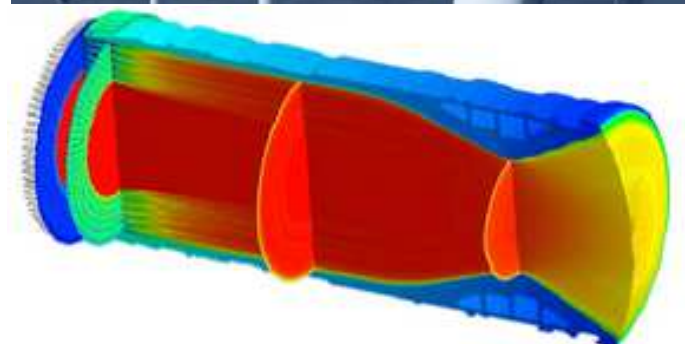
## MS/PhD Students

### MS Students

1. Mr. Liaqat Hussain
2. Mr. Fakharul Hasnain
3. Ms. Madeeha Khan
4. Mr. Muhammad Ahmed
5. Mr. Rehan Qaiser
6. Mr. Amani Room

### PhD Students

1. Mr. Rizwan Sabir
2. Mr. Noman Bashir
3. Mr. Shahid Shafiq



## ALUMNI

### Mr. Abubakar Ayub

**Thesis Title:** Exergetic optimization and comparison of combined gas turbine supercritical CO<sub>2</sub> power cycles  
**Year:** 2018

### Mr. Rizwan Bhatti

**Thesis Title:** Numerical study of hydrogen peroxide thermal decomposition in a shock tube  
**Year:** 2017

## Selected Publications

### Journal Publications

- M. M. Khan, J. Hélie, and M. Gorokhovski, "Computational methodology for non-evaporating spray in quiescent chamber using Large Eddy Simulation", *International Journal of Multiphase Flow*, vol. 102, pp. 102–118, 2018.
- M. M. Khan, N. A. Sheikh, A. Khalid, and W. A. Lughmani, "Experimental characterization of sprays under highly evaporating conditions", *Heat and Mass Transfer*, vol. 54, no. 5, pp. 1531–1543, 2018.
- M. Irfan and M. Muradoglu, "A Front Tracking Method for Particle-Resolved Simulation of Evaporation and Combustion of a Fuel Droplet", *Computers and Fluids*, vol. 174, pp. 283–299, 2018.
- A. Ayub, N. A. Sheikh, R. Tariq, M. M. Khan, and C. M. Invernizzi, "Exergetic Optimization and Comparison of Combined Gas Turbine Supercritical CO<sub>2</sub> Power Cycles", *Journal of Renewable and Sustainable Energy*, vol. 10, no. 4, p. 044703, 2018.
- E. Khalid, S. Manzoor, N. A. Sheikh, M. Ali, H. M. Ali, and M. M. Khan, "Numerical Investigation of Transient Response of a Coupled Two Degrees of Freedom Symmetric Airfoil before Flutter", *International Journal of Aeroacoustics*, vol. 17, no. 3, pp. 275–294, 2018.
- M. Irfan and M. Muradoglu, "A front-tracking method for direct numerical simulation of evaporation process in a multiphase system", *Journal of Computational Physics*, vol. 337, pp. 132–153, 2017.
- M. M. Khan, J. Hélie, M. Gorokhovski, and N. A. Sheikh, "Experimental and Numerical study of Flash Boiling in Gasoline Direct Injection Sprays", *Applied Thermal Engineering*, vol. 123, pp. 377–389, 2017.
- M. M. Khan and N. A. Sheikh, "Experimental characterization of sprays under highly evaporating conditions", *Journal of Mechanical Science and Technology*, vol. 31, no. 4, pp. 1–13, 2017.
- M. M. Khan, J. Helie, M. Gorokhovski, and N. A. Sheikh, "Air Entrainment in Multi hole Gasoline Direct Injection Sprays", *Journal of Applied Fluid Mechanics*, vol. 10, no. 4, pp. 1223–1234, 2017.
- M. Ali, M. H. Iqbal, N. A. Sheikh, H. M. Ali, S. Manzoor, and M. M. Khan "Performance investigation of air velocity effects on PV modules under controlled conditions", *International Journal of Photoenergy*, vol. 2017, pp. 1–10, 2017.
- M. R. Bhatti, N. A. Sheikh, S. Manzoor, and M. M. Khan, "Numerical studies of Hydrogen Peroxide Thermal Decomposition in a Shock Tube using OpenFOAM", *Journal of Thermal Science*, vol. 26, no. 3, pp. 235–244, 2017.
- A. Mustafa, A. Erten, R. M. A. Ayaz, O. Kayilioglu, A. Eser, M. Eryurek, M. Irfan, M. Muradoglu, M. Tanyeri, and A. Kiraz, "Enhanced dissolution of liquid microdroplets in the extensional creeping flow of a hydrodynamic trap", *Langmuir*, vol. 32, no. 37, pp. 9460–9467, 2016.





# Water and Environment Research Group (WE R)



## GROUP INTRODUCTION

The Water and Environment Research (WE R) Group focuses on performing research work in broad domains including Environmental Studies, Climate Change Assessment, Water Crises, Irrigation Channel Efficiency Improvements etc. The group is actively involved in finding means to augment needs of potable water by adopting rainwater harvesting & greywater reuse techniques at residential levels and exploration of groundwater recharge potential in populated areas. The Research work not only concentrates on exploration of Water Resources Flow Forecasting but also on scientific evaluation of Barrage Related Issues. The Research Group also addresses Water Storage and Distribution issues at national and international levels.

## GROUP HEAD

### Dr. Ishtiaq Hassan

Dr. Ishtiaq Hassan has vast academic and Industrial experience. He did his PhD in Civil Engineering with specialization in Water Resources and Irrigation Engineering from UET Taxila. He served in NESPAK from 1999 to 2014. He has many design and project management projects to his credit. His key research areas include Water Resources Planning & Designing, Global Warming & Climate Change, Rainwater Harvesting, Flow Estimations, Hydrology and Public Health Engineering. He is currently supervising 05 PhD and 04 MS students in addition to 03 MS students who have got their MS degree. He has authored numerous research papers published in HEC recognized / ISI recognized journals. He has also presented his research work in various conferences. Currently he is chairing Civil Engineering Department at Capital University of Science & Technology, Islamabad.



## RESEARCH AREAS

- Scientific Evaluation of Barrage related issues with Remedial Measures
- Water Distribution and Water Storage Issues
- Irrigation Channel Efficiency Improvements
- Climate Change and Global Warming
- Water Resources Conservation
- Water Distribution Studies
- Environmental Impact Assessment Studies
- Environmental studies

## MS ALUMNI

### Mr. Muhammad Ali

**Thesis Title:** Comparative Evaluation of Hydro power Potential of Jhelum and Indus Basins Using GIS  
**Year:** 2018

### Mr. Arsam Awan

**Thesis Title:** Optimum Lengths of Lining to Reduce Losses in Watercourses by Using Advanced Non-linear Modeling  
**Year:** 2017

### Mr. M. Umar Nadeem Qureshi

**Thesis Title:** Comparative Study of Hydroponic and Geoponic systems  
**Year:** 2017

## GROUP MEMBERS

1. Engr. Syed Shuja-ul-Hassan
2. Engr. Aruba Waqar

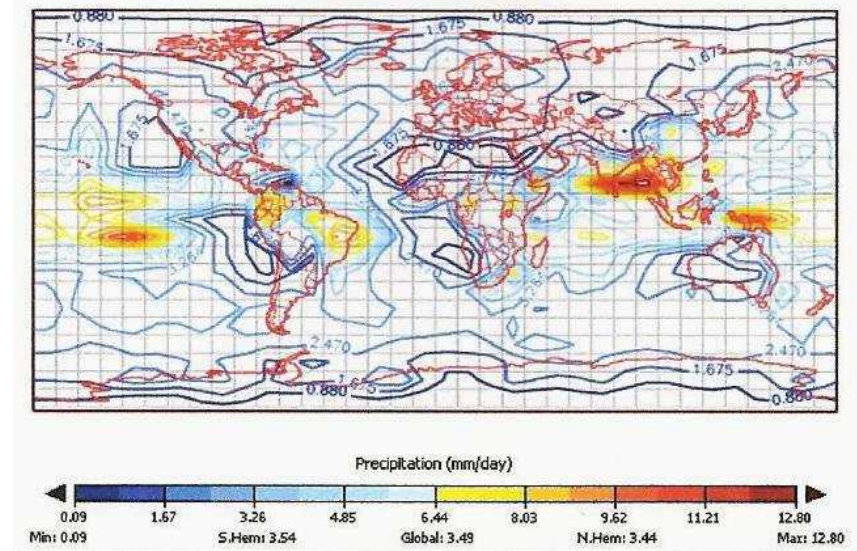
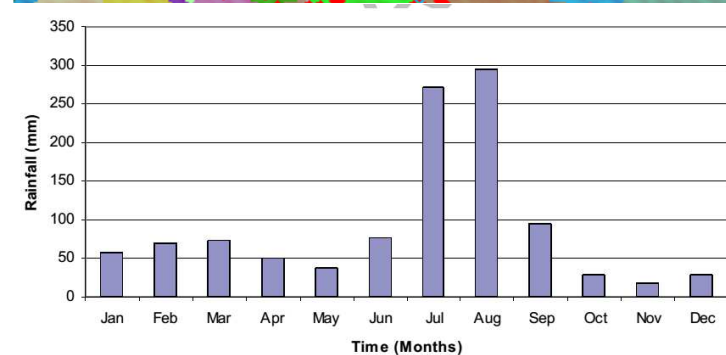
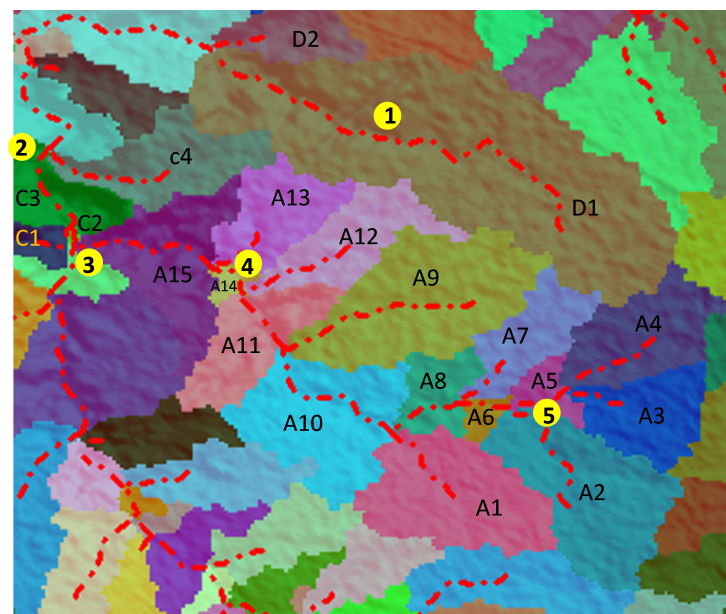
## MS/PhD Students

### MS Students

1. Mr. Kawish Mehboob
2. Mr. Hamid Ali Shah
3. Mr. Shafqat Ali Aslam
4. Mr. Adnan Ahmed Khan

### PhD Students

1. Mr. Muhammad Hassan
2. Mr. Shahmir Janjua
3. Ms. Erum Aamir
4. Mr. Arsam Awan
5. Mr. M. Waqas Zafar
6. Ms. Laila Khalid



## Selected Publications

### Journal Publications

- H. Ishtiaq, R. Osama, M. A. Furqan, U. Zakir, A. Hamza, A. Shehryar, M. Arsalan, and W. Aruba, "Reducing water demands by adopting harvesting and recycling techniques in Pakistan", *J. Bio. Env. Sci.* vol. 14, no. 4, pp. 79–88, 2019.
- I. Hassan, A. R. Ghumman, Y. Ghazaw, R. H. Abdel-Maguid, B. Samreen. "Climate Change Impact on Precipitation in Arid Areas of Pakistan", *International Journal of Water Resources and Arid Environments*, vol. 6, no. 1, pp. 80–88, 2017.
- A. A. Awan, I. Hassan, and M. Hassan, "Optimizing lining length of watercourses for increased water saving in Punjab, Pakistan", *Journal of Biodiversity and Environmental Sciences (JBES)*, vol. 10, no. 2, pp. 173–180, 2017.
- I. Hassan, "Rainwater Harvesting - an alternative water supply in the Future for Pakistan", *Journal of Biodiversity and Environmental Sciences*, vol. 8, no. 6, pp. 213–222, 2016.
- I. Hassan, A. R. Ghumman, and H. N. Hashmi, "Global warming and temperature changes for Saudi Arabia", *Journal of Biodiversity and Environmental Sciences (JBES)*, vol. 8, no. 1, pp. 179–191, 2016.
- I. Hassan and A. R. Ghumman, "Application of Civil Engineering Softwares for Downscaling GCM Results", *International Invention Journal of Engineering Science and Technology*, vol. 2, no. 1, pp. 1–9, 2015.
- A. R. Ghumman, I. Hassan, Q. U. Z. Khan, and M. A. Kamal, "Investigation of impact of environmental changes on precipitation pattern of Pakistan", *Environmental Monitoring and Assessment* vol. 185, no. 6, pp. 4897–4905, 2013.

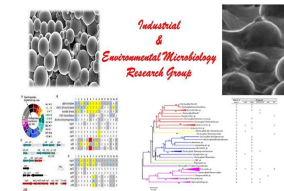
### Conference Proceedings

- I. Hassan, A. R. Ghumman, and W. Aruba. "Simulating Precipitation of Bahawalpur and its Adjoining Cholistan Desert of Pakistan due to Climate Change", *8th International Conference on Water Resources and Arid Environments (ICWRAE 8)*, 2019.
- A. Waqar and I. Hassan, "Comparative Analysis of Solid Waste Management Practices in Higher Education Institutions of Developing Countries", *3rd Asian Conference on Science, Technology & Medicine, ACSTM*, 2019.
- I. Hassan, A. R. Ghumman, Y. Ghazaw, R. H. Abdel-Maguid, and B. Samreen, "Climate Change Impact on Precipitation in Arid Areas of Pakistan", *7th International Conference On Water Resources And Arid Environments*, pp. 195–205, 2016.





# Industrial and Environmental Microbiology



## GROUP INTRODUCTION

The Industrial and Environmental Microbiology Research Group is passionate to work on diverse research areas within the domain of Microbiology, Molecular Biology, Industrial Biotechnology, Dairy Microbiology, Systematics & Taxonomy, Tissue Culture and Bacterial Metabolites Encapsulation.

## GROUP HEAD

**Dr. Arshia Amin Butt**

Dr. Arshia completed her PhD degree in Microbiology with specialization in Microbial Biotechnology, Bacterial Systematics and Taxonomy from Department of Microbiology, Quaid-i-Azam University Islamabad. Her research work included the isolation and identification of bacteria based on 16S rRNA gene sequence. She experimented on house keeping gene(s) as well as whole genome sequence of selected bacterial strains. She had sequenced many bacterial strains using 16S rRNA gene and submitted these sequence data to DNA database. She had also worked on 2nd generation pyrosequencing technique and analyzed huge data by using various bioinformatic tools. She remained Senior Research Fellow at Yunnan Institute of Microbiology (YIM), Yunnan Kunming China. She had worked with National Agriculture Research Centre Islamabad on Micropropagation of commercially important Date palm varieties. She had also worked with Pakistan Biological Safety Association and Fogarty International Centre, NIH, USA on Biosafety and Biosecurity related projects. Dr Arshia is a lifetime member of Next Generation Global Health Security Network and Pakistan Biosafety Association. She is also active member of American Society of Microbiology. She is recipient of numerous national and international trainings and certifications. Presently she is actively involved in Academia and Research at Department of Bioinformatics and Biosciences, Capital University of Science and Technology, Islamabad.



## Awards and Distinctions of Head

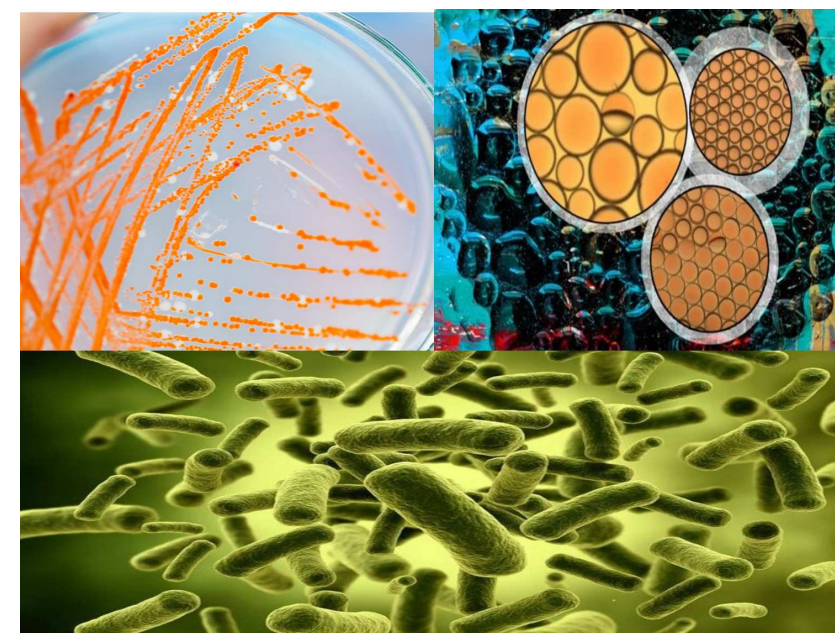
- Certified by IFBA for Biorisk Management
- Certified for Transportation of Infectious Substance by WHO
- Awarded for "Best Presenter Award" in International Conference on Date Palm entitled "Date palm Tissue Culture, Outstanding Problems and Solutions."

## RESEARCH AREAS

- Glacial Soil Bacterial Diversity Shift and Impact of Physicochemical Characteristics over Diversity Distribution
- Psychrophilic Bacterial Diversity and Isolates Antibiotic Resistance Pattern
- Microbially Enhanced Oil Recovery (MEOR) with reference to Biotransformation Capability and Enhanced Surfactant Activity
- Encapsulation of Probiotic Bacteria and Metabolites for Biodegradable Polymers
- Antimicrobial Activities of Medicinally Important Plants
- Characterization and Identification of novel Bacterial Species from Extreme Environments
- Bacterial Systematic and Taxonomy
- Psychrophilic Bacterial Diversity and Antibiotic Resistance Pattern of Isolates
- High Temperature Tolerance in Various Microorganisms at Molecular level
- Identification of Novel High Temperature Tolerant Bacteria and their Mechanisms of Tolerance
- Proteomics in Bacteria for Targeting of high Temperature Tolerance

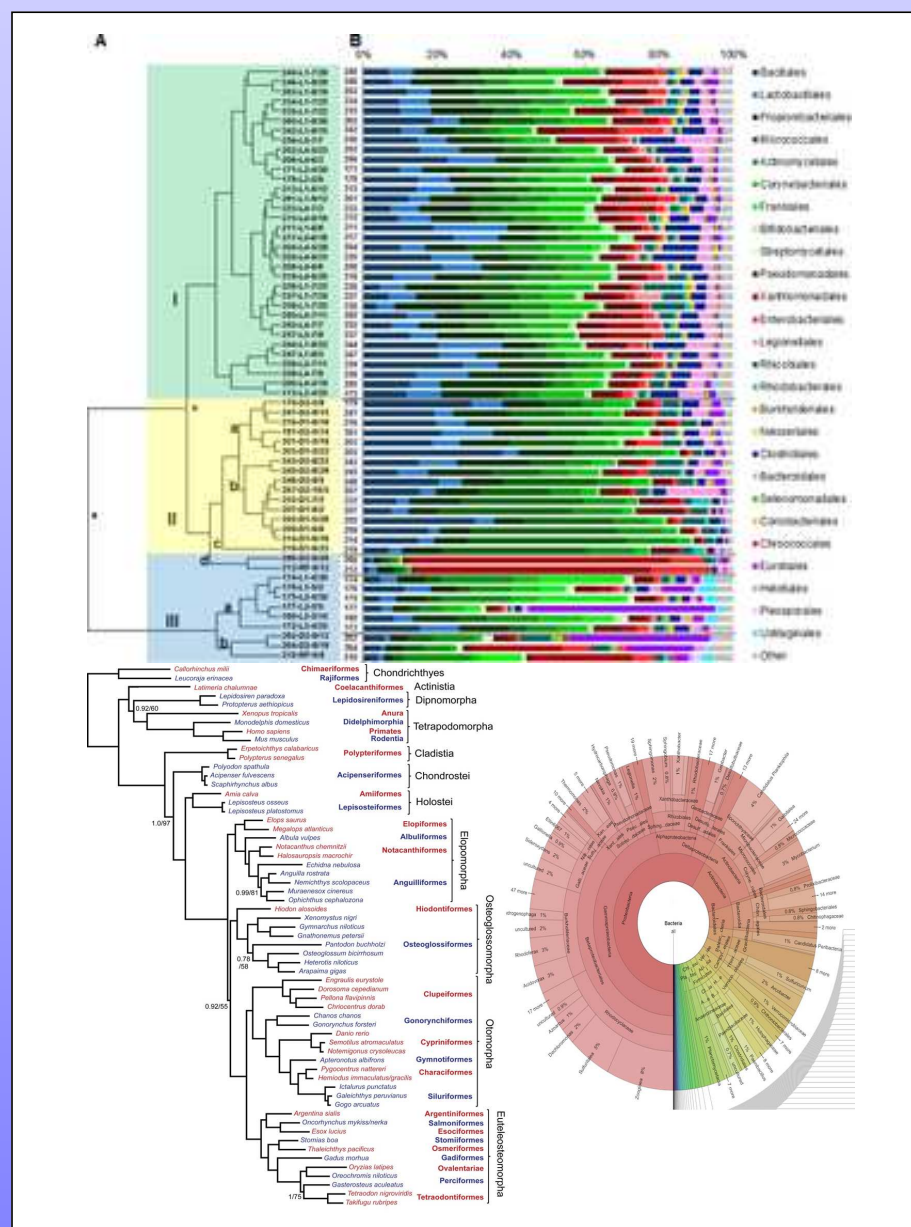
## GROUP MEMBERS

- Hafsa Raja
- Zainab Rasheed Bhutto
- Tehseen Zahra
- Sajjida Tayyaba
- Rabia Shahid
- Quratul Ain Rehman
- Barira Anees
- Sundus Batool
- Tooba Khalid
- Hareem Batool
- Shagufta Batool



## Selected Publications

- A. Amin, I. Ahmed, N. Salam, B.Y. Kim, D. Singh, X.Y. Zhi, M. Xiao, and W.J. Li, "Diversity and distribution of thermophilic bacteria in Hot Springs of Pakistan". **Microbial Ecology**, vol. 74, no. 1, pp. 116, 2017.
- A. Amin, I. Ahmed, N. Khalid, G. Osman, I. U. Khan, M. Xiao, and W. J. Li, "Streptomyces caldifontis sp. nov., isolated from a hot water spring of Tatta Pani, Kotli, Pakistan". **Antonie van Leeuwenhoek Journal Microbiology**, vol. 110, no. 1, pp. 77, 2017.
- A. Amin, I. Ahmed, N. Habib, S. Abbas, F. Hasan, M. Xiao, W. N.Hozzein, and W. J. Li, "Microvirga Pakistanensis sp. nov., a novel bacterium isolated from desert soil of Cholistan, Pakistan. Archives of Microbiology ". **International Journal of Systematic and Evolutionary Microbiology**, vol. 198, no. 10, pp. 933, 2017.
- I. U. Khan, F. Hussain, N. Habib, M. Xiao, I. Ahmed, A. Amin, X. Y. Zhia, and W. J. Li, "Nocardioides thalensis sp. nov., isolated from a desert". **International Journal of Systematic and Evolutionary Microbiology**, vol. 67, no. 8, pp. 2848, 2017.
- I. U. Khan, N. Habib, F. Hussain, W. D. Xian, A. Amin, E. M. Zhou, I. Ahmed, X. Y. Zhi, and W. J. Li, "Thermus caldifontis sp. nov., a thermophilic bacterium isolated from a hot spring". **International Journal of Systematic and Evolutionary Microbiology**, vol. 67, no. 8, pp. 2868, 2017.
- A. Amin, I. Ahmed, N. Habib, S. Abbas, M. Xiao, W. N.Hozzein, and W. J. Li, "Nocardioides Pakistanensis sp. nov., isolated from hot water spring of Tatta Pani in Pakistan". **Antonie van Leeuwenhoek Journal Microbiology**, vol. 109, no. 8, pp. 1101, 2016.
- A. Amin, I. Ahmed, G. Osman, N. Habib, F. Hussain, M. Xiao, M. N. Rao, and W. J. Li, "Proposal of Zafarii solitudinis sp. nov., a halotolerant bacterium isolated from hot water spring of Tatta Pani, Pakistan". **Internaional Journal Systematic and Evolutionary Microbiology**, vol. 109, no. 8, pp. 1101, 2016.
- M. I. Afridi, N. Ali, K. I. Shinwari, M. A. Hassan, A. Amin, A. Shah, and A. Muhammad, "Optimization of Aseptic Conditions for Micropropagation of Olive (Olea europaea L.) Cultivar Uslu". **Journal of Bio-Molecular Sciences (JBMS)**, vol. 3, no. 1, pp. 35, 2015.







## GENETIC AND MOLECULAR EPIDEMIOLOGY RESEARCH GROUP



### GROUP INTRODUCTION

Genetic and Molecular Epidemiology Research Group works on the implementation of Integrated Molecular Genetics and genomics approaches to understand the complexities of Inherited Genetic Diseases, their characterization at molecular level and strategies for their control & prevention. The research group focuses on Infectious Diseases, Causative Microbes and corresponding Immune Responses by the host. The group is also employing Bioinformatics and Computational Biology approaches to analyze and interpret the vast amount of genomic data available on public databases and utilization of this data with full potential to progress the scientific understanding in human health and disease.

### GROUP HEAD

#### Dr. Syeda Marriam Bakhtiar

Dr. Syeda Marriam Bakhtiar completed her PhD in Human Molecular Genetics from National Institute of Biotechnology and Genetic Engineering, Quaid-i-Azam University, Faisalabad. Her research interests include molecular understanding of inherited diseases/disorders and other infectious diseases more prevalent in Pakistan. She served as research assistant at Department of Bioinformatics, Federal University of Minas Gerais, Brazil. She is honored to accomplish the European Molecular Biology Organization (EMBO) fellowship in Wilhelm Johansen Center for Functional Genomics, University of Copenhagen, Denmark. She is an active member of American Society of Microbiology. Currently she is serving as Assistant Professor at Department of Biosciences, CUST, Islamabad where she is also vigorous member of numerous professional bodies, notably Health and Safety Committee, Quality Assurance Committee, Curriculum Review Committee etc.



### RESEARCH AREAS

- Human Molecular Genetics
- Genetic and Molecular Epidemiology
- Gut Brain Axis
- Host Pathogen Interactions
- Metabolomics

### CURRENT MS/Ph.D. STUDENTS

#### PhD Students

1. Ms. Hina Aslam Butt
2. Mr. Naveed Iqbal Soomro
3. Mr. Muhammad Qasim Khan
4. Ms. Sobia Khurshid

#### MS Students

1. Ms. Hajra Qayyum
2. Ms. Qurat ul ain
3. Ms. Ayesha Aftab
4. Ms. Nosheen Afzal Qureshi
5. Ms. Maham Fayyaz
6. Ms. Sadaf Kiyani
7. Ms. Shabeen Fatima

### SELECTED ALUMNI

#### Mr. Saeed Iqbal

**Thesis Title:**Prevalence of Inflammation Associated Diseases in Obese and Non-Obese Subjects of Kahuta Region. **Year: 2018**

#### Mr. Hammad Safdar Ali

**Thesis Title:**Prevalence of Hepatitis B and Hepatitis C in Relation to Minor Risk Factors in Kahuta Region. **Year: 2018**

#### Mr. Muhammad Nadeem

**Thesis Title:**Impact estimation of inflammatory genes IL-6, TNF-alpha and ACE on diabetes and obesity as comorbidity of CAD. **Year: 2017**

#### Ms. Hina Aslam Butt

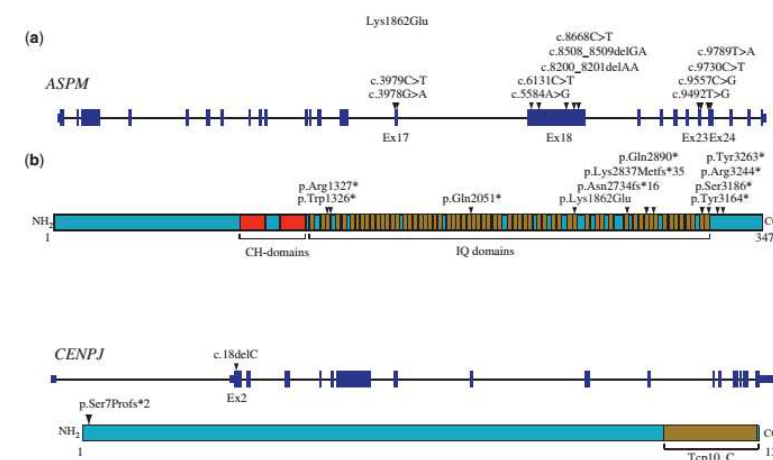
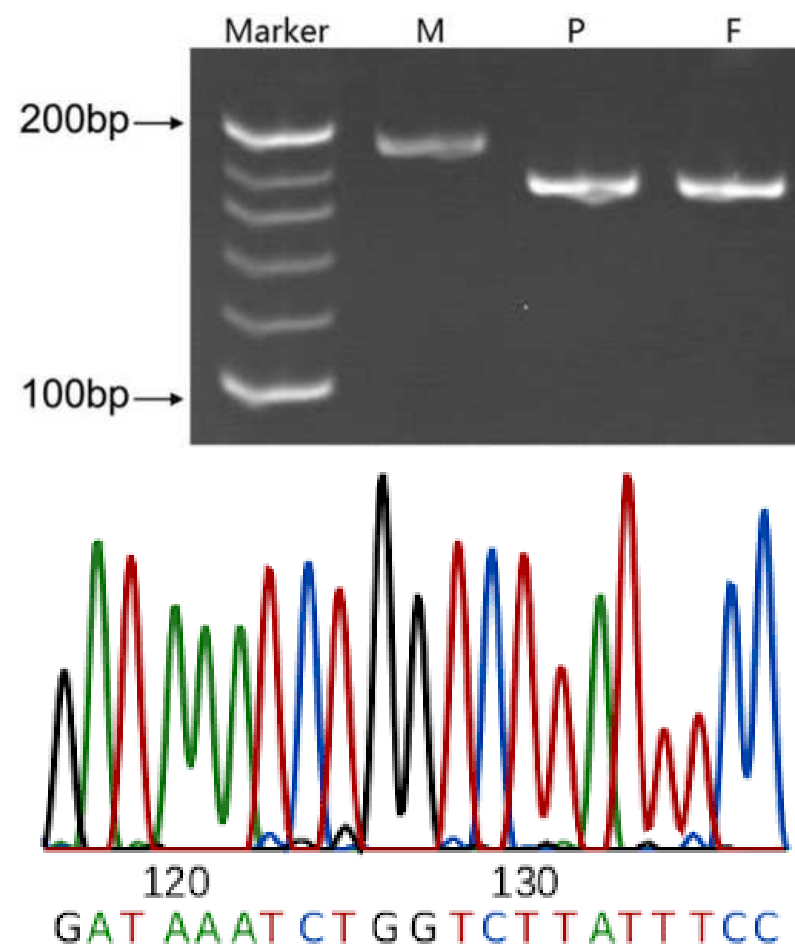
**Thesis Title:**Genetic heterogeneity in Pakistani Obese individuals. **Year: 2017**

#### Ms. Saima Gul

**Thesis Title:**Prevalence and functional analysis of commonly reported SNPs in Pakistani obese kindreds. **Year: 2017**

#### Ms. Sidra Azam

**Thesis Title:**Prevalence of Genetic and Non Genetic risk factors for Diabetes among Obese Individuals. **Year: 2017**



### Selected Publications

#### Journal Publications

- M. Nadeem, U. Naz, and S. M. Bakhtiar, "TNF: Common Culprit of Inflammatory diseases", **Journal of Bioautomation**, 2019.
- F. Nawaz, M. N. Khan, A. Javed, I. Ahmed, N. Ali, M. I. Ali, S. M. Bakhtiar, and M. Imran, "Genomic and Functional Characterization of Enterococcus mundtii QAUEM2808 Isolated from Artisanal Fermented milk product Dahi", **Frontiers in Microbiology**, vol. 10, pp. 1–16, 2019.
- M. Farooq, Y. Mang, S. M. Bakhtiar, A. Fatima, et al, "A Novel Mutation in CDK5RAP2 Gene Causes Primary Microcephaly With Speech Impairment And Sparse Eyebrows in a Consanguineous Pakistani Family", **European Journal of Medical Genetics**, vol. 60, no. 12, pp. 627–630, 2017.
- N. Farah, A. Mehdi, S. I. Soomro, N. I. Soomro, R. Tereb, S. M. Bakhtiar, and M. Imran, "Draft Genome Sequence of Enterococcus Mundittii QAUEM2808, Isolated From Dahi, A fermented Milk Product", **Genome Announcement**, vol. 4, no. 5, p. e00995-16, 2016.
- S. T. Ashraf and S. M. Bakhtiar, "Exploring the Protein Interaction Related to Hepatitis C Virus", **NUST J. Nat Sci**, vol. 3, no. 1, pp. 13–18, 2015.
- H. Safdar, R. Ali, and S. M. Bakhtiar "Implementation of Mathematical Models for HCV Infection", **J. Appl. Environ. Biol. Sci**, vol. 6, no. 25, pp. 109–113, 2016.
- H. A. Butt and S. M. Bakhtiar, "Identification and Classification of bacterial Auto transporters", **Jurnal Teknologi (Sciences & Engineering)**, vol. 78, no. 4-3, pp. 47–51, 2016.
- A. Ali, A. Naz, S. C. Soares, S. M. Bakhtiar, et al, "Pangenome Analysis of Human Gastric Pathogen H. pylori: Comparative Genomics and Pathogenomics Approaches to Identify Regions Associated with Pathogenicity and Prediction of Potential Core Therapeutic Targets", **Biomed Res Int**, vol. 2015, pp. 1–17, 2015.

#### Conference Proceedings

- N. Afzal, H. Qayyum, N. I. Soomro, and S. M. Bakhtiar "miRNA silencing of Streptococcus gallolyticus: a potential treatment strategy against endocarditis", **1st international conference on medicinal chemistry & drug discovery, Islamabad**, 2018.
- H. A. Butt, S. M. Bakhtiar, A. Noor, and I. Riasat "Genetic Heterogeneity in Pakistani Obese Families", **1st Annual Health Research Conference, Islamabad**, 2018.
- S. I. Soomro, H. Safdar, N. T. Soomro, H. A. Butt, and S. M. Bakhtiar, "The prevalence of Inflammatory Disorders in Obese and Non-Obese Subjects of Kahuta Region", **1st Annual Health Research Conference, Islamabad**, 2018.



## GROUP INTRODUCTION

The Research Group of Entrepreneurship is actively involved in basic and applied research in the fields of Entrepreneurship and Leadership. The scope of research group includes areas like Entrepreneurship, Small and Medium Enterprises (SMEs), Micro and Small Enterprises (MSEs), Governance and Finance etc. The group has published numerous research articles in the mentioned domains.

## GROUP HEAD

### Dr. Muzaffar Asad

Dr. Muzaffar Asad has completed his Doctorate from University Utara Malaysia, an AACSB Accredited university. His research interests include Entrepreneurship & Leadership, Small and Medium Enterprises (SMEs), Micro and Small Enterprises (MSEs) etc. He has published numerous articles in national and international journals of highest repute. Dr Muzaffar is the certified trainer of IBA Karachi, Punjab Education Endowment Fund (PEEF), Akhuwat Institute of Social Entrepreneurship and Management (AISEM) and International Islamic University Islamabad (IIUI). He has conducted several trainings in the domains of Leadership, Entrepreneurship and Research. He is an active member of Editorial Board of Journal of Business (European Journal) and Review Board for International Conferences conducted in collaboration with Emeralds. He has also conducted numerous workshops on CV Writing, Negotiation & Communication Skills, SPSS, and Smart PLS at various academic and professional institutes. Currently he is serving as Assistant Professor at Faculty of Management and Social Sciences, Capital University of Science and Technology, Islamabad.



## RESEARCH AREAS

- Entrepreneurship and Leadership
- Small and Medium Enterprises (SMEs)
- Micro and Small Enterprises (MSEs)
- Human Resource
- Corporate Governance

## GROUP MEMBERS

- Dr. Salman Shabbir
- Dr. Rabia Kiran
- Mr. Syed Hussain Haider
- Mr. Hassam Baig
- Mr. Khawar Zafar

## CURRENT MS STUDENTS

- Ms. Samar Khalid
- Mr. Sayab Nadeem
- Ms. Haleema Majeed
- Mr. Aneel Javaid

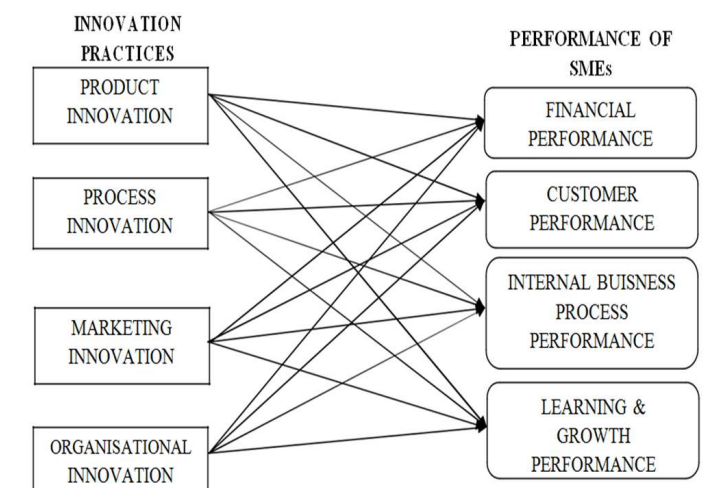
## ALUMNI

### Mr. Hassam Baig

**Thesis Title:** Impact of Team Competence and Team Communication on Information Technology Project Success with a mediating role of Team Cohesion.  
**Year:** 2019

### Mr. Khawar Zafar

**Thesis Title:** Impact of Project Management Practices on Performance of Small and Medium Enterprises with Mediating role of Knowledge Management and Moderating Role of Business Environment.  
**Year:** 2018



## Selected Publications

### Journal Publications

- M. Asad, A. Rizwan, M. Shah, and A. Munir, "Impact of Innovation Practices of Sustainable Performance of SMEs", **Herald National Academy of Managerial Staff of Culture and Arts**, vol. 3, pp. 537-546, 2018.
- M. Asad and U. Abid, "CSR practices and customer's loyalty in restaurant industry: Moderating role of gender", **NUML International Journal of Business & Management**, vol. 13, no. 2, pp. 144-155, 2018.
- M. Shah and M. Asad, "Effect of motivation on employee retention: Mediating role of perceived organizational support", **European Online Journal of Natural and Social Sciences**, vol. 7, no. 2, pp. 511-520, 2018.
- A. Z. Almansour, M. Asad, and I. Shahzad, "Analysis of corporate governance compliance and its impact over return on assets of listed companies in Malaysia", **Science International**, vol. 28, no. 3, pp. 2935-2938, 2016.
- M. Asad, M. N. Sharif, and J. M. Alekam, "Moderating role of entrepreneurial networking on the relationship between entrepreneurial orientation and performance of MSEs in Punjab Pakistan", **Science International**, vol. 28, no. 2, pp. 1551-1556, 2016.
- M. Asad, M. N. Sharif, and M. Hafeez, "Moderating effect of network ties on the relationship between entrepreneurial orientation, market orientation, and performance of MSEs", **Paradigms: A Research Journal of Commerce, Economics, and Social Sciences**, vol. 10, no. 2, pp. 69-76, 2016.
- K. Zahra, K. Majeed, A. Mahmood, and M. Asad, "Impact assessment of community participation in solid waste management projects in selected areas of Faisalabad city", **Journal of Urban Planning and Development**, vol. 138, no. 4, pp. 319-327, 2012.

### Conference Proceedings

- M. Asad, "Microfinance and empowerment: A case study on beneficiaries of a community development program", **8th Asian Management Research and Case Conference. Al Ain: United Arab Emirates University**, 2019.
- M. Asad, "Practices of corporate social responsibility and labor laws in small and medium enterprises of Sialkot", **8th Judicial Conference, Islamabad: Supreme Court of Pakistan**, pp. 1-9, 2018.
- M. Asad, and M. N. Sharif, "Entrepreneurial orientation market orientation and performance of SMEs moderating effect of network ties", **2nd International Conference on Business Management, Jakarta**, 2016.



## Capital University of Science and Technology

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No.23/CUST/ORIC/2019

Feb 13, 2019

### **Three Days Autodesk Inventor Workshop (06<sup>th</sup> – 08<sup>th</sup> Feb, 2019)**



Capital University of Science and Technology hosted a 3 days' workshop entitled "Autodesk Inventor Short Course" on 06<sup>th</sup> – 08<sup>th</sup> February 2019. The workshop was a part of the university collaboration with H-Cube BMG Pvt. Ltd. Office of Research Innovation and Commercialization (ORIC) in collaboration with the Department of Mechanical Engineering organized the workshop aiming to equip students with the contemporary engineering tools and softwares.

Autodesk Inventor is a computer-aided design application for 3D mechanical design, simulation, visualization and documentation developed by Autodesk. The software allows 2D and 3D data integration in a single environment, creating a virtual representation of the final product that enables users to validate the form, fit, and function of the product before it is ever built.

A total of 22 Mechanical Engineering students attended the 3-days workshop from 10:00 AM to 4:00 PM. Instructor of the Workshop was Mr. Muhammad Umer, lecturer at Lahore Institute of Animation and Design (LAD), Islamabad campus.

The participants of the workshop were provided user level AUTODESK authorized certifications by LAD



*M A Bhatti*

Prof. Aamer Iqbal Bhatti

Dean Research & Innovation





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No.23/CUST/ORIC/2019

April 16, 2019

### Workshop on Model Predictive Control (4<sup>th</sup> – 6<sup>th</sup> April, 2019)



Capital University of Science and Technology hosted a three days workshop entitled “**Model Predictive Control: Algorithms, Tools & Applications**” on 4<sup>th</sup> – 6<sup>th</sup> April, 2019 in A-1 Auditorium. Office of Research Innovation and Commercialization (ORIC) organized the particular workshop aiming to equip students, researchers and Industry professionals with the contemporary knowledge of Model Predictive Control and its practical and industrial implications.

Model Predictive Control (MPC) is one of the most commonly implemented advanced control techniques in the process industries today. MPC is a tool to optimize a system’s performance by using a model to predict the system’s future trajectory. In recent years MPC is rapidly expanding in several other domains, such as in the automotive and aerospace industries, smart energy grids, and financial engineering. The workshop was intended to present the basic introductory material, as well as more recent results, on the topics of MPC.

The participants of the workshop included graduate students, researchers and professionals from various organizations and institutes notably NESCOM, NDC, AWC, NUST, IST, CUST etc. The guest speaker at the event was Dr. Aamer Shahzad, Deputy Director, General NESCOM, Islamabad. The respected speaker was thanked and acknowledged with University memento by Dean Office of Research, Innovation and Commercialization at the end of session.



Prepared by:

Muhammad Raheel Anjum  
Assistant Director ORIC

Approved by:

Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

## Report

### Revit Structure Fundamentals - BIM CoE

BIM Center of Excellence (BIM CoE) at Department of Civil Engineering, Capital University of Science & Technology (CUST), Islamabad in collaboration with H-cube has successfully conducted its 2<sup>nd</sup> training workshop on *Revit Structure Fundamentals* for two (02) days on 22<sup>nd</sup> February and 1<sup>st</sup> March, 2019.



Ten (10) individuals with different educational/industrial background participated in this training from various organizations (E-N-C, Naqvi and Siddiqui, MS Scholar from CUST etc.). During the two days, the participants were briefed about the fundamentals of Structural Modeling and experienced hands-on training of Revit Structure. At the end the training, certificates were distributed among the participants.



## Report

### Revit Architecture Fundamental - BIM CoE

BIM Center of Excellence (BIM CoE) at Department of Civil Engineering, Capital University of Science & Technology (CUST), Islamabad in collaboration with H-cube has successfully conducted its 3<sup>rd</sup> training workshop on *Revit Architecture Fundamentals* for two (02) days on 29<sup>th</sup> and 30<sup>th</sup> March, 2019.



This training was specifically arranged for undergraduate students (batch 153) of Civil Engineering Department, CUST. Eighteen (18) students participated in this training. During the two days, the students were briefed about the fundamentals of BIM and received hands on training of Revit Architecture. Certificates were also presented to the participants after completion of the training.







## Capital University of Science and Technology

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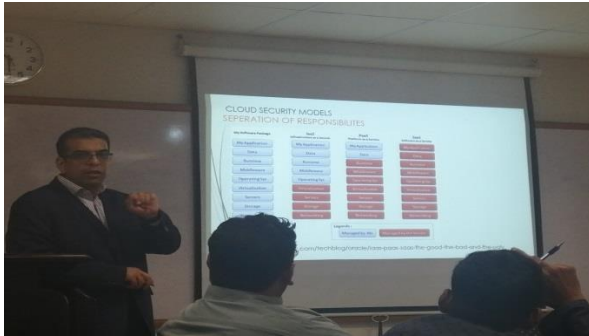
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No.23/CUST/ORIC/2019

May 07, 2019

### Seminar on “Cyber Security: Next Defense Frontier”



Capital University of Science and Technology hosted a seminar entitled “**Cyber Security: Next Defense Frontier**” on 24<sup>th</sup> April, 2019 in Workshop Room, B-Block at 5:00 P.M. Office of Research Innovation and Commercialization (ORIC) organized the particular seminar aiming to create awareness about Cyber Attacks and significance of Cyber Security in modern digital world.

Cyber Security is the practice of protecting systems, networks and programs from digital attacks. These cyber attacks are usually aimed at accessing, changing, or destroying sensitive information, extorting money from users or interrupting normal business processes. The particular seminar covered following key topics.

- Security Technology and Processes
- Common Threats and Risk Management
- Standards, Policies and Guidelines
- Cyber Security for Businesses & Government
- Cyber Security for Professionals

The participants of the seminar included graduate students, faculty and researchers from Capital University of Science & Technology. The guest speaker at the event was Mr. Rizwan Mustafa Mir, Chief Executive Officer, Universal Services Fund, Islamabad. The respected speaker was acknowledged with University memento by Dean Office of Research, Innovation and Commercialization at the end of session.



Prepared by:

Muhammad Raheel Anjum  
Assistant Director ORIC

Approved by:

Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation



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No.23/CUST/ORIC/2019

April 02, 2019

### Seminar on “Genomics Approach in Drug Designing”



Capital University of Science and Technology hosted a seminar entitled “Genomics Approach in Drug Designing” on 28<sup>th</sup> March 2019 in A-2 Auditorium. Office of Research Innovation and Commercialization (ORIC) in collaboration with the Faculty of Health and Life Sciences organized the seminar aiming to equip faculty, researchers and students with the contemporary knowledge of Genomics and Drug Designing.

Genomics is an interdisciplinary field of biology focusing on the structure, function, evolution, mapping and editing of genomes. Genomics, particularly high-throughput sequencing and characterization of expressed human genes has created new opportunities for drug discovery. Knowledge of all the human genes and their functions may allow effective preventive measures and change drug research strategy & drug discovery development processes. Pharmacogenomics is the application of genomic technologies such as gene sequencing, statistical genetics and gene expression analysis to drugs in clinical development.

The participants of the seminar included faculty members, researchers and students of Biosciences and Pharmacy Departments. The guest speaker at the event was Dr. Johar Ali, Head of Genomics Center, Rehman Medical Institute, Peshawar. The respected speaker was thanked and acknowledged with University memento by Dean Office of Research, Innovation and Commercialization at the end of session.



**Prepared by:**

Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**

Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation



OFFICE OF RESEARCH, INNOVATION AND COMMERCIALIZATION

# CAPITAL UNIVERSITY OF SCIENCE & TECHNOLOGY



## FINAL YEAR PROJECTS FUNDING

### Details

Applications are invited for FYP funding by the Office of Research, Innovation and Commercialization (ORIC). A total of six Undergraduate Projects would be sponsored. The maximum fund limit for each Project is 30,000 PKR.

### Criteria

The particular Project should have:

- ✓ Innovative Idea
- ✓ Specific Business Plan
- ✓ Marketing Potential
- ✓ Sales Tendency
- ✓ Commercialization Aptitude
- ✓ Economical Perspective

**Applications Deadline**

31<sup>st</sup> March 2019

Application forms are available at:

ORIC Office, H-Block, Ground Floor ☎ 051-111-555-666 Ext: 445

✉ [raheel.anjum@cust.edu.pk](mailto:raheel.anjum@cust.edu.pk) ✉ [muhammad.farhan@cust.edu.pk](mailto:muhammad.farhan@cust.edu.pk)





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No.23/CUST/ORIC/2019

May 15, 2019

### Final Year Projects Funding Evaluation Report

Office of Research, Innovation and Commercialization (ORIC) upon the profound desire of Vice Chancellor initiated Final Year Projects funding for Undergraduate students of Capital University of Science & Technology, Islamabad. The purpose of given activity was financial encouragement of students whose project ideas have particular business and marketing prospective. A total of six Undergraduate projects were to be funded encompassing 30,000 PKR each.

The specific criteria for the said funding along with associated terms and conditions were advertised in first week of March 2019. The event flyer along with application form and cover letter were distributed to all the respective Deans and HoDs to inspire students for the given sponsorship. The flyers were advertised through emails and university notice boards. The specific criteria devised by ORIC was that given project should have:

1. Innovative Idea
2. Specific Business Plan
3. Marketing Potential
4. Sales Tendency
5. Commercialization Aptitude
6. Economical Perspective

The Application forms were available online and also in ORIC office. The deadline for forms submission was 31<sup>st</sup> March 2019. A total of 14 forms were received from various departments including 7 from EE, 5 from SE and 1 each from ME and MS departments.

**Provisional Results:** After a systematic assessment particular projects were shortlisted for the funding. The initial scrutiny of applications was done by following faculty members in a meeting held on 22<sup>nd</sup> April 2019 in ORIC Office at 11A.M.

1. Dr. Aamer Iqbal Bhatti (Dean ORIC)
2. Dr. Muhammad Azhar Iqbal (Associate Professor, CS Department)
3. Dr. Muhammad Faisal Iqbal (Associate Professor EE Department)
4. Dr. Muzaffar Asad (Assistant Professor, MS Department)

The provisional evaluation of application forms was done according to the above mentioned criteria. Initially the top 9 projects were shortlisted in accordance with the list given below.

Sr. No.	Project Title	Supervisor	Students	Department	Average Marks (Out of 30)
1	Design & Fabrication of Automatic Solar Tracker with Panel Cleaning and Cooling System	Dr. Saif-Ur-Rahman	1. Tajamul Baig 2. Arhaam Mubarak 3. Saad Bin Zubair	Mechanical Engineering	24.00
2	Blindroid	Mr. Ibrar Arshad	1. Alina Sarwar 2. Rubeeqa Tahir 3. Usman Mehmood	Software Engineering	23.33
3	AL-FUNOON	Dr. Sajid Bashir	1. Andla Sohail 2. Iqra Ma-jeed	Management Sciences	23.00
4	Prosthetic Hand Using Brain Pulses	Dr. Muhammad Aleem	1. Aashan Javed Khan 2. Usama Mehmood	Computer Science	23.00
5	Navigational Glasses	Dr. Muhammad Aleem	1. Kiran Hameed 2. Mariyam Noor 3. Hammad Sohail	Computer Science	22.33
6	Smart Gloves for Handicapped People	Dr. Muhammad Ashraf	1. Hammad Zafar 2. Kashaf Tauseef 3. Umair Minhas	Electrical Engineering	21.67
7	Off Grid Automatic Egg Incubator	Dr. Muhammad Ashraf	1. Zeeshan Yousaf 2. Atif Ijaz 3. Nauman Zakir	Electrical Engineering	21.00

8	Pipe Lining Inspection Robot	Mr. Umar Maqbool	1. Osama Ahmed 2. M. Uzair 3. Ali Abbasi	Electrical Engineering	20.67
9	Smart Receptionists for Hospitals	Dr. Abdul Qadir	1. Siddique Ali 2. Sheryar Tariq 3. Salman Tariq	Software Engineering	20.67
10	Multipurpose Assistance Robot for Elderly People	Mr. Osama Akbar Raja	1. Sheraz Baig 2. Ahmed Mujtaba 3. Shehroze Kayani	Electrical Engineering	20.00
11	Automatic Car Wash Station	Dr. Umer Amir Khan	1. Mehran Waheed 2. Nabeel Ahmad 3. Tauseef Ilyas	Electrical Engineering	19.67
12	Combat and Spy Robot	Mr. Muhammad Tahir	1. M. Zeeshan 2. Abdul Rehman 3. Syeda Kainat	Electrical Engineering	19.33
13	Virtual Reality Based Surveillance System	Mr. Muhammad Naeem	1. M. Hamza 2. Haseeb Ahmed	Electrical Engineering	19.00
14	Reselling Application	Mr. Ibrar Arshad	1. Hamid Mahmood 2. Usama Ahmed 3. Ahmed Tariq	Software Engineering	18.00

**Evaluation Committee Members:**

Dr. M Azhar Iqbal

Dr. M Faisal Iqbal

Dr. Muzaffar Asad

Signatures

Signatures

Signatures

It was decided by the committee members that the top 9 projects would be re-evaluated through their project and business plan presentation. The event details along with presentation format were shared with respective students, supervisors and research committee members.

**Final Evaluation:** The final evaluation of shortlisted projects was done in 8<sup>th</sup> ORIC Research Committee Meeting held on Thursday 2<sup>nd</sup> May, 2019 in the Workshop Room, B-Block at 11:00 AM. Prof. Dr. Aamer Iqbal Bhatti, Dean Research & Innovation, chaired the meeting.

The following members attended the meeting.

Dr. Majid Ali	Associate Professor (CE Dept)	Member
Dr. Sahar Fazal	Associate Professor (BI Dept)	Member
Dr. Khawar Naveed	Associate Professor (ME Dept)	Member
Dr. Muzaffar Asad	Assistant Professor (MS Dept)	Member
Dr. Mahboob Alam	Assistant Professor (Pharmacy Dept)	Member

Dr. Umer Amir Khan and Dr. Abdul Rahman Kashif did not attend the meeting. Dr. Muhammad Azhar Iqbal was not present at the event due to personal commitments. Dr. Saif-Ur- Rahman and Mr. Ibrar Arshad were also present at the occasion to witness the presentations of their students.

The students were required to discuss following topics in their presentations and grading was also done considering these points.

1. Generic Introduction including Innovation in the Project
2. Practical Possibility of Project
3. Marketability (Whether End Product can find Place in Market or not)

The students presented their project ideas and business plans before ORIC Research committee. The committee evaluated the presentations according to above mentioned criteria. The main focus was on practical feasibility, business plan and marketability of particular idea. The maximum achievable marks were 10. The final results with detailed evaluation sheet are listed below.

Sr. No.	Project Title	Supervisor	Students	Department	Average Marks (Out of 10)
1	Off Grid Automatic Egg Incubator	Dr. Muhammad Ashraf	1. Zeeshan Yousaf 2. Atif Ijaz 3. Nauman Zakir	Electrical Engineering	8.3
2	Design & Fabrication of Automatic Solar Tracker with Panel Cleaning and Cooling System	Dr. Saif-Ur-Rahman	1. Tajamul Baig 2. Arhaam Mubarak 3. Saad Bin Zubair	Mechanical Engineering	7.5
3	AL-FUNOON	Dr. Sajid Bashir	1. Andla Sohail 2. Iqra Ma-jeed	Management Sciences	6.8

4	Blindroid	Mr. Ibrar Arshad	1. Alina Sarwar 2. Rubeeqa Tahir 3. Usman Mehmood	Software Engineering	6.6
5	Prosthetic Hand Using Brain Pulses	Dr. Muhammad Aleem	1. Aashan Javed Khan 2. Usama Mehmood	Computer Science	6.5
6	Smart Gloves for Handicapped People	Dr. Muhammad Ashraf	1. Hammad Zafar 2. Kashaf Tauseef 3. Umair Minhas	Electrical Engineering	6.3
7	Navigational Glasses	Dr. Muhammad Aleem	1. Kiran Hameed 2. Mariyam Noor 3. Hammad Sohail	Computer Science	6
8	Smart Receptionists for Hospitals	Dr. Abdul Qadir	1. Siddique Ali 2. Sheryar Tariq 3. Salman Tariq	Software Engineering	5.6
9	Pipe Lining Inspection Robot	Mr. Umar Maqbool	1. Osama Ahmed 2. M. Uzair 3. Ali Abbasi	Electrical Engineering	4.4

**Evaluation Committee Members:**

Dr.Muzaffar Asad

Dr.Khawar Naveed

Dr. Majid Ali

Dr.Sahar Fazal

Dr. Mahboob Alam

Signatures

Signatures

Signatures

Signatures

Signatures

Following the detailed analysis, discussion and assessment of projects, the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**



Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Registrar
- Dr. Muhammad Ashraf
- Dr. Saif-Ur-Rahman
- Dr. Sajid Bashir
- Dr. Muhammad Aleem
- Dr. Abdul Qadir
- Mr. Ibrar Arshad
- Mr. Umar Maqbool
- ORIC Committee Members
- File



## Capital University of Science and Technology

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No.23/CUST/ORIC/2019

June 14, 2019

### **FYPs Funding Certificate Distribution Ceremony**



In response to 8<sup>th</sup> ORIC Research Committee Meeting in which the particular undergraduate projects partaking the devised criteria were nominated for funding, the Certificate Distribution Ceremony was held on Monday, 27<sup>th</sup> May 2019 in Workshop Room, B-Block at 2 P.M. The event was organized by Office of Research, Innovation and commercialization to instigate the students for their innovative project ideas and explicit business plans. Professor Dr. Arshad Hassan, Dean FMSS was chief guest at the occasion. The following faculty members/project supervisors were present at the event.

1. Dr. Aamer Iqbal Bhatti, Dean ORIC/Professor EE Department
2. Dr. Muhammad Ashraf, Professor EE Department
3. Dr. Saif-Ur- Rahman, Professor ME Department
4. Dr. Muhammad Aleem, Assistant Professor CS Department
5. Dr. Sajid Bashir, HoD MS Department

The event started with the recitation of few Verses from Holy Quran. Prof. Aamer Iqbal Bhatti, briefed Dean FMSS about the particular competition and the evaluation procedure adopted. He appreciated the efforts of students and highlighted the significance of entrepreneurship and marketing the product in present time.

Subsequently Dean FMSS was invited for certificate distribution among the students as per following merit standing.

S.r. No.	Project Title	Supervisor	Group Members	Dept
1	Off Grid Automatic Egg Incubator	Dr. Muhammad Ashraf	1. Zeeshan Yousaf 2. Atif Ijaz 3. Nauman Zakir	EE
2	Design and Fabrication of Automatic Solar Tracker with Pannel Cleaning and Cooling system	Dr. Saif-Ur- Rahman	1. Saad Bin Zubair 2. Tajammul Baig 3. Arhaam Mubarak	ME
3	AL-FUNOON	Dr. Sajid Bashir	1. Iqra Majeed 2. Andla Sohail	MS
4	Blindroid	Mr. Ibrar Arshad	1. Alina Sarwar 2. Rubeeqa Tahir 3. Usman Mehmood	SE
5	Prosthetic Hand Using Brain Pulses	Dr. Muhammad Aleem	1. Aashan Javed Khan 2. Usama Mehmood	CS

Following the ceremonial Dean FMSS delivered a brief talk. He inspired the students about their endurance and highlighted the importance of business plans in present age of commercialization. He assured that department of Management Science would fully conjoin the projects for their businesses and marketing aspects.

He said that such events should be conducted on continual basis. He also emphasized interdepartmental collaborations and joint projects for better progression of students and faculty.



**Prepared by:**

Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**

Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution:**

- Vice Chancellor
- File





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No.23/CUST/ORIC/2019

May 21, 2019

### **Inaugural Ceremony of CS Incubation Lab at CUST**



Office of Research, Innovation and Commercialization in collaboration with department of Computer Science has formally inaugurated the Incubation lab at Capital University of Science & Technology, Islamabad. Dr. Muhammad Azhar Iqbal, Assistant Professor, CS Dept. have laid his special devotion to make this workroom possible. The purpose of given incubation center is to provide a platform to CS students where they can practice their technical, innovative and freelancing skills for comprehensible earning. Initially following projects are being worked on by final year students of CS department.

#### **1. Capital Classified:**

The purpose of given application is to provide spam free visual market place to Pakistani users where they can buy authentic products online without any meet up through courier services.

The given project assignment is being worked on by following students.

1. Muhammad Sohaib Rasheed
2. Awais Mehmood

#### **2. PEBS Reservation System for Pak Express:**

PEBS Reservation System is a seat booking application for Pak Express Train. The purpose of given system is to provide a website that can allow users to search and reserve a seat online or cancel his/her reservation any time.

The present consignment is being done by following students.

1. Ameer Abdullah
2. Muhammad Sabeeh
3. Hasnain Ahmed

The incubation center is established in CS Project lab, E-block. The respective ceremony was inaugurated by Dr. Nayyar Masood, HoD CS Dept. Prof. Aamer Iqbal Bhatti, Dean Research & Innovation, Dr. Muhammad Azhar Iqbal and Assistant Directors ORIC were also present at the occasion.

Dean ORIC and HoD, CS Dept greeted the students and acknowledged the efforts of Dr. Muhammad Azhar Iqbal and ORIC Team. The students also gave a brief demonstration about their job details and future prospects.



**Prepared by:**

Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**

Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation



## MEMORANDUM OF UNDERSTANDING

BETWEEN

IDEAGIST PAKISTAN PVT LTD

AND

Partner Institution: CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY,  
ISLAMABAD

July 16, 2019



## MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is made at \_\_\_\_\_ on this \_\_\_\_ day of \_\_\_\_\_ 2018 (Effective Date).

### 1. PARTIES:

- 1.1. Bir Ventures USA Ltd. is registered with the State of Delaware in the United States as a Corporation, with its registered office at 7900 International Drive, Suite 300, Bloomington, Minnesota, United States and is the owner of IdeaGist Brand internationally, including IdeaGist Pakistan (hereinafter "**IdeaGist**"), with **IdeaGist Pakistan (Private) Limited** its representative in Pakistan, registered with Securities Exchange Commission of Pakistan (SECP) under the Company's Act 2017, with its registered office at Office at Khumriyal Center, Basement Floor, G8, Islamabad 44000 .

AND

- 1.2. **Capital University of Science and Technology** a Federally Chartered University established through an Act No XVI of 2015 of parliament, published in the Gazette of Pakistan by the Senate Secretariat, Government of Pakistan vide No. F.9 (19)/2015-Legis dated 22-09-2015 (hereinafter referred to as "**CUST**") (hereinafter "**Partner**")

(IdeaGist and Partner are hereinafter referred to individually as "Party" and collectively as "Parties")

### 2. BACKGROUND:

- 2.1. IdeaGist Pakistan is the sole distributor of IdeaGist Global Platform, connecting innovators, entrepreneurs, investors, and students from 195 UN recognized countries and territories.
- 2.2. Under the umbrella of the Prime Minister's Startup Pakistan, IdeaGist plans to invest PKR 8 billion, over the next five years, in the entrepreneurial and innovation (E & I) ecosystem in Pakistan. To develop a connected startup ecosystem, IdeaGist plans to partner with universities in establishing and professionally managing business incubation units nationwide.
- 2.3. IdeaGist Pakistan is establishing strategic partnership through this Memorandum of Understanding with universities interested in offering business incubation to their students and alumni, aligning themselves with the Prime Minister's Startup Pakistan Movement by offering entrepreneurship as a career choice, and collaborate in developing a vibrant innovation and startup ecosystem.
- 2.4. Partner organization is a university or university campus recognized by the Higher Education Commission (HEC) as a degree granting institution.
- 2.5. Partner organization understands the importance of entrepreneurship as a career choice for its students and planning to actively participate in the Prime Minister's Startup Pakistan movement.
- 2.6. IdeaGist and Partner desire to enter into an agreement in which IdeaGist and Partner will work together to start and support business incubation program, develop ideas on technology commercialization, showcasing innovations, and implementing best practices at policy and procedures level (hereinafter "Project").;



- 2.7. Until IdeaGist and Partner reach a formal agreement, IdeaGist and Partner agree to enter into a Memorandum of Understanding between them, setting out the working arrangements that each of the Partners agree are necessary to start the Project;

### **3. Goals and Objectives of the Project**

- 3.1. Provide online entrepreneurship training to final year students, offering entrepreneurship as a career choice to the university students.
- 3.2. Support business incubation center workshops, one-on-one mentoring, process guidelines and by connecting the incubator to a global pool of investors.
- 3.3. Develop an online community of students, alumni, researchers and industry to encourage collaboration in developing innovation driven enterprises.
- 3.4. Offer virtual incubation to students that do not get admitted in the regular program, already graduated, or live in remote campuses.
- 3.5. Find investment opportunities for innovative new products developed by faculty and students.

### **4. ROLE AND RESPONSIBILITIES**

IdeaGist Role:

- 4.1. Invest USD 150,000, over the next five years, in technology licensing and free mentoring services.
- 4.2. Provide online training to 500 students every year in Practical Entrepreneurship. @ USD 50 each, a total value of USD 25,000 per year. Additional licenses can be provided if needed.
- 4.3. Provide fully managed digital collaboration community to faculty, staff, student, and alumni with unlimited users and unlimited usage, an annual value of USD 5,000.
- 4.4. Provide access to National Investment Portal and National Innovation Showcase to the faculty and students.
- 4.5. Find funding sources, with the government, international donor organizations, and corporations, that can help in improving the effectiveness of the incubation program.
- 4.6. Provide policy level best practices for universities running an active incubation program.
- 4.7. Provide process and procedure for student, faculty, and alumni engagement in the program.
- 4.8. Provide access to the global mentors' pool under the Empower Pakistan Mentorship program.

Partner Role:

- 4.9. Executive Level Program Ownership.
- 4.10. Inclusion of Entrepreneurship and Innovation in Strategic Plans.
- 4.11. Strict implementation of policies and procedures based on best practices to ensure faculty, staff, student, and alumni engagement in the process.
- 4.12. Actively promote incubator program and entrepreneurship as a career choice to faculty, staff, students, and alumni.
- 4.13. Actively find ways to support IdeaGist in connecting the innovation and incubation ecosystem nationally.

## 5. GENERAL TERMS:

- 5.1. The term of this MOU is limited to three years or until a formal agreement is signed by the parties.
- 5.2. Each Party shall be responsible for its own costs and expenses incurred as a result of the entering into or the carrying forward of this MOU.
- 5.3. The Partner gives IdeaGist permission to discuss the Project with other parties that could potentially provide resources to the Project, either in-kind or in-cash, including but not limited to grant applications, funding proposals, mentoring, and Start-up Investment proposals.
- 5.4. Notwithstanding anything to the contrary contained herein, neither Party shall be liable for any indirect or consequential loss, damage or injury, including loss of goodwill, caused to any party hereto under any of the matters entailed herein nor shall any Party or any third party have the right to claim any special or punitive damages under any provision of this MOU.
- 5.5. Both parties shall provide a quarterly report to each other on the activities and progress.
- 5.6. There is no exclusivity the parties and both are free to enter into similar arrangements with other potential partners.

[Signatures on the next page]



Signed by the Parties:

For and on behalf of **IdeaGist  
Pakistan**

By: \_\_\_\_\_

Name: Hassan Syed

Title: Chairman of the Board

Date: \_\_\_\_\_

For and on behalf of **CUST, Islamabad**

By: \_\_\_\_\_

Name: Prof. Aamer Iqbal Bhatti

Title: Dean ORIC

Date: \_\_\_\_\_



## Capital University of Science & Technology

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No.23/CUST/ORIC/2019

14<sup>th</sup> March, 2019

### **5<sup>th</sup> FYP Commercialization Meeting on CS Project entitled "Smart Hospital Management System"**

#### **Minutes of the meeting held on 14<sup>th</sup> March, 2019**

The 5<sup>th</sup> meeting on FYP Commercialization was conducted on March 14, 2019 in office of Dr. Arshad Hassan, Dean Faculty of Management & Social Sciences. Dean Research & Innovation, Prof. Dr. Aamer Iqbal Bhatti chaired the meeting.

The following faculty members attended the meeting.

Dr. Arshad Hassan      Dean (FMSS)

Dr. Lakhi Muhammad      Assistant Professor (MS Dept)

Subsequently the meeting progressed as per agenda items listed below.

<b>Item 01</b>	<b>Record Presentation of various Hospitals</b>	<b>Action By</b>
	1.1 Dr. Lakhi Muhammad shared the facts and figures that his project team had collected during their visit to various hospitals. A brief analysis of particular data was done. The respected meeting members then discussed over various ideas and prospects to intensify the development in project.	
<b>Item 02</b>	<b>Major Difficulties &amp; Complications</b>	
	2.1 Dr. Lakhi Muhammad discussed various problems that are encountered while record collection. Some hospitals are willing to cooperate while others have quite discreet response.	
	2.2 Dr. Lakhi Muhammad further updated about the priority based problems they faced while visit to different hospitals. A lot of hospitals don't have inclined precedence for such type of systems and they simply prefer manual procedures.	
	2.3 Dean Research & Innovation asked Dr. Lakhi to motivate their students more for speeding up their survey so that we can have some prospective outcomes.	Dr. Lakhi



Being no further item for discussion the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**



Muhammad Raheel Anjum

Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Registrar
- Dr.Arshad Hassan, Dean Faculty of Management Science
- Dr. Abdul Qadir, Dean, Faculty of Computing
- Dr. Lakhi Muhammad, Assistant Professor, Management Science Dept
- File



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No.23/CUST/ORIC/2019

March 29, 2019

### **6<sup>th</sup> FYP Commercialization Meeting on CS Project entitled "Smart Hospital Management System"**

#### **Minutes of the meeting held on 28<sup>th</sup> March, 2019**

The 6<sup>th</sup> meeting on FYP Commercialization was conducted on March 28, 2019 in in office of Dr. Arshad Hassan, Dean Faculty of Management & Social Sciences. Dean Research & Innovation, Prof. Dr. Aamer Iqbal Bhatti chaired the meeting.

The following faculty member attended the meeting.

Dr. Lakhi Muhammad Assistant Professor (MS Dept)

Dr. Arshad Hassan was unable to attend the meeting due to certain personal reasons.

The meeting progressed as per agenda items listed below.

<b>Item 01</b>	<b>Survey Record Discussion</b>	<b>Action By</b>
	1.1 Dr. Lakhi Muhammad shared the latest progress on record collection that their team had done during their visit to various hospitals. A generic analysis of survey was also done.	
<b>Item 02</b>	<b>Business Ideas Gala</b>	
	2.1 Dean Research & Innovation and Dr. Lakhi Muhammad agreed upon that alongside Marketing Gala which is specific to Management Science students, we should also organize Business Ideas Gala which should be open to every discipline.	Dean ORIC & Dr. Lakhi
<b>Item 03</b>	<b>Commercialization Projects from all Departments</b>	
	3.1 Dean Research & Innovation recommended that every department should analyze its students projects and look for those which can have specific business case or commercialization factor.	
	3.2 Dean ORIC further added that through mutual collaboration in the form of joint projects of different departments we can move towards commercialization in a better way.	

Being no further item for discussion the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**



Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Registrar
- Dr. Arshad Hassan, Dean Faculty of Management Science
- Dr. Abdul Qadir, Dean, Faculty of Computing
- Dr. Lakhi Muhammad, Assistant Professor, Management Science Dept
- File



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No.23/CUST/ORIC/2019

April 16, 2019

### **7<sup>th</sup> FYP Commercialization Meeting on CS Project entitled "Smart Hospital Management System"**

#### **Minutes of the meeting held on 8<sup>th</sup> April, 2019**

The 7<sup>th</sup> meeting on FYP Commercialization was held on April 8, 2019 in the office of Dr. Arshad Hassan, Dean Faculty of Management & Social Sciences. Dean Research & Innovation, Prof. Dr. Aamer Iqbal Bhatti chaired the meeting.

The following faculty member attended the meeting.

Dr. Arshad Hassan      Dean (FMSS)

Dr. Lakhi Muhammad      Assistant Professor (MS Dept)

Following is the decided task with particular deadline.

The meeting progressed as per agenda items listed below.

<b>Item 01</b>	<b>Survey Record Discussion</b>	<b>Action By</b>
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- 1.1 Dr. Lakhi Muhammad shared the latest progress on record collection that their team had done during their visit to various hospitals. A generic analysis of survey data was given.
- 1.2 Dr. Lakhi Muhammad briefed the members about requirements and expectancies of doctors, patients and management. He shared each aspect of his survey in detail and discussed about what the stake holders actually demand from the particular software application.

<b>Item 02</b>	<b>Detailed Report Compilation</b>	
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- 2.1 Dean Research & Innovation and Dean FMSS directed Dr. Lakhi Muhammad to compile a detailed report on survey results taking in to consideration those factors that are more prominent so that the given project can be worked on technical side for the prospective outcomes.

<b>Item 03</b>	<b>Detailed Discussion on Survey Results</b>	
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- 3.1 Dean Research & Innovation, Dean FMSS and Dr. Lakhi Muhammad analyzed the survey results in detail keeping in view the expectations of stake holders including patients, doctors and management.

- 3.2 Dean Faculty of Management & Social Sciences constricted down the survey results towards the factors that seemed more promising to doctors, patients and management. He proposed that the particular software system should touch the underlined factors which are more significant to the end users.
- 3.3 Dean Research & Innovation underlined the fact that given software can be developed precisely once we narrow down basic requirements of end users. He further added that patients expect given application to be exclusively free, however we can charge hospitals for the particular system. Dr. Lakhi

Being no further item for discussion the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**



Muhammad Raheel Anjum

Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Registrar
- Dr. Arshad Hassan, Dean Faculty of Management Science
- Dr. Abdul Qadir, Dean, Faculty of Computing
- Dr. Lakhi Muhammad, Assistant Professor, Management Science Dept
- File



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No.28/CUST/ORIC/2019

June 24, 2019

### **8<sup>th</sup> FYP Commercialization Meeting on CS Project entitled "Smart Hospital Management System"**

#### **Minutes of the meeting held on 20<sup>th</sup> May, 2019**

The 8<sup>th</sup> meeting on FYP Commercialization was held on May 20, 2019 in the office of Dr. Nayyer Masood, HoD Computer Science at 12 P.M. Dean Research & Innovation, Prof. Dr. Aamer Iqbal Bhatti chaired the meeting.

The following faculty member attended the meeting.

Dr. Nayyer Masood	HoD (CS Dept)
Dr. Aamer Nadeem	HoD (SE Dept)
Dr. Lakhi Muhammad	Assistant Professor (MS Dept)
Mr. Ibrar Arshad	Lecturer (SE Dept)

Subsequently, the meeting progressed as per agenda items listed below.

<b>Item 01</b>	<b>Case Diagram Analysis of Survey Results</b>	<b>Action By</b>
	1.1 Dr. Lakhi Muhammad presented the report before meeting attendees. The faculty members discussed the requirements and expectancies of doctors, patients and management and thought over what stakeholders actually demand from the particular software application.	
	1.2 It was decided to have a case diagram analysis of given report for in depth understanding of the survey results and Dr. Lakhi Muhammad would present the said analysis in next meeting.	Dr. Lakhi
	1.3 The subsequent meeting about the particular Case Diagram Analysis would be done in upcoming week.	
<b>Item 02</b>	<b>Meet up of CUST Faculty Team with Medical Industry Personnel</b>	
	2.1 It was decided that a team from CUST consisting of nominated MS and CS Faculty members would visit the medical industry personnel before beginning the work on particular software application as per their requirements.	Dr. Lakhi and CS Faculty Team

**Item 03                      Launch of Pilot Project Version**

- 3.1 Dean Research & Innovation, HoD CS and HoD SE      CS Faculty  
agreed that work on the given software would be      and ORIC  
started soon after the industry meetup.
- 3.2 It was anticipated that initial Pilot Project Version of  
the given software application would be launched till  
December 2019.

Being no further item for discussion the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**



Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Dr. Arshad Hassan, Dean Faculty of Management Science
- Dr. Abdul Qadir, Dean, Faculty of Computing
- Dr. Nayyer Masood, HoD, Computer Science
- Dr. Aamer Nadeem, HoD, Software Engineering
- Mr. Ibrar Arshad, Lecturer, Software Engineering Dept
- Dr. Lakhi Muhammad, Assistant Professor, Management Science Dept
- File



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No.28/CUST/ORIC/2019

July 11, 2019

### 9<sup>th</sup> FYP Commercialization Meeting on CS Project entitled "Smart Receptionist for Hospitals"

#### **Minutes of the meeting held on 03<sup>rd</sup> July, 2019**

The 9<sup>th</sup> meeting on FYP Commercialization was held on July 03, 2019 in the Conference Hall, F-Block at 2 P.M. Dean Research & Innovation, Prof. Dr. Aamer Iqbal Bhatti chaired the meeting.

The following faculty members attended the meeting.

Dr. Lakhi Muhammad	Assistant Professor (MS Dept)
Mr. Shahzad Rafique	Assistant Professor (SE Dept)
Mr. Mudassar Adeel	Lecturer (SE Dept)

Dr. Aamer Nadeem, HoD SE was unable to attend the meeting due to other commitments. Subsequently, the meeting progressed as per agenda items listed below.

Item 01	Generic Overview of Survey Report	Action By
	<p>1.1 Dr. Lakhi Muhammad briefed the meeting participants about the proposed hospital management system and indicated that it would be an extensive application targeting the general hospital problems.</p> <p>1.2 Mr. Shahzad Rafique queried about the market gap analysis and feasibility report of the particular software application. Dr. Lakhi Muhammad updated him that given report is actually based on the market gap analysis and is a sort of initial feasibility report.</p>	
Item 02	Target Industry	
	<p>2.1 Dr. Lakhi Muhammad apprised the members about the target industry being middle and lower middle level hospitals. Based upon the end user requirements the system should have potential to be upgraded in future. The effort estimation and pricing would be done accordingly.</p> <p>2.2 Mr. Shahzad Rafique described that if all the features are incorporated in the given application, it would need substantial finance in terms of software development and maintenance costs. Dean Research &amp; Innovation proposed that we can adopt a middle approach by scaling down our scope which is suitable for all the stake holders. <i>He recommended Mr. Shahzad to present the implementable generalized hospital structure in the next meeting.</i></p>	<p>Mr. Shahzad Rafique</p>



**Item 03****Detailed Discussion about Patient's Requirements**

3.1 A detailed discussion about the patient's requirements from the particular system was done with respect to survey report. The following points were agreed upon.

- Online access to doctor's qualifications, schedules, fees etc.
- Online access to patients medical history including test results, lab reports etc.
- Contacts directory service of doctors and management
- Patients online security and user log management

3.2 There were certain patient's responses which were partially agreed upon and needed further discussion and feedback from end users. The following aspects needed further analysis.

- Communication Feature
- Explanation of hospital management
- Patient's requirements from pharmacy

**Item 04****Finalization of Agenda Items for Next Meeting**

4.1 It was decided that the subsequent meeting on the particular subject would be scheduled in the next week. The following agenda items were agreed upon for the given meeting.

- Detailed Discussion on Doctors and Management response
- Generic Hospital Structure to be targeted

Dr. Lakhi /  
Mr. Shahzad

**Item 05****Meet up of CUST Faculty Team with Medical Industry Personnel**

5.1 It was decided that after the detailed analysis of the report the meeting team would visit the hospital industry to clarify the ambiguities from targeted users including doctors, patients and management.

Dr. Lakhi /  
Mr. Shahzad /  
Mr. Mudassar

Being no further item for discussion the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**



Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Dr. Arshad Hassan, Dean Faculty of Management Science
- Dr. Abdul Qadir, Dean, Faculty of Computing
- Dr. Nayyer Masood, HoD, Computer Science
- Dr. Lakhi Muhammad, Assistant Professor, Management Science Dept
- Mr. Shahzad Rafique, Assistant Professor, Software Engineering Dept
- Mr. Mudassar Adeel, Lecturer, Software Engineering Dept
- File



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No.15/CUST/ORIC/2018

March 5, 2019

### Industrial Liaisons Meeting held on 21<sup>st</sup> February 2019

An Industrial Liaisons meeting was held by Office of Research Innovation and Commercialization (ORIC) in reference to the item No. 04 of the 16th FoE Meeting which was held on 21<sup>st</sup> Jan, 2019. The Industrial Liaison Meeting was held on 21<sup>st</sup> Feb 2019 in the Dean FoE office at 2:00 PM. Prof. Dr. Imtiaz Ahmed Taj, Dean FoE chaired the meeting. The following attended the meeting.

Prof. Aamer Iqbal Bhatti	Dean ORIC
Dr. Ishtiaq Hassan	HoD CE
Dr. Noor Muhammad Khan	HoD EE
Dr. Khawar Naveed	Associate Prof. ME

Dean FoE welcomed the participant for making it possible to attend the meeting, he started the meeting with discussion of the OBE criteria No. 09. The meeting progressed as per following agenda items.

#### **Item 01      Constitution of Departmental Industrial Outreach Committee (IOC)      Action By**

- 1.1 Dean FoE informed the participants that in the 16th FoE meeting the departments were requested to nominate members for the industrial linkage committee, therefore the committees should be constituted at earliest. After a deliberate discussion the members agreed for naming the industrial linkage committee as **Industrial Outreach Committee (IOC)**. Dean FoE emphasized that targets/objective for IOC are needed to be set. The following targets were defined for the IOC.

#### **Objectives of IOC:**

- (a) To identify local industries and define mechanism for having feedback from industries. Find out the requirements of the industries by meeting with the representative or by inviting them to university.
- (b) To take measures to improve the employability of our graduates in the local Industry. The committee should devise a proper plan for this.

- (c) Final Year Projects (FYPs), the committee should take ideas from the industry of projects feasible to them, the committee should also look for equipments, sponsors from industry along with joint supervision for FYPs.
- (d) To look for supervision/consultancy for faculty members with the industry.
- (e) To propose consultancy frame work beneficial for both university and industry
- (f) To provide help in project proposals to the faculty members.

Concerned  
HoD's, IOC  
Members

1.2 Dean FoE further apprised that the IOC's will put forward their recommendations to the Industrial Advisory Board, these recommendations will be forwarded to BoS then to BoF and the concerned HoD will be responsible for having an appropriate action upon it.

## **Item 02                      Constitution of Industrial Advisory Board**

- 2.1 Dean FoE briefed the participants of the meeting that there is a need of industrial Advisory Board (IAB). The previous IAB was changed to ORIC Advisory Board but in the view of Criteria No. 9 of PEC Program Evaluation Report highlights the need of IAB to be established.
- 2.2 The HoD's were requested to provide at least two names from their respective Departments for the IAB in the second week of the semester Spring 2019.
- 2.3 It was agreed after detailed discussion that IAB should be comprised of Dean FoE (Convener), HoD's, Industry Members (02 from each Department), Dean ORIC and IOC members.

IAB          Nomi-  
nations by HoD  
CE, HoD EE,  
HoD ME in  
Second week of  
Semester

## **Item 03                      Other Agenda Item**

- 3.1 HoD CE Department floated the suggestion that consultancy and testing should be initiated at Department of CE, this would lead towards Industry-Academia liaisons.

The minutes are communicated for perusal and implementation wherever so required by the concerned members. In case of non receipt of observation in writing on the minutes within 02 days the same will stand as confirmed.

**Prepared by**



Muhammad Farhan  
Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Dean FoE
- HoD CE, EE, ME
- File



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No.31/CUST/ORIC/2019

May 20, 2019

### 1<sup>st</sup> Joint Industrial Outreach Committee Meeting of FoE

#### **Minutes of the Meeting held on 18<sup>th</sup> April, 2019**

The 1<sup>st</sup> Joint Industrial Outreach Committee Meeting of Faculty of Engineering was held on Thursday 18<sup>th</sup> April, 2019 in the Conference Room, F-Block at 2:00 PM. Prof. Dr. Aamer Iqbal Bhatti, Dean Research & Innovation, chaired the meeting.

The following faculty members attended the meeting.

Dr. Muhammad Ashraf	Professor (EE Dept)	Convener
Engr. Muhammad Naeem	Lecturer (EE Dept)	Member
Engr. Amir Hamza	Lab Engineer (EE Dept)	Member
Dr. Khawar Naveed	Associate Professor (ME Dept)	Convener
Dr. Salman Warsi	Assistant Professor (ME Dept)	Member
Dr. Muhammad Irfan	Assistant Professor (ME Dept)	Member
Dr. Waqas Akbar Lughmani	Assistant Professor (ME Dept)	Member
Dr. Ishtiaq Hassan	HoD (CE Dept)	Advisor
Dr. Shujaa Safdar	Associate Professor (CE Dept)	Convener
Dr. Majid Ali	Associate Professor (CE Dept)	Member
Dr. Munir Ahmed	Associate Professor (CE Dept)	Member

Mr. Tauseef Ahmed was engaged in departmental activities.

Dean Research and Innovation, Prof. Dr. Aamer Iqbal Bhatti welcomed the committee members. Subsequently, the meeting progressed as per agenda items listed below.

Item 01	Industrial Outreach Demand for OBE System	Action By
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- |     |  |  |
|-----|--|--|
| 1.1 | Dean Research & Innovation presented the importance of Industrial linkages and said that an Outcome Based Education system is affected if Industrial Outreach and Industrial Liaisons are missing. He added that the role of University should not merely be the provision of quality education but also the establishment of effective Industry Linkages. |  |
|-----|--|--|

**Item 02                      Industrial Zones of Rawalpindi & Islamabad**

- 2.1 Dean Research & Innovation shared the data of Islamabad and Rawalpindi Chamber of Commerce and Industries. He recommended that the nearby Industrial zones of Rawat, Hattar, Humak and Kahuta can be effectively approached.
- 2.2 Dean ORIC updated the members that there are 781 manufacturers in twin cities. He informed the members about three major categories of Industries with numbers in Rawalpindi and Islamabad namely Iron & Steel, Floor & General Mills and Pharmaceuticals.
- 2.3 He further briefed the members about nearby Pharmaceutical Industrial zones with their locations & proposed the committee members to visit these industries and look for their specific problems that CUST faculty and students can solve out.

**Item 03                      Workout for Mutual Benefit of Academia & Industry**

- 3.1 Dr. Muhammad Ashraf said that the possibilities of graduates employability would increase if we work for the benefit of Industry by solving their real time problems. This would lead towards the benefit of our students in terms of technical skills and professional carrier.

**Item 04                      Consultancy Policy for CUST Faculty**

- 4.1 Dr. Ishtiaq Hassan, HoD CE discussed about the initial frame work of Consultancy Policy which is almost complete and would be discussed with Vice Chancellor soon. He updated the members that in terms of consultancy policy following three options were proposed before Industry Professionals.

HoD      CE  
& Dr. Majid  
Ali

  - (a) Seeking Advice on site issue faced during the execution through call, email and letter
  - (b) Involving in Individual Capacity of a faculty member to do design or procurement work for a particular project.
  - (c) Involving Department(s) for performing consultancy for a whole project.
- 4.2 He further briefed that industry experts didn't observe first option viable. The second option was conditionally agreed upon that the individual consultant should register himself with Pakistan Engineering Council(PEC) for the mentioned service. The third option was considered more viable to register as a consultant department with PEC and provide consultancy services.



**Item 05      Faculty Visit to Pharmaceutical Companies**

- |  |  |
|--|--|
| 5.1 Dean Research & Innovation recommended Outreach committee members of EE and ME Departments to visit nearby Pharmaceutical Companies and look for their technical problems that can be addressed by concerned departments.                        | Outreach Committees of EE & ME Departments |
| 5.1 He further added that students can be involved to solve these problems so that they can achieve technical set of skills in advance before joining any Industry in future. This would also increase the employment possibilities of our students. |  |

**Item 06      Labs Up-gradation according to Industry Requirements**

- |  |                            |
|--|----------------------------|
| 6.1 Dean Research & Innovation acclaimed the Engineering Faculty to invite Industry Professionals, visit them University Labs and seek suggestions about how we can upgrade our labs to meet modern Industry requirements. | Outreach Committees of FoE |
| 6.2 Industry Professionals can also be benefited with University Labs for their desired inspection and testing.  |                            |

Being no further item for discussion the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**



Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Registrar
- Industrial Outreach Committee Members EE Dept
- Industrial Outreach Committee Members ME Dept
- Industrial Outreach Committee Members CE Dept
- File



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No.31/CUST/ORIC/2019

May 21, 2019

### Industrial Outreach Meeting of Dean ORIC with Conveners of EE & ME Departments

#### **Minutes of the Meeting held on 8<sup>th</sup> May, 2019**

The Industrial Liaison Meeting was held on Wednesday 8<sup>th</sup> May, 2019 in the office of Dr. Aamer Iqbal Bhatti, Dean Office of Research, Innovation and Commercialization at 11:00 AM. Prof. Dr. Aamer Iqbal Bhatti chaired the meeting.

The following faculty members attended the meeting.

Dr. Muhammad Ashraf	Professor (EE Dept)	Convener EE Outreach Committee
Dr. Khawar Naveed	Associate Professor (ME Dept)	Convener ME Outreach Committee
Engr. Amir Hamza	Lab Engineer (EE Dept)	Member EE Outreach Committee

Dean Research and Innovation, Prof. Dr. Aamer Iqbal Bhatti welcomed the committee members. Subsequently, the meeting progressed as per agenda items listed below.

<b>Item 01</b>	<b>Industrial Outreach Demand for OBE System</b>	<b>Action By</b>
	<p>1.1 Dean Research &amp; Innovation presented the importance of Industrial linkages and said that an Outcome Based Education system is affected if Industrial Outreach and Industrial Liaison is missing.</p> <p>1.2 He added that the role of University should not merely be the provision of quality education but also the establishment of effective Industry linkages to increase graduates employment rate.</p>	
<b>Item 02</b>	<b>Labs Up-gradation in Accordance with Industry Requirements</b>	
	<p>2.1 Dean Research &amp; Innovation acclaimed the members to collaborate with ORIC in inviting Industry Professionals to visit of University Labs. The recommendations of professionals can be valuable in upgrading our labs according to modern Industry requirements. This would help us in training our students according to market requirements.</p>	<p>Outreach Committees &amp; ORIC</p>

**Item 03****Visit of Industry Professional to University Labs**

- 3.1 Dr. Muhammad Ashraf updated Dean Research & Innovation about some nearby industry personnel namely Mr. Shahzad Khan, Mr. Shakaib and Mr. Jabir Abbas and also provided their contact details to ORIC. ORIC/EE Dept
- 3.2 He contacted Mr. Shakaib, CTO Designex Solutions, Islamabad and requested him to visit CUST Engineering labs and recommend improvements. Designex Solutions is an Electrical and Electronic based Manufacturing company located in Islamabad. The professional agreed to visit CUST Electrical Engineering labs on Monday 13<sup>th</sup> May, 2019. The given activity would be implemented by ORIC in collaboration with EE department.
- 3.3 Dr. Muhammad Ashraf added that these individuals can also connect us with other similar industries using their peculiar relations around. It was agreed upon that the industry professionals would be visited University labs on regular basis for their continual up gradation and improvement.

Being no further item for discussion the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**

Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**

Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Registrar
- Dr. Muhammad Ashraf
- Dr. Khawar Naveed
- Dr. Ishtiaq Hassan
- Lab Engineers EE Dept.
- File



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No.22/CUST/ORIC/2019

June 17, 2019

### Visit Report of Industry Professional to CUST EE Department Labs

In response to the action tasks of particular Industrial Outreach Meeting of Dean ORIC with Dr. Muhammad Ashraf, convener EE Dept held on 8<sup>th</sup> May, 2019, Mr. Shakaib, CTO, Designx Solutions visited Capital University of Science and Technology, Islamabad on Monday 13<sup>th</sup> May, 2019 at 3 P.M.

Designx Solutions is an Electrical and Electronic based Manufacturing company located in Islamabad that works under following domains.

- Alternate Energy Solutions
- Backup Power Systems
- Engineering Services
- Electronics Design Services
- Power Conditioning

The objective of present visit was to show him CUST EE Department labs and seek suggestions about how we can upgrade our labs to meet modern day Industry requirements. This would help us in training our students according to technical skills in compliance with market requirements that would ultimately enhance employability chances of our students.

Prof. Aamer Iqbal Bhatti, Dean Research & Innovation, Dr. Muhammad Ashraf, Professor EE Department and Mr. Osama Akbar Raja, Lecturer EE Department welcomed the honorable guest.

Subsequently the honorable guest comprehensively visited the particular labs. The following Lab Engineers were present in their respective labs.

1. Mr. Attabik Tabib
2. Mr. Zeeshan Ahmad
3. Mr. Nadir Mehmood
4. Mr. Amir Hamza
5. Mr. Mudassar Hussain
6. Mr. Abu Turab
7. Mr. Muhammad Waleed Farooq

After a detailed visit followed by analysis of featured equipment, following key points emerged as recommendations for each lab.

## **Electronics Lab**

1. Silicon Carbide based Insulated-Gate Bipolar Transistors (IJBTs) is the new technology, which may be used in Electronics lab.
2. Interleaving switching may be included in experiments of Electronic Circuit Design (ECD) lab.
3. Instead of conventional procedures, Step Craft PCB Routing Machine should be used which would not only reduce manual processes but also enhance quality and efficiency.

## **Analogue Electronics Lab**

1. For the observation of cut off frequency of RC filters, Digital Oscilloscope may be used in the lab.

## **Digital Electronics Lab**

1. Duty Cycles Changing Function Generators must be included in lab.
2. The theory of Universal Asynchronous Receiver Transmitter (UART) Design should be essentially taught to students in some course because for synchronization and asynchronization UART Design is used.
3. Serial Peripheral Interface (SPI) should also be taught in a theory course.
4. The specific Delta sigma Analogue to Digital Converters need to be taught in theory or lab course.

## **Microprocessor Lab**

1. IAR Systems Compiler must be used which already have built in Keil Software along with other software packages.
2. The specific 8086 Intel Microprocessor can be replaced with better and more recent ARM Processor.
3. Real Time Operating System, Parallel Processing and Multitasking needs to be included in Lab course.

## **Control Systems Lab**

1. The students should be assigned to implement PID in C language alongside MATLAB. This would lead towards better understanding of basic concepts to them.
2. Ball and Beam Balance Experiment may be done using Atmega Micro Controllers.
3. A new type of simple PLC Experiment can be designed in lab by filling rubber tyre with 50-60 psi compressor.

## **Communication Systems Lab**

1. Software Defined Radio (SDR) theory should be taught in theory or lab course.
2. SDR can be implemented with GNU Radio software.

## Details about Manufacturing Companies

Mr. Shakaib also recommended some high profile companies for purchasing electronics based products and equipment e.g. Taraz Tech for 3-phase devices and power modules. He also recommended a well reputed company Quanser for buying particular lab equipment.

Dr. Noor Muhammad Khan, HoD EE dept also visited the guest. Dean Research & Innovation, Prof. Aamer Iqbal Bhatti, Dr. Muhammad Ashraf and HoD EE Dept thanked the worthy guest for his valuable feedback and recommendations. Mr. Shakaib desired to visit and collaborate with CUST in future also.

**Prepared by**



Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Dean FoE
- HoD EE
- Dr. Muhammad Ashraf, Professor EE Dept.
- Mr. Osama Akbar Raja, Lecturer EE Dept.
- Lab Engineers EE Dept.
- File



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No.31/CUST/ORIC/2019

June 14, 2019

### Meeting of Dean ORIC with HoD CE on Testing & Consultancy Policy

#### **Minutes of the meeting held on 28<sup>th</sup> May, 2019**

The meeting of Dean ORIC with Dr. Ishtiaq Hassan, HoD CE on Consultancy & Testing Policy for CUST faculty members was held on Tuesday 28<sup>th</sup> May, 2019 in ORIC Office, H-Block at 11:00 AM. Prof. Aamer Iqbal Bhatti, Dean Research & Innovation, chaired the meeting. The following attended the meeting.

Dr. Ishtiaq Hassan	HoD (CE Dept)
Muhammad Raheel anjum	Assistant Director (ORIC Dept)

Dean Research and Innovation, Prof. Aamer Iqbal Bhatti welcomed Dr. Ishtiaq Hassan. Subsequently, the meeting progressed as per agenda items listed below.

Item 01	Design/Supervision/Consultancy Framework for CUST Faculty Members	Action By
1.1	The Procedural Frame work for faculty members involvement in Design/Supervision/Consultancy Role was conversed in detail. HoD CE briefed Dean ORIC that given proposal has been discussed with Vice Chancellor and would be presented in next Executive Committee Meeting.	HoD CE
1.2	HoD CE proposed following two ways through which faculty members can provide consultancy services to industry. (a) Involvement of faculty members through individual consultancy service. (b) Involvement of faculty members through research project.	
1.3	HoD CE informed Dean ORIC that Pakistan Engineering council (PEC) does not allow Professional Engineer to work in multiple firms at the same time. However PEC sub criterion (v) of Criteria 9 allows faculty members to perform consultancy only if they are provided NOC from their respective institutes.	
1.4	Dean Research & Innovation recommended that provision of consultancy services through registration as an institute could be more effective against the same through individual capacity.	

**Item 02                      Consultancy through Authority letter from PEC**

- 2.1 HoD CE updated Dean ORIC that certain institutes like UET have attained specific letter from PEC that allows them consultancy services. Dean ORIC proposed HoD CE to obtain sample letter from any such institute. The similar letter can also be used by CUST for consultancy services. HoD CE

**Item 03                      Testing Policy for CUST Faculty Members**

- 3.1 Dean Research & Innovation emphasized that Testing could be more practicable than consultancy. HoD CE
- 3.2 HoD CE shared MOU draft with Dean ORIC for Academia Industry Linkage related to sample testing and Research Projects.
- 3.3 Testing would be done according to internationally recognized standard like ASTM. HoD CE also shared some test protocols that were mentioned in the report.
- 3.4 Dean Research & Innovation suggested that a particular data base can be maintained on University website related to Testing results. CS Department can also be involved in it. This data base can be equally beneficial to University and contractors for similar type of testings in future.

Being no further item for discussion the meeting was adjourned with a vote of thanks the chair and participants.

**Prepared by**



Muhammad Raheel Anjum  
Assistant Director ORIC

**Approved by:**



Prof. Aamer Iqbal Bhatti  
Dean Research & Innovation

**Distribution.**

- Vice Chancellor
- Dr. Ishtiaq Hassan, HoD CE Department
- File





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Dated: 30/07/2019

### **POLICY FOR CONSULTANCY & EXTERNAL PROFESSIONAL WORK**

## 1 Purpose

1.1 The University comprehends the value of its faculty/staff undertaking consultancy for outside bodies. Consultancy is an important channel through which knowledge and expertise can flow to and from businesses and other external agencies and therefore contributes to the development of growing and productive relationships with these bodies. Faculty/staff involved in design/supervision/consultancy role with industry will ensure that the university gets due benefits as potential outcomes of the consultancy such as:

- Increased level of research capacity, primarily more PhD students and related activity
- Applied Research at MS and PhD level
- Increased Industry engagement
- Students Funded FYP's
- Student internships
- Student Job Placements

1.2 This document defines procedures that are to be used for management of consultancy activities and service works, in a way which ensures these profits while protecting the interests of both University and its faculty/staff in a manner which reflects appropriate professional standards.

1.3 This policy is projected to provide the information required to undertake consultancy work in accordance with the University's approved procedures.

## 2 Consultancy

2.1 Consultancy is defined as the provision of any advice, information, training, acting as subject matter expert for an external organization or other such professional service for a fee. The policy does not apply to the following areas as these are not considered in consultancy.

- a) External examiner duties
- b) Authorship of, or royalties from, the publication of books
- c) The dissemination of primary knowledge (i.e. education) – i.e. a Faculty's core teaching or teaching related activities.
- d) Reviewing publications
- e) Appearances in the media



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- f) Voluntary duties for the society such as related to but not limited to HEC, Regulatory Councils (PEC etc.), IEEE, IMECH and ACM.

### 3 Kinds of Consultancy

#### 3.1 University Consultancy

- 3.1.1 Such consultancy in which a member of faculty/staff provides a consultancy service to a third party in the course of his/her employment with the University and where the nature of the task arises naturally from, and is related to, his or her University employment. A task involving at least one of the following is defined as university consultancy:
- a) Use of any University facilities or staff (including the time of the member of staff undertaking the consultancy)
  - b) Use of any kind of university resource in carrying out the work
  - c) Legal liability lies, in whole or in part, with the University
- 3.1.2 As a guideline, up to 30 days per annum may be spent on University consultancy activities. However, this may be increased by obtaining written approval from the Vice Chancellor. All University consultancy contracts must be negotiated and dealt with through the Office of Research, Innovation & Commercialization (ORIC).
- 3.1.3 The concerned faculty/staff member will ensure that there is a certain benefit to the university in terms of tangible outcomes as mentioned in clause 1.1. The achieved outcomes will be duly intimated to ORIC after the conclusion of the consultancy .

#### 3.2 Private Consultancy

- 3.2.1 Private or personal consultancy is defined as the provision of expert advice and services for a fee to external clients by University employees in areas of activity related to their University appointment and academic expertise but undertaken privately.
- 3.2.2 Faculty/staff entering into private consultancy does so at his/her own risk and out of university working hours, out of university premises, and without using any of university resources and facilities. Faculty/staff entering into private consultancy he/she must:
- a) Use the home address for all contractual and other correspondence
  - b) Include the following disclaimer in all correspondence and contractual matters relating to the private consultancy

*“Please note that the services are provided by [NAME] acting in a personal capacity. (NAME) is not, and shall not be considered to be, acting as employee or representing the Capital University of Science and Technology; and the University exercises no control or supervision over the actual performance or quality of the*



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*work. Accordingly, you and your company, by accepting the services, (i) acknowledge that the Capital University of Science and Technology has no responsibility or liability for the services and (ii) is deemed to have waived any right or entitlement to pursue or instigate any claim or action against the Capital University of Science and Technology for any injury, loss or damage you or your company may sustain as a result of (insert name of member of staff) undertaking the services for you or your company."*

- c) Not use university email account, nor webpage
- d) Any failure by a member of staff to comply with any of the foregoing requirements may result in the University taking appropriate action

3.2.3 A member of staff seeking consent to undertake private consultancy must provide full information to his/her Head of Department and ORIC in advance of agreeing to the activity. The information includes:

- a) Amount of time required for the commitment
- b) Description of the activity
- c) Client details
- d) Confirmation that the activity does not conflict with the undertaking of any University duties

3.2.4 The concerned faculty/staff member will ensure that there is a certain benefit to the university in terms of tangible outcomes as mentioned in clause 1.1. The achieved outcomes will be duly intimated to ORIC after the conclusion of the consultancy.

## 4 Services

4.1 The provision of analytical, testing or other services for third parties involving any use of University facilities, equipment, IT networks, and staff resources. For the purposes of these procedures, all such work should be regarded as similar to university consultancy and be regulated as such.

## 5 Approval

5.1 In order to protect the university from legal and financial risk, and to ensure transparency and consistency of treatment for all faculty/staff who may engage in consultancy activity, all university and private consultancies must be negotiated through ORIC office.

5.2 All consultancy proposals should be passed to the Head of Department in the first instance. The Head of Department in consultation with the ORIC office will make the decision to accept or decline the proposal.

5.3 In seeking approval, the individual must also disclose any outside activity, relationship or interest (including any financial interest), which might give rise to conflict of interest.



## Capital University of Science and Technology

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## 6 Duration & Extent

- 6.1 Where approval is given to undertake consultancy or service work, a member of faculty/staff should not spend more than stipulated time during semester on the consultancy.
- 6.2 It is the responsibility of the Dean of Faculty or the Head of Department to ensure that the proposed consultancy does not conflict, in nature or extent, with the University duties of the member of faculty/staff concerned.

## 7 Income Sharing

- 7.1 After the deduction of any direct costs and expenses the standard division of the income is as follows:

University Consultancy	
Individual member of faculty/staff	60%
University	40%
Private Consultancy	
Individual member of faculty/staff	85%
University	15%

## 8 Summary of Principles

	University Consultancy	Private Consultancy
Head of Department and ORIC permission obligatory	Yes	Yes
Declaration of interests required	Yes	Yes
Use of University name, equipment, facilities	Yes	No
Permitted working days	30 days per annum (Can be extended by prior approval from VC)	N. A