ORIC Activities

Fall 2018

Dated: 13th Feb, 2019

Prepared by:

Office of Research Innovation and Commercialization (ORIC)

Capital University of Science and Technology,
Islamabad

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

No./CUST/ORIC/2018
Dated: 07th December, 2018

ORIC Progress Fall 2018

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.

Mission statement for ORIC as approved from BASR is given 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. CUST Research Operations (CRO)
B. CUST Technology Incubation and Innovation (CTII)
C. CUST Industrial Liaisons (CIL)

The list of ORIC activities is given below based on the domains stated above.

Month	Semester Weeks	Events & Tasks	Domain
Sep-2018	1	National Incubation Center (NIC) Visit	CTII
	2	MoU signed with Mayo Clinic, USA	CRO
	2	i. MoU with H-Cube ii. Faculty Research Load Criteria	CTII&CRO
Oct-18	3	i. FYP Meeting with HoD CS and HoD FMSS ii. Preparation CUST Research Groups 5ps data iii. Annual Research Book	CRO&CTII
	4	PhD Poster Workshop	CRO
	5	i. 6th ORIC Research Committee Meeting ii. FYP Commercialization Follow up.	CRO&CTII
	6	Poster for Research of Microelectronics and RF Engineering	CRO
Nov-18	7	Updated CUST 2018 publications	CRO

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

	8	Seminar on Entrepreneurship and Innovation	CTII
	9	i. Revit Workshop for EE Department ii. Reporting and Documentation of Workshop Conducted iii. Rs. 29204/- submitted (40% CUST Share) to the University.	CRO&CTII
	10		
	11	Poster for Integrative Biosciences Research Group	CRO
Dec-2018	12	i. Poster for Centre for Research in Data Science ii. BIM Center of Excellence Inauguration iii. Coordination for Inauguration Ceremony of BIM Center of Excellence	CRO &CTII
	13		
	14	Poster for Green Biotechnology Research Group	CRO
	15	i. STEM Project Meeting ii. Finalizing CUST Journal and Conference Publication for the year 2018 iii. Printing of Annual Research Group	CRO&CTII
Jan-18	16	i. Collaborative session with Director Research ShifaTameer-e-Milat University Islamabad ii. Workshop on Revit Architecture iii. MoU with SJTU, China iv. Compiling ORIC Progress Summary	CRO& CTII

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

Contents

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

No./CUST/ORIC/2018
Dated: 08hJanuary 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) the Office of Research Innovation and Commercialization started its working in September 2017 under the patronage of Prof. Muhammad Mansoor Ahmed, Vice Chancellor, CUST. 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.

Mission statement for ORIC as approved from BASR is given 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:

I. CUST Research Operations
II. CUST Technology Incubation and Innovation
III. CUST Industrial Liaisons

The list of ORIC activities is given below based on the domains stated above.

I. CUST Research Operations

A. MoU with Mayo Clinic USA

Capital University of Science and Technology CUST and Mayo Clinic USA signed a MoU for exchange of confidential data relating to mathematical modeling of cancer biology and anti-cancer therapy related to human cancer cell lines or patients with hematologic cancer or solid tumor.

B. Faculty Research Load Criteria

Dean ORIC gave a brief presentation on the faculty research load projection at the university to the Vice Chancellor Capital University of Sceince and Technology, Islamabad

C. FYP Meeting with HoD CS and HoD FMSS CUST

Several meeting with HoD CS and HoD MS were held in October 2018 for having joint project in context of commercialization. A joined team from Department of Computer Science and Department of Management Science is formed and tasks have been assigned to them.

D. PhD Poster Workshop

Office of Research Innovation and Commercialization conducted a workshop on writing a poster of PhD work on October 11th, 2018. The workshop was mandatory for those PhD students whose thesis have been submitted for foreign evaluation.

E. 6th ORIC Research Committee Meeting

6th ORIC Research Committee Meeting was held on October 18, 2018. The meeting was chaired by Prof. Aamer Iqbal Bhatti, Dean ORIC

F. Preparation of CUST Research Groups 5ps data

Office of Research Innovation and Commercialization prepared the 5P data of Active Research Groups of CUST. The 5P data included the number of publications, R&D Projects Completed, Prototypes/Products developed, number of PhDs produced and number of patents filed by each research group respectively.

G. Annual Research Book

ORIC has compiled CUST Annual Research Book 2017 and its first hard copy has been printed after changes as asked by the VC office. The book showcases university research culture & innovation and will prove a source of narration of CUST extensive research culture.

H. Poster for Research of Microelectronics and RF Engineering

ORIC compiled poster for Microelectronics and RF Engineering Research Group headed by Prof. Dr. Muhammad Mansoor Ahmed. The poster is displayed in-front of the research lab and ORIC office to highlight the achievements and research areas of the group.

I. Poster for Integrative Biosciences Research Group

Poster for Integrative Biosciences Research Group headed by Dr. SaharFazal was compiled. The poster is displayed in-front of the research lab to highlight the achievements and research areas of the group.

J. Poster for Centre for Research in Data Science

Poster for Centre for Research in Data Science jointly headed by Dr. Abdul Qadir and Dr. TanvirAfzal was compiled by ORIC. The poster is displayed in ORIC office to highlight the achievements and research areas of the group.

K. Poster for Green Biotechnology Research Group

With the aim of showcasing CUST research culture ORIC compiled poster for Green Biotechnology research group headed by Dr. Erum Dilshad, Assistant Prof. Department of Biosciences compiled by. The poster is displayed at the ORIC office.

L. STEM Project Meeting

A joint team is established by ORIC office for the project that would participate in HEC STEM competition. The project is based upon indigenously developing Shake Table using local resources. The joint team consists of at least one member from CE, EE, CS, ME and MS Department respectively.

M. Finalizing CUST Journal and Conference Publication for the year 2018

CUST Publication (Conference and Journals) for the year 2018 were finalized and shared with Web-Developer for updating to CUST website.

N. MoU with SJTU, China

An MoU between Capital University of Science and Technology, Islamabad and Shanghai Jiao Tong University (SJTU), a key university directly under the administration of the Ministry of Education (MOE) of the People's Republic of China is in process. The MoU has been signed from CUST representatives and is forwarded to SJTU to be signed by the representatives of SJTU.

II. CUST Technology Incubation and Innovation

O. Visit to National Incubation Center (NIC) Islamabad

The visit to National Incubation Center (NIC) was executed with an objective to get an overall picture of the facilities provided to the young entrepreneur and to witness activities carried at NIC. Prof. Aamer Iqbal Bhatti, Dean ORIC, Dr. Azhar Iqbal, Assistant Professor CS Departmentalong withhis student visited NIC with the objective stated above on September 19, 2018.

P. MoU with H-Cube Group of Companies

For strengthening the collaboration between CUST and H-Cube and to make it durable and sustainable Director H-Cube Mr. Saeed Ashraf along with his team visited CUST and signed anMoU on 26 Sep, 2018. MoU was signed between Capital University of Science and Technology and H-Cube Group of Companies, both parties agreed to establish multiple fronts via initiating internationally recognized certifications along with diplomas and professional development courses through deployment of H-Cube’s international industrial partners’ tools, products and services in accordance with CUST’s respective needs and objectives.

Q. Seminar on Entrepreneurship and Innovation

A seminar was organized for faculty on “Entrepreneurship and Innovation” on Tuesday November 06, 2018. The guest speaker of the seminar was MrPervaizAbbasi, Project Director National Incubation Center (NIC) Islamabad. It was an interactive session focusing on the subject that to be successful in life one should be industrious, innovative and resourceful.

R. Revit Workshop for EE Department

A three (03) days’ workshop entitled “Autodesk REVIT Electrical Workshop” was conducted by ORIC on Nov 29th, Dec 01st and Dec 03rd, 2018. 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 Electrical Engineering organized the workshop aiming to equip students with the knowledge of modern engineering tools. The students were provided hands on

experience of complete building electrification using REVIT by the Instructor Mr. Shafaqat, 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.

- Rs. 29204/- submitted (as 40% CUST Share) to the University.

S. BIM Center of Excellence Inauguration

Keeping in view the fact that the global constructionindustry is moving towards sustainable development. The adoption of digital technology is one of the keyin such objectives. At present, Building Information Modeling (BIM) innovations are the leaders inensuring 3D virtual modeling and one of the vital factors for achievement of sustainable construction. In view of the future concerns, the Office of Research Innovation and Commercialization and Department of Civil Engineering atCapital University of Science and Technology (CUST) in collaboration with H-Cube recentlyestablished "BIM Centre of Excellence" at its campus.In order to celebrate this event, an inauguration ceremony was held at CUST graced by the presence of Vice Chancellor CUST, Industrial Professionals, H-Cube representatives and MS/PhD scholars.

T. Collaborative session with Director Research ShifaTameer-e-Milat University Islamabad

ORIC at Capital University of Science and Technology (CUST) with the ambition to brace the academic collaboration of the university organized a brainstorming session with Dr. FouziaSadiq, Director Research, ShifaTameer-e-Millat University (STMU). The session was held on Wednesday 09th January, 2019 during her visit to CUST. The aim was to identify areas of research in which both universities can collaborate. Prof. Aamer Iqbal Bhatti, Dean Research & Innovation, chaired the meeting. Dr. SaharFazal, HoD Department of Biosciences, Dr. Muzaffar Abbas, HoD Department of Pharmacy, Faculty Members from Department of Biosciences and Pharmacy along with MS and PhD scholars attended the session.

U. Workshop on Revit Architecture

A workshop on Revit Fundamentals for Architecture was conducted from 11th – 12th January 2019, the course content of the workshop included Introduction to BIM and Autodesk, Revit Basic Sketching, Modify and modeling Tools and Creating Construction Documents. Professionals from Industry and students from academia attended the workshop.

III. CUST Industrial Liaisons

Prof. Aamer Iqbal Bhatti
Dean ORIC

CONFIDENTIALITY AGREEMENT

This Confidentiality Agreement ("Agreement") is made as of the last dated signature below ("Effective Date") by and between Mayo Clinic Jacksonville, with Aneel Paulus, M.D., M.S. and Asher A. Chanan-Khan, M.D., M.B.B.S., with offices at 4500 San Pablo Road, Jacksonville, FL 32224 ("Mayo") and Capital University of Science and Technology, Islamabad ("CUST"), with Prof. Dr. Muhammad Mansoor Ahmed, Vice Chancellor, with offices at Kahuta road, off Islamabad Expressway, Islamabad Pakistan. As used herein, a party disclosing Confidential Information (as defined below) shall be defined as the "Disclosing Party," and the party to whom the Disclosing Party discloses such Confidential Information shall be defined as the "Recipient."

The parties are considering entering into certain agreements and/or other transactions relating to *mathematical modeling of cancer biology and anti-cancer therapy related to human cancer cell lines or patients with hematologic cancers or solid tumor* (the "Purpose"). In the process of, and throughout the course of their discussions, assessment and negotiations of the Purpose, the Disclosing Party may disclose its Confidential Information to Recipient so that Recipient may examine and evaluate such Confidential Information for the sole and limited purpose of assessing and making business decisions as to the Purpose ("Permitted Use"). In consideration of the knowledge gained from a review of this Confidential Information and other consideration as described herein, each party is agreeing to maintain the confidentiality of and not use or disclose such Confidential Information other than as expressly permitted herein.

A. **Definition.** Confidential Information includes, without limitation, (i) all information disclosed by the Disclosing Party pursuant to this Agreement, whether in oral, written, graphic or electronic form, and all information accessed or observed by the Recipient in relation to the Purpose and/or this Agreement, and (ii) all unpublished or nonpublic information, documents and materials, whether or not marked as confidential, regarding the business affairs, services and operations, patents, proprietary information, copyrights, trademarks and other proprietary rights, business plans, processes, supplier lists, pricing information, of the Disclosing Party and/or its affiliates ("Confidential Information").

B. **Non-Disclosure and Non-Use.** Confidential Information shall not:

(1) be used by Recipient for any reason other than the Purpose and the Permitted Use related thereto; or

(2) be disclosed by Recipient in any manner to any third party, without the prior written consent of the Disclosing Party. Recipient may disclose Confidential Information to its employees and those of its legal affiliates, other Mayo Clinic sites and Mayo Clinic Health System sites, attorneys and accountants ("Representatives") who have a need to know exclusively for purposes of the Permitted Use, provided that such Representatives are bound by Recipient to maintain the confidentiality of the Confidential Information in compliance with this Agreement. Recipient agrees that it shall be liable for any breach of the terms of this Agreement by its Representatives. No Confidential Information shall be disclosed by the Recipient to any of its Representatives who do not have a need for such Confidential Information.

C. **Exceptions.** This Agreement imposes no obligation upon Recipient with respect to Confidential Information that Recipient can establish:

(1) was at the time of receipt, publicly available;

(2) after its receipt, becomes available to the public through no fault of the Recipient or its Representatives;

(3) was in the possession of the Recipient before its receipt from the Disclosing Party or its representatives;

(4) is received in good faith by Recipient from a third party and is not subject to an obligation of confidentiality owed to the third party;

(5) is independently developed by Recipient without reference to or use of Confidential Information received hereunder, as established by competent proof; or

(6) is disclosed as required by applicable law or pursuant to a requirement or request of a government agency, subpoena or other legal proceeding, provided that in the event that Recipient becomes legally compelled (by deposition, interrogatory, request for documents, subpoena, civil investigation demand, other demand or request by government agency or the application of statutes, rules and regulations under the

federal securities laws or similar process) to disclose any of the Confidential Information. Recipient shall provide the Disclosing Party with prompt written notice of such requirement prior to such disclosure to allow the Disclosing Party to seek a protective order or other remedy. In the event that a protective order or other remedy is not obtained, or that the Disclosing Party waives compliance with the provisions hereof, Recipient agrees to furnish only that portion of the Confidential Information which Recipient reasonably believes is legally required to be furnished.

D. **Standard of Care.** Each party shall protect and safeguard the Confidential Information using the same degree of care, but no less than a reasonable degree of care, as the party uses to protect its own confidential information. In the event that the Recipient becomes aware of any use, loss or disclosure not consistent with the purpose of this Agreement, the Recipient shall immediately notify the Disclosing Party and use best efforts to establish safeguards to endeavor to prevent any further unauthorized loss, disclosure or use. The Disclosing Party may seek equitable and legal remedies as appropriate in the event of a threatened or actual disclosure or unauthorized use of its Confidential Information. The Disclosing Party shall further be entitled to seek injunctive relief in the event of a breach or threatened breach of this Agreement, as well as all other applicable remedies at law or in equity.

E. **Term; Termination.** The term of this Agreement shall commence on the Effective Date and continue in effect until the earlier of: (a) the execution of a definitive agreement or statement of work relating to the Purpose; (b) the final determination of the parties not to proceed with the Purpose; or (c) one (1) year after the date of execution hereof. Either party may terminate this Agreement earlier by written notice to the other party. The obligations of the Recipient with respect to the Confidential Information under this Agreement shall survive and continue for three (3) years after the expiration or termination of this Agreement.

F. **Effect of Termination.** Upon the termination or expiration of this Agreement, or upon the Disclosing Party's written request, all Confidential Information in the Recipient's possession, and, all documents in Recipient's possession which incorporates the Disclosing Party's Confidential Information shall be returned to the Disclosing Party. Recipient may retain one copy of the Disclosing Party's Confidential Information in its legal offices for archival purposes, provided the confidentiality obligations herein shall continue to apply to such Confidential Information. Notwithstanding the foregoing, it is acknowledged that copies that reside on computer system backups will not be destroyed. Retention of Confidential Information on a backup computer system beyond termination or expiration of this Agreement shall not relieve the Recipient of its non-disclosure and non-use obligations.

G. **Export Control.** Each party agrees that it and its representatives shall comply with any applicable import and export control laws, rules and regulations relating to the import and export of technical information, materials or products in connection with any disclosure of Confidential Information under this Agreement.

H. **No License or Warranties.** All Confidential Information (including all copies thereof) shall remain at all times the property of the Disclosing Party, and no property rights, intellectual property rights, license or other rights to the Disclosing Party's Confidential Information is granted to Recipient or implied hereby. Neither this Agreement nor the disclosure of any Confidential Information hereunder will result in any obligation on the part of either party to enter into any further agreement with the other party (with respect to the Purpose or otherwise) or to license, purchase or provide any products or services to the other party, or to require a party to disclose any particular Confidential Information. Recipient acknowledges that the Disclosing Party is not making any express or implied representation or warranty as to the accuracy or completeness of its Confidential Information; all Confidential Information is provided "AS IS" with all faults and errors. Recipient agrees that the Disclosing Party will not have any liability relating to the Confidential Information disclosed or for any errors therein or omissions therefrom. Recipient further agrees that it is not entitled to rely on the accuracy or completeness of the Disclosing Party's Confidential Information disclosed and that Recipient will only be entitled to rely on such representations and warranties as may be included in any later executed definitive agreement between the parties, subject to such limitations and restrictions as may be contained therein.

I. **Amendment.** This Agreement may not be amended or modified except by a writing signed by both parties and identified as an amendment to this Agreement.

J. **Binding Effect.** This Agreement shall be binding upon and inure to the benefit of the parties, their heirs, legal representatives, successors and assigns.

K. **Complete Agreement.** This Agreement constitutes the final, complete and exclusive agreement between the parties with respect to its subject matter and supersedes all past and contemporaneous agreements, promises, and understandings, whether oral or written, between the parties.

L. **Relationship.** It is mutually understood and agreed that the relationship between the parties is that of independent contractors. Neither party is the agent, employee, or servant of the other. Except as specifically set forth herein, neither party shall have nor exercise any control or direction over the methods by which the other party performs work or obligations under this Agreement. Further, nothing in this Agreement is intended to create any partnership, joint venture, lease or equity relationship, expressly or by implication, between the parties.

M. **Governing Law.** This Agreement and its effects are subject to and shall be construed and enforced in accordance with the laws of the State of Florida, exclusive of choice of law provisions.

N. **Severability.** In the event any provision of this Agreement is held to be invalid or unenforceable, the remainder of this Agreement shall remain in full force and effect as if the invalid or unenforceable provision had never been a part of the Agreement.

O. **Waiver.** The failure of either party to complain of any default by the other party or to enforce any of such party's rights, no matter how long such failure may continue, will not constitute a waiver of the party's rights under this Agreement. The waiver by either party of any breach of any provision of this Agreement shall not be construed as a waiver of any subsequent breach of the same or any other provision. No part of this Agreement may be waived except by the further written agreement of the parties.

P. **Use of Name.** Except as provided in (C)(6) above, neither party shall, without the prior written consent of the other party, directly or indirectly, make any public or private comment, statement or communication with respect to, or otherwise disclose or permit the disclosure of the existence of discussions regarding the Purpose and/or a possible transaction between the parties or any of the terms, conditions, or other aspects of any such transaction or any other Confidential Information. Neither party will use the name or trademarks of the other party or its affiliates in any news release, publicity, advertising, endorsement, or commercial communication without the prior written approval of the other party. All requests for approval for the use of Institution's name pursuant to this Section must be submitted to the Mayo Clinic Public Affairs Business Relations Group, at the following E-mail address: BusinessRelations@mayo.edu at least five (5) business days prior to the date on which a response is needed.

Q. **Counterparts.** This Agreement may be executed in any number of counterparts which, when taken together, will constitute one original, and photocopy, facsimile, electronic or other copies shall have the same effect for all purposes as an ink-signed original.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement by proper person there unto duly authorized.

MAYO CLINIC JACKSONVILLE

By: _____

Name: Randall S. Jones

Operations Manager

Title: Legal Contract Administration

Date: 5/1/2018

Reviewed by LGA Contract Manager

CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

By: _____

Name: **Dr. Muhammad Mansoor Ahmed**

~~Vice Chancellor~~

Title: **Capital University of Science and Technology, Islamabad**

Date: 31-07-2018

FACULTY EXPECTATIONS AT WESTERN UNIVERSITIES

By
Prof. Aamer Iqbal Bhatti
Dean Research & Innovation

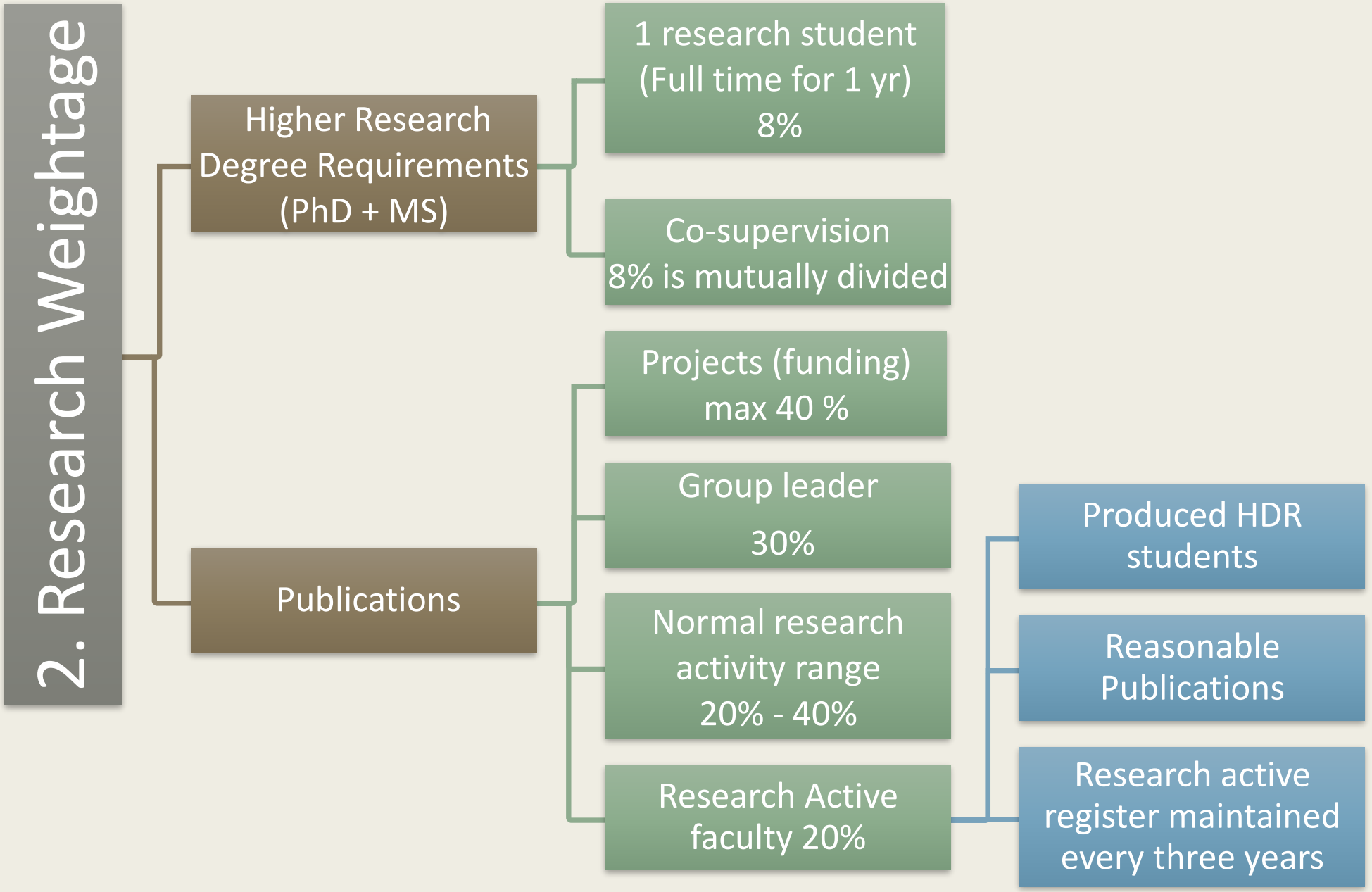
1. Teaching Weightage

Annual Requisite	1 Cr Hour lecture (face to face)	3 Cr Hours lecture	Course Coordination (exam, paper marking, course file, portal etc)	Marking per 25 students	New course (Extra)
100%	2.5%.	7.5%.	3%.	1.25%	2 %.

One Final Year Project (FYP)= 2 %.

Example

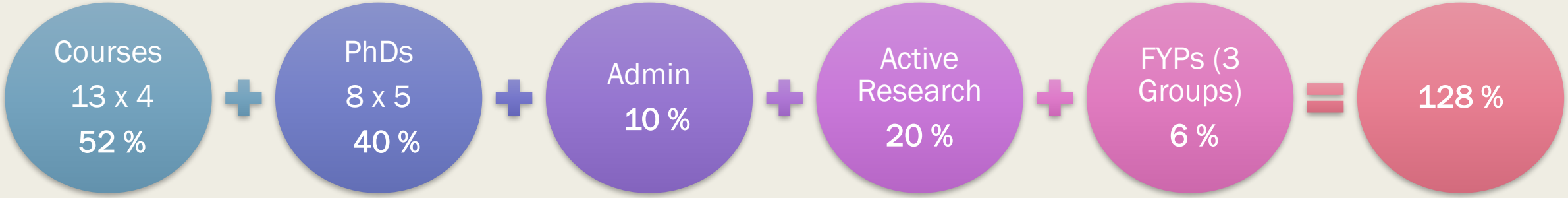
- Regular 3 Cr Hours course for 50 students
  - 3% + 7.5% + 2.5 % = 13%


2. Research Weightage
Higher Research Degree Requirements (PhD + MS)
1 research student (Full time for 1 yr) 8%
Co-supervision 8% is mutually divided
Publications
Projects (funding) max 40 %
Group leader 30%
Normal research activity range 20% - 40%
Research Active faculty 20%
Produced HDR students
Reasonable Publications
Research active register maintained every three years

3. Admin Weightage

Min Admin load for every faculty 10%	**For admin position** 20%--30% (Excluding the preceding weightage)	**Official Committee** 0%-5% (Senate committee, senate membership, university wide committee. Journal editors, community engagement)	Every faculty should take at least **20%** teaching a year

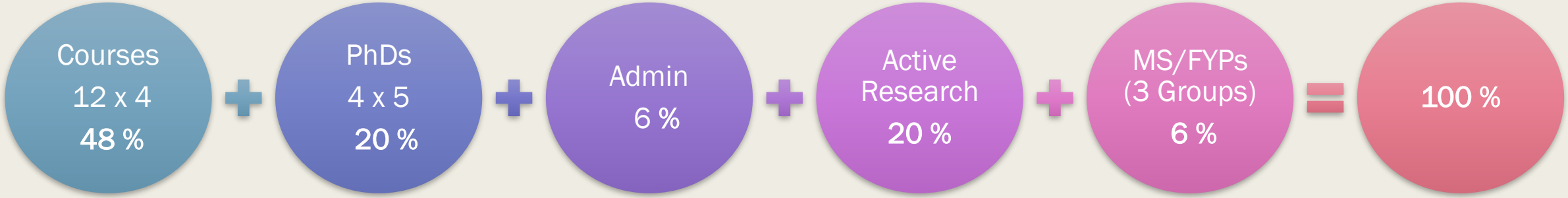
Average Profile of Yearly Output



Vary between 95-105%

2 Semesters per Year

Our Estimate



Vary between 95-105%

2 Semesters per Year

Capital University of Science and Technology

Islamabad Expressway, Kahuta Road, Zone-V, Islamabad

Phone: +92 51 111 555 666, Fax: 92 51 4486705

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

No. 23/CUST/ORIC/2018

29th October, 2018

A meeting was conducted in which Dr. Sajid Bashir, Head of Department of Management Sciences, Dr. Nayyar Masood Head of Department of Computer Science and Dr. Amir Iqbal Bhatti, Dean Office of Research, Innovation and Commercialization participated and discussed several projects of Computer Science students to pursue them to commercialization. After an interactive session, one of the projects was selected, titled as Smart Receptionist for the hospitals. Later, another meeting between the teams of both Management Sciences and Computer Science departments was arranged in which they discussed some technical and managerial aspects of the project. This project is to be presented in an upcoming 4th Cohort to be announced by National Incubation Center.

Prof. Aamer Iqbal Bhatti

Dean Research & Innovation

Capital University of Science & Technology
Islamabad
Expressway, Kahuta Road, Zone-V, Islamabad
Phone: 92-51-111-555-666 Fax:92-51-4486705
Email: info@cust.edu.pk Website: http://www.cust.edu.pk

No.23/CUST/ORIC/2018
29th October, 2018

Workshop on Poster Writing

Office of Research Innovation and Commercialization conducted a workshop on writing a poster of PhD work. The workshop was mandatory for those PhD students whose thesis have been submitted for foreign evaluation. The help regarding invitation of PhD students was provided by Director Graduate Studies (DGS).

Prof. Aamer Iqbal Bhatti, Dean Research & Innovation was speaker of the workshop the theme was to make PhD students of the university capable to make a poster of their own PhD research work. A predefined template of the poster as approved by competent authority of the university was shared with all the participating student.

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation

Capital University of Science & Technology

Islamabad Expressway, Kahuta Road Zone-V, Islamabad
Phone: +92-51-111555666, Fax 92-51-44867065
Email:info@cust.edu.pk, Website:http//www.cust.edu.pk

No.15/CUST/ORIC/2018
October 24, 2018

6^{th} ORIC Research Committee Meeting

Minutes of the meeting held on 18^{th} October, 2018

The 6^{th} ORIC Research Committee meeting was held on Thursday 18^{th} October, 2018 in the Workshop Room, B-Block at 11:00 AM.
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 Kahsif	Associate Professor (Math Dept)	Member
Dr. Khawar Naveed	Assistant Professor (ME Dept)	Member
Dr. Muhammad Azhar	Assistant 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.

Dean Research and Innovation, Prof. Aamer Iqbal Bhatti welcomed the committee members and informed that ORIC Committee has been re-constituted. Three new members Dr. Abdul Rehman Kashif, Associate Professor (Math Dept), Dr. Muzaffar Asad, Assistant Professor (MS Dept) and Dr. Mahboob Alam, Assistant Professor (Pharmacy Dept) have been included in the ORIC Committee. Dean Research and Innovation apprised briefly about ORIC stating the three (03) major directions ORIC at CUST is contributing, that are:

- Research Operations
- Technology Incubation and Innovation
- Industry Liaison

Dean Research and Innovation further added that to have a trend of technology incubation and innovation, commercialization of FYPs will be done and for this purpose meetings have been planned with HoD Management Sciences and HoD Computer Science. He said that ORIC is also working for starting up of an Incubation lab at university, a step towards industry-academia liaison.

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

Item 01	**Confirmation of previous minutes of meeting**	**Action By**
	1.1 It was notified that no observation were received on the decisions taken in the 5^{th} ORIC Research Committee meeting held on May 08, 2018. Therefore, the minutes of meeting were confirmed.	

Item 02 **Revised ORIC Advisory Board and ORIC Committee Members**

2.1 Dean Research & Innovation shared re-constituted ORIC Committee and ORIC Advisory Board. He said that three new members have been included in the ORIC Committee, each member representing respective department and two new members are included in the ORIC Advisory Board. Dean Research & Innovation apprised the committee that Dr. Arshad Hassan, Dean FMSS have given his consent and is now a member of ORIC Advisory Board.

Item 03 **FYP Commercialization**

3.1 The committee members agreed upon the suggestion floated by Dean Research & Innovation for joint FYP commercialization. In this context every Committee member was asked to share current FYP projects with ORIC office from their respective department. The projects selected will be commercialized through support from Department of Management Sciences. — Committee Members

Item 04 **Departmental Research Groups**

4.1 Dean Research & Innovation briefed the Committee members about research groups of the University. He said that we have collected details of 17 Research Groups of university, he asked the committee to identify if any research group have not been shared with ORIC office from their respective department, the details of it should be shared with the said office. — Committee Members

Item 05 **Research Seminars for Faculty**

5.1 Dr. Abdul Rehman Kashif shared his experience of conducting seminars regularly in the Department of Mathematics. He said that a proper book is maintained of the conducted seminar which he agreed to share with the ORIC office. — Assistant Director ORIC, Dr Abdul Rehman Kashif

5.2 Dean Research & Innovation proposed to have at least four (04) faculty seminars in the running semester. He asked Dr. Abdul Rehman Kahsif and Assistant Director ORIC to plan first seminar in this context.

	5.3 Upon suggestion of Dr. Sahar Fazal the seminar was decided to be open for both faculty and students adding that at least two faculty representation of each department should be made sure by the member of concerned department.	Committee Member
	5.4 Dean Research & innovation agreed to the suggestion floated by Dr. Muzaffar Asad, he proposed visits of university student to Incubation Centers and their participation in Business plan competition should be encouraged. Dean Research & innovation asked Dr. Muzaffar Asad and Dr. Muhammad Azhar for initiation of these visits.	

Item 06 ORIC Activities Calender

	6.1 Dean Research & Innovation briefed the Committee members about the activities planned for Fall 2018 semester.	ORIC

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

Prepared by

Muhammad Farhan
Assistant Director ORIC

Approved by:

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation

Distribution.

- Vice Chancellor
- Registrar
- ORIC Committee Members
- File

CUST Research Groups 5P's Data

S.No.	Research Group	Group Head	Publications	Projects	Prototypes/products	PhD's Produced	Patents filed/Approved
1	Acme Center for Research in Wireless Communications (ARWiC)	Prof.Noor Muhammad Khan	30	-	-	4	-
2	Research Group of Microelectronics & RF Engineering.	Prof. Muhammad Mansoor Ahmed	34	-	-	4	-
3	Center of Research in Network & Telecom (Cornet)	Prof. Amir Qayyum	21	9	3	5	-
4	Vision and Pattern Recognition (Visprs)	Prof. Imtiaz Ahmed Taj	22	2	-	6	-
5	Genetic and Molecular Epidemiology Research Group (GMER)	Dr. Maryam Bakhtiar	5	-	-	-	-
6	Human Molecular Genetics	Prof. Shaukat Iqbal Malik	21	-	-	-	-
7	Green Biotechnology	Dr. Erum Dilshad	5	-	-	1	-
8	Integerative BioSciences Research Group	Dr. Sahar Fazal	21	-	-	1	-
9	Data Management and Analytics (DMA)	Dr. Nayyer Masood	5	-	-	-	-
10	Parallel Computing and Network	Dr. Arshad Islam	13	-	-	-	-
11	CUST OB & HR Research Group	Dr. Sajid Bashir	16	-	-	5	-
12	Center for Software Dependability (CSD).	Dr. Aamer Nadeem	17	-	-	2	-
13	Water and Enviroment (WER)	Dr. Ishtiaq Hassan	5	-	-	-	-
14	Performance Based Seismic Evaluation, Vibration Control and Seismic Risk Assessment Research Group	Dr. Munir Ahmed	4	-	1	-	-
15	Structural Material Research Group (SMaRG	Dr Majid Ali	11	-	-		-
16	Construction Management Research Group	Dr. Syed Shuja Safdar	-	-	-	-	-
17	Centre for Research in Data Science, Semantics, & Scientometrics ($CRDS^3$)	Dr. Abdul Qadir and Dr. Tanvir Afzal	46	-	2	6	1
18	Control and Automation	Dr. Liaqat Ali Khan	2	-	-	-	-
19	Design and Machines	Dr. Waqas Akbar Lughmani	-	-	-	-	-
20	Industrial and Systems Engineering Research Group	Dr. Mujtaba Hasan Agha	5	-	-	-	-
21	Thermofluids	Dr. M. Mahabat Khan	9	-	-	-	-

Integrative Biosciences Research Group

GROUP INTRODUCTION

Integrative Biosciences research group at Capital University of Science and Technology (CUST), Islamabad, Pakistan was founded in December 2015 under the supervision of Dr. Sahar Fazal, who is now serving as head of Department of Bio-Sciences at CUST. The group has been working in diverse areas within the domain of Biological Sciences (Molecular Biology, Microbiology, Entamology, Genetics & Biotechnology) & Computational Biology.

GROUP HEAD

Dr. Sahar Fazal

Dr. Sahar Fazal has completed her Post-Doctoral degree in Biochemistry and Molecular Genetics at the University of Sussex, Brighton, UK and her Ph.D. in Applied Chemistry at the South China Agriculture University. She is currently serving as the HOD and Associate Professor in the Department of Biosciences, CUST, Islamabad. Her devotion towards research has been proved by her dynamic Portfolio. Dr. Sahar focuses on collaborating biological sciences with computational biology. Her contribution to biological sciences as a team leader in IBRS is really appreciable, being aware of the present need of research and so helping the group members to update their understanding for applied site of bioinformatics. Dr. Sahar Fazal possess the ability of providing the best Platform to the members so that they can excel their hidden abilities for solving biological problems scientifically. Her major interests include bioinformatics (phylogenetic, protein interactions, modeling, pathways), resistance management, molecular entomology, microbiology and genetics.

RESEARCH AREAS

- Human Genetics, Molecular Genetics, Micobiology Molecular Entomology and Phylogenetics.
- Pharmacokinetics, Dynamics, Data-mining of Biological Networks.
- Systems Biology, Cancer Pathways and Resistance Management.
- Mathematical Modeling and Simulations.
- Protein ,Protein Interections
- Pathways

GROUP MEMBERS

1.	Ms. Attiya Kanwal	PhD. Scholar
2.	Ms. Shanila Emmanuel	PhD. Scholar
3.	Ms. Rabbiya Manzoor	PhD. Scholar
4.	Ms. Fakhra Nazir	PhD. Scholar
5.	Ms. Anam Tariq	PhD. Scholar
6.	Ms. Sana Elahi	PhD. Scholar
7.	Ms. Shumaila Azam	PhD. Scholar
8.	Ms. Anila Sajid	MS Scholar
9.	Ms. Almas Zahra	MS Scholar
10.	Ms. Samar Manzoor	MS Scholar

PhD ALUMNI

Ms. Nighat Noureen: **Thesis Title**: Genome wide mapping of chromatin states based on histone combinatorics for determination of epigenetic expression.
Year: 2016

MS ALUMNI

Ms. Anila Sajjad: **Thesis Title**: Delineating the invitro biological and qualitative analysis of selected herbal teas.
Year: 2018

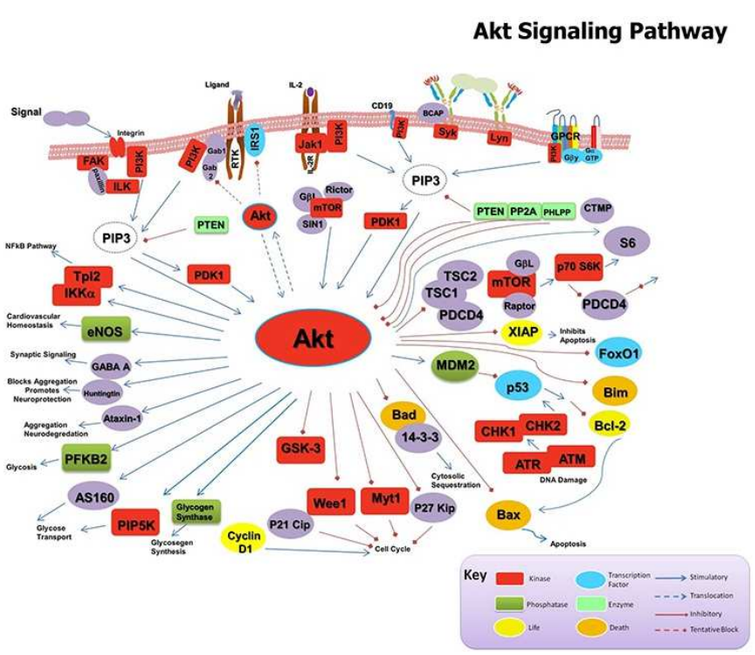
Mr. Syed Nouman Hassan Shah: **Thesis Title**: Isolation and identification of microbial pathogens from M. domestica, Important for human health.
Year: 2018

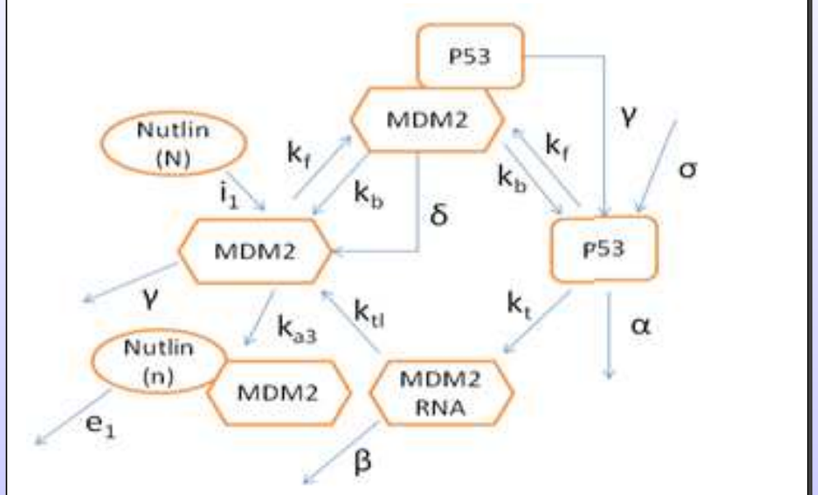
Mr. Syed Ehtisham Zulfiqar: **Thesis Title**: Disease pattern identification exploring metabolic pathways in breast cancer.
Year: 2018

Ms. Shumaila Azam: **Thesis Title**: P53 Revival Using System Oriented Dosage Design Targeting MDM2.
Year: 2016

Ms. Rozina Tabassum: **Thesis Title**: Computational assay for drug designing of Antiphospholipd Syndrome.
Year: 2015

Ms. Faryal Khattak: **Thesis Title**: Mathematical Modeling of E6 Protein of Human Papiloma Virus.
Year: 2015





Selected Publications

Journal Publications

- A. Kanwal and S. Fazal, "Construction and analysis of protein-protein interaction network correlated with ankylosing spondylitis", **Gene**, Vol. 638, pp. 41–51, 2018.
- M. R. Azam, S. Fazal, M. Ullah, and A. I. Bhatti, "System-based strategies for p53 recovery", **IET Systems Biology**, vol. 12, no. 3, pp. 101–107, 2018.
- M. T. Khan, S. I. Malik, A. I. Bhatti, S. Ali, A. S. Khan, M. T. Zeb, T. Nadeem, and S. Fazal, "Pyrazinamide-resistant mycobacterium tuberculosis isolates from Khyber Pakhtunkhwa and rpsA mutations", **Journal of Biological Regulators and Homeostatic Agents**, vol. 32, no. 3, pp. 705–709, 2018.
- A. Munir, S. Azam, S. Fazal, and A. I. Bhatti, "Evaluation of the whole body physiologically based pharmacokinetic (wb-pbpk) modeling of drugs", **Journal of Theoretical Biology**, vol. 451, pp. 1–9, 2018.
- F. Khattak, M. Haseeb, S. Fazal, A. I. Bhatti, and M. Ullah, "Mathematical modeling of E6-p53 interactions in cervical cancer", **Asian Pacific Journal of Cancer Prevention**, vol. 18, no. 4, pp. 1057–1061, 2017.
- M. Haseeb, S. Azam, A. I. Bhatti, R. Azam, M. Ullah, and S. Fazal, "On p53 revival using system oriented drug dosage design, **Journal of Theoretical Biology**, vol. 415, pp. 53–57, 2017.
- N. Noureen, H. M. Zohaib, M. A. Qadir, and S. Fazal, "ChromBiSim: Interactive chromatin biclustering using a simple approach", **Genomics**, 2017.

Conference Proceedings

- A. I. Bhatti, M. Haseeb, S. Azam, S. Fazal, and M. Ullah, "State feedback based intervention design in WNT and cell cycle network", **American Control Conference (ACC)**, pp. 4242–4247, IEEE, 2017.
- M. N. Sharif, A. I. Bhatti and S. Fazal, "Observer design and analysis of wnt-cell cycle joint pathway",**Asian Control Conference 2017**, pp.1470-1475, IEEE, 2017
- S. E. Aziz, S. Fazal,, S. Hussain and H. Rashid, "Detection of relationship between breast cancer and ovarian cancer through network analysis", **2nd conference on emerging trends in Bioinformatics**, pp. 19, 2014.

Centre for Research in Data Science, Semantics, & Scientometrics (CRDS^3)

GROUP HEAD

This group is jointly headed by Prof. Dr. M. Abdul Qadir and Dr. M. Tanvir Afzal.

Prof. Dr. M. Abdul Qadir

Twenty five years of career of Prof. Dr. M. Abdul Qadir can be categorized into three main areas as industry, academia and management. He is currently actively involved in teaching / R&D and academic management. Dr. Qadir has been teaching and doing research in the development of simple and efficient algorithms to solve real-life problems by using soft computing. His current focus is on semantic web, multimedia semantics, Ontologies, distributed systems and bioinformatics as is clear from more than 80 research publications in international refereed proceedings and journals. Dr Qadir have been playing a leading role in the management of industry and academia and have produced significant results in achieving the goals of different R&D organizations. He is also a reviewer of many international journal publishing articles in the area of Computer Science. He has presented his scholarly work in many reputed conferences all over the world. Under his supervision, more than 40 students have successfully completed their research thesis at MS and PhD level and a number of research students are pursuing their research with him.

Dr. Muhammad Tanvir Afzal

Dr. Afzal received the PhD degree with high distinction in Computer Science from the Graz University of Technology, Austria, secured Gold medal in his M.Sc Computer Science from Quaid-i-Azam University, Islamabad, Pakistan. He has been associated with academia and industry at various levels for the last 15 years, and currently he is serving as Associate Professor in the Department of Computer Science at Capital University of Science and Technology, Islamabad. He is also serving as editor-in-chief for reputed impact factor journal known as: Journal of Universal Computer Science. Dr. Afzal authored more than 90 research papers in the field of Digital Libraries, Information retrieval and visualization, Semantics, and Scientometrics including two books. His ISI impact factor is 40+. With citations over 300. He played pivotal role in making collaborations between MAJU-JUCS, MAJU-IICM, and TUG-UNIMAS. He served as PhD symposium chair, session chair, finance chair, committee member, and editor of several IEEE, ACM, Springer, Elsevier international conferences and journals. Dr. Afzal conducted more than 100 curricular, co-curricular, and extra- curricular activities in the last 5 years including seminars, workshops, national competitions (ExcITeCup) and invited international and national speakers from Google, Oracle, IICM, IFIS, SEGA Europe etc. Under his supervision, more than 50 post grad students (MS and PhD) have defended their research theses successfully and a number of PhD and MS students are pursuing their research with him.

RESEARCH AREAS

- Semantic Web
- Data Science
- Scientometrics
- Information Visualization
- Information Retrieval
- Ontologies

R&D Projects

1. Dynamic bandwidth aggregation in heterogeneous wireless networks for Mission Critical Applications, ICT R&D Funded project (2013)
2. High-Quality Tele-Medicine Driven Video Encoding System Under Very-Low Bitrates, ICT R&D Funded project (2017)

ALUMNI

The group has produced 10 PhDs and 75 MS theses. Due to space limitation, only the PhD titles are listed below:

Dr. Sher Afgun Khan: **Thesis Title:** OWL2 benchmarking for the evaluation of the knowledge based system´s platforms, **Year:** 2018.

Dr. Najmul Ikram: **Thesis Title:** Investigating Protein Semantic Similarity Measurement And its Co-relation with sequence similarity, **Year:** 2018.

Dr. Riaz Ahmad: **Thesis Title:** Ranking similar papers based upon section wise co-citation occurrences , **Year:** 2018.

Dr. Raja Habib Ullah: **Thesis Title:** Research paper recommendation using citation proximity analysis in bibliographic coupling, **Year:** 2018.

Dr. Naseer Ahmed Sajid: **Thesis Title:** Multi-label classification of computer science research papers using papers' metadata, **Year:** 2018.

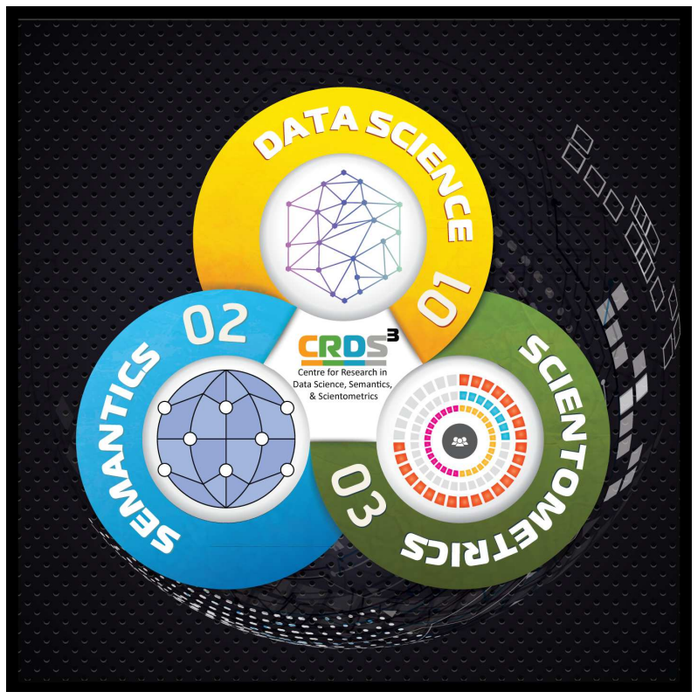
Dr. Samiullah Khan: **Thesis Title:** Adaptive simultaneous multi-path transmission scheme, **Year:** 2017.

Dr. Munir Ahmad: **Thesis Title:** Optimization of Semantic Cache Query Processing System, **Year:** 2017.

Dr. Abdul Shahid: **Thesis Title:** Recommending relevant papers using in-text ciation frequencies and patterns, **Year:** 2016.

Dr. Muhammad Imran: **Thesis Title:** Evaluation of hidden markov model for malware behavioral classifications, **Year:** 2016.

Dr. Syed Zubair Ahmed: **Thesis Title:** QOS optimization through capacity aggregation of multiple links in heterogeneous wireless networks, **Year:** 2011.



Current PhD Students

1. Mr. Imran Ehsan
2. Mr. Touseef Ikraam
3. Mr. Faisal Kiyani
4. Mr. Shahbaz Ahmed
5. Ms. Raabia Asif
6. Mr. Sajjad Haider
7. Ms. Hummaira Waqas
8. Mr. Raja Muhammad Waqas Ahmed
9. Mr. Jaffar Hussain
10. Mr. Muhammad Saboor Ahmed

Selected Publications

Journal Publications

- F. Qayyum, M. T. Afzal, "Identification of Important Citations by Exploiting Research Articles: Metadata and Cue-Terms from Content", **Scientometrics**, 2018. **(IF: 2.147)**
- R. Ahmad, M. T. Afzal, "CAD: an algorithm for citation-anchors detection in research papers", **Scientometrics**, vol. 117 no. 3, pp. 1405-1423, 2018. **(IF: 2.147)**.
- N. Ikram, M. A. Qadir, M. T. Afzal, "Investigating Correlation between Protein Sequence Similarity and Semantic Similarity Using Gene Ontology Annotations", **IEEE/ACM Transactions on Computational Biology and Bioinformatics**, vol. 15, no. 3, pp. 905-912, 2017. **(IF: 1.955)**
- N. Noureen, H. M. Zohaib, M. A. Qadir, S. Fazal, "ChromBiSim: Interactive chromatin biclustering using a simple approach", **Genomics**, vol. 109 no. 5-6, pp. 353-361, 2017. **(IF: 2.910)**
- M. Imran, M. T. Afzal, M. A. Qadir, "Malware classification using dynamic features and hidden Markov model", **Journal of Intelligent and Fuzzy Systems (JIFS)**, vol. 31, no. 2, pp. 837-847, 2016. **(IF: 1.812)**
- U. Farooq, A. Nongaillard, Y. Ouzrout, M. A. Qadir, "A multi source product reputation model", **Computers in Industry**, vol. 83 , pp. 55-67, 2016. **(IF: 1.685)**

Conference Proceedings

- Z. Hassan, M. A. Qadir, M. A. Islam, U. Shahzad, N. Akhter, "Modified MinG Algorithm to Find Top-K Shortest Paths from large RDF Graphs", **Semantic Web Evaluation Challenge**, 2016.
- R. Ahmad, M. T. Afzal, M. A. Qadir, "Information Extraction from PDF Sources Based on Rule based System Usig Integrated Formats", **Semantic Web Challenges: Third SemWebEval Challenge at ESWC** pp. 293-308, 2016 [Challenge Winner].
- U. Farooq, T. P. Dhamala, A. Nongaillard, Y. Ouzrout, and M. A. Qadir, "A word sense disambiguation method for feature level sentiment analysis", **9th International Conference on Software, Knowledge, Information Management and Applications (SKIMA)**, pp. 1?8, IEEE, 2015.
- Q. Mahmood, M. A. Qadir, M. T. Afzal, "Finding Relatedness between Research Papers Using Similarity and Dissimilarity Scores", **15th international Conference Web-Age Information Management (WAIM)**, vol. 8485,pp. 707-710, 2014.
- A. Latif, M. T. Afzal, D. Helic, K. Tochtermann, H. Maurer, "Discovery and Construction of Authors' Profile from Linked Data (A case study for Open Digital Journal)", **LDOW at World Wide Web conference**, 2010. '

Green Biotechnology

GROUP INTRODUCTION

Currently, research group is working on Nanobiotechnology, production of metallic nanoparticles by chemical and biological methods involving green chemistry approach. Research is also focused on production of transgenics of both medicinal and edible crops for enhancement of secondary metabolites, tolerance against biotic and abiotic stress along with their phytochemical analysis. It also involves establishing plant tissue culture, biological evaluation of synthetic and natural compounds along with cancer cell line studies.

GROUP HEAD

Dr. Erum Dilshad

PhD in Plant Biotechnology from the Department of Biochemistry, Quaid-i-Azam University Islamabad Pakistan and Department of Natural Products, Faculty of Pharmacy, University of Barcelona, Spain, with main focus on enhancement of antimalarial compound by genetic transformation of Artemisia species along with its phytochemical analysis including cancer cell line studies and pharmacological investigations.

Awards and Distinctions of Head:

1. HEC approved Supervisor
2. Productive Scientist of Pakistan by PCST (2016-2017)

RESEARCH AREAS

- Nanobiotechnology
- Phytochemistry
- Bioassays
- Cancer cell line studies
- DNA Barcoding
- Plant Cell and Tissue Culture
- Plant and Bacterial Genetic Transformation

GROUP MEMBERS

- Mehmoona Bibi
- Kamran javed
- Iqra Bashir
- Farhan Kamal Bakhtiar
- Nabgha Nosheen
- Huma Noor
- Umar Ali
- Syeda Sojla
- Zainab Bashir
- Ammar Hamza
- Adeel Siddique

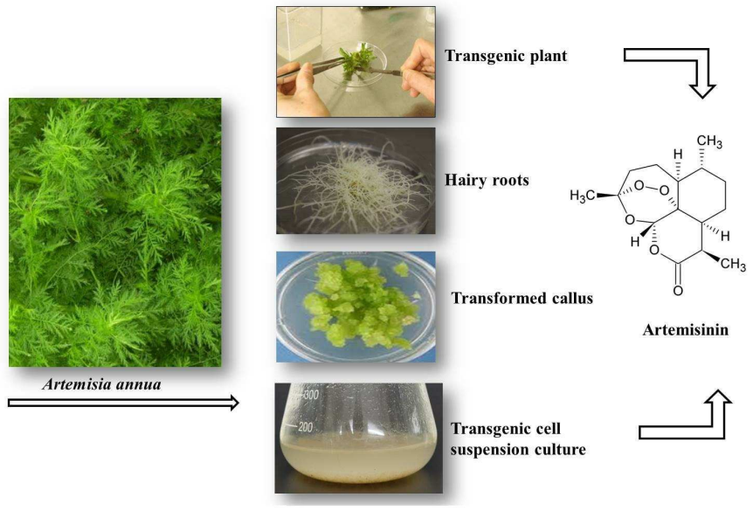
MS ALUMNI

Miss Naqoosh Zahra

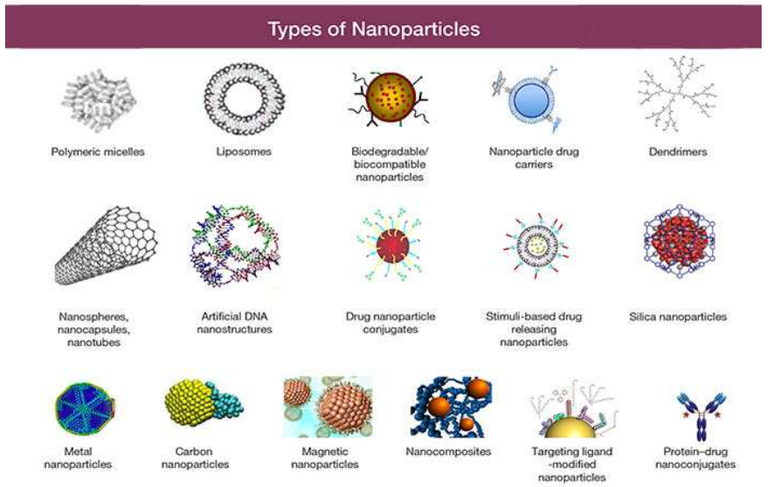
Thesis Title: Green Synthesis and Characterization of Silver Nanoparticles Using Leaf Extract of Artemisia Carvifolia and their Anti-Bacterial, Anti-Fungal, Anti-Oxidant, Cytotoxic Activities.
Year: 2018

Miss Fatimah tu Zahra:

Thesis Title: Optimization of Conditions for Micropropogation of Spinach (Spinacia oleracea).
Year: 2018



Biotechnological production of artemisinin



Selected Publications

Journal Publications

- L. F. Ali, A. Saeed, M. Faisal, P. A. Channar, S. S. Azam, H. Ismail, E. Dilshad, and B. Mirza, "Synthesis, molecular docking and comparative efficacy of various alkyl/aryl thioureas as antibacterial, antifungal and α-amylase inhibitors". **Computational biology and chemistry**, vol. 77, pp.193–198, 2018.
- W. K. Kayani, B. H. Kiani, E. Dilshad, and B. Mirza, "Biotechnological approaches for artemisinin production in artemisia", **World Journal of Microbiology and Biotechnology**, vol. 34, no. 4, pp. 54, 2018.
- A. Munir, S. Hussain, and E. Dilshad, "Silver nanoparticles conjugated with neurotrophin 3 upregulate myelin gene transcription pathway", **Journal of theoretical biology**, vol. 459, pp. 111–118, 2018.
- S. Rehman, Ring, K. K., Haq. I. U. , E. Dilshad, M. I. Khan, N. Akhtar, and B. Mirza, "Drier Climatic Conditions Increase Withanolide Content of Withania coagulans Enhancing Its Inhibitory Potential Against Human Prostate Cancer Cells", **Applied biochemistry and biotechnology**, 2018.
- A. Saeed, P. A. Channar, F. A. Larik, F. Jabeen, U. Muqadar, S. Saeed, U. Fl¨orke, H. Ismail, E. Dilshad, and B. Mirza, "Design, synthesis, molecular docking studies of organotin-drug derivatives as multi-target agents against antibacterial, antifungal, α-amylase, α-glucosidase and butyrylcholinesterase", **Inorganica Chimica Acta**, vol. 464, pp. 204–213, 2017.
- H. Ismail, E. Dilshad, M. T. Waheed, and B. Mirza, "Transformation of Lettuce with rol ABC Genes: Extracts show enhanced antioxidant, analgesic, anti-Inflammatory, antidepressant, and anticoagulant activities in aats", **Applied Biochemistry and Biotechnology**, vol. 181, no. 3, pp. 1179–1198, 2017.
- H. Ismail, E. Dilshad, M. T. Waheed, M. Sajid, W. K. Kayani, and B. Mirza, "Transformation of Lactuca sativa L. with rol C gene results in increased antioxidant potential and enhanced analgesic, anti-inflammatory and antidepressant activities in vivo", **3 Biotech**, vol. 6, no. 2, p. 215, 2016.
- W. K. Kayani, E. Dilshad, T. Ahmed, H. Ismail, and B. Mirza, "Evaluation of Ajuga bracteosa for antioxidant, anti-inflammatory, analgesic, antidepressant and anticoagulant activities", **BMC Complementary and Alternative Medicine**, vol. 16, no. 1, pp. 375, 2016.
- E. Dilshad, R. M. Cusido, J. Palazon, K. R. Estrada, M. Bonfill, and B. Mirza. "Enhanced artemisinin yield by expression of rol genes in Artemisia annua", **Malaria journal**, vol. 14, no. 1, pp. 424, 2015.
- E. Dilshad, R. M. Cusido, K. R. Estrada, M. Bonfill, and B. Mirza. "Genetic transformation of Artemisia carvifolia Buch with rol genes enhances artemisinin accumulation". **PLoS One**, vol. 10, no. 10, pp. e0140266, 2015.

Conference Proceedings

- S. Sojla, Z. Bashir and E. Dilshad, "Green Synthesis and Characterization of Silver Nanoparticles Using Alo vera Plant Gel and Their Biological Evaluation?, **1st National Conference on Medicinal Plant Research**, 2018.
- N. Ashraf, E. Dilshad and B. Mirza, "Genetic transformation of Lycopersicon esculentum Mill. using an abiotic stress tolerance gene", **4th International Conference on Biological and Computer Science**, 2016.
- E. Dilshad and B. Mirza, "Genetic transformation of Artemisia carvifolia Buch with rol genes for enhancement of secondary metabolites", **ISESCO WINS 2016 conference Quaid-i-Azam University Islamabad**, 2016

Research Group of Microelectronics and RF Engineering

GROUP HEAD

Prof. Dr. Muhammad Mansoor Ahmed

Dr. M. Mansoor Ahmed completed the PhD degree in Microelectronics from the University of Cambridge, U.K., in 1995, and joined academia where he worked at different positions including Professor; Chairman; Dean; Executive Vice President and Vice Chancellor. Dr. M. Mansoor Ahmed research interests are in Microelectronics, Microwave devices and RF Engineering. He has supervised numerous MS and PhD research projects. He authored 125+ research papers and his ISI research impact factor is 75+ with citation index over 900+. Dr. M. Mansoor Ahmed is a fellow of the Institution of Engineering and Technology (IET), UK.; a Chartered Engineer (CEng) from the UK Engineering Council and holds the title of European Engineer (Eur Ing) from the European Federation of National Engineering Association (FEANI), Brussels. He is a life member of PEC (Pak); EDS and MTTS (USA).

RESEARCH AREAS

- Simulation and Modeling of Chrage Transport Mechanism of MESFET/MOSFET
- Simulation and Modeling of Charge Transport Mechanism of Organic Semiconductor Devices such as OLED, OTFT
- Investigation of Microscopic Phenomena in Electronic Devices based on Montecarlo Methods
- Electrical Characterization of Organic Semiconductor based Sensors
- Investigation of Photovoltaic Response of Novel Organic Semiconductor Devices
- Temperature Dependent Characterization of Organic Semiconductor Devices
- High Temperature Superconducting Electronics
- Antenna Design for Microwave and Millimeter-wave Applications
- Design and Characterization of Radio Frequency (RF) Circuits and Systems

GROUP MEMBERS

- Dr. Syed Abdul Moiz
- Dr. Muhammad Riaz (Alumni)
- Umair Rafique (Research Associate)
- Umer Farooq Ahmed (Research Associate)

CURRENT Ph.D. STUDENTS

- Muhammad Naeem Khan
- Saif ur Rehman
- Hisham Khalil
- Zubair Ahmed
- Anis Chaudhry
- Shahid Shafique
- Usman Tahir
- Qamar ud Din Memon

ALUMNI

Dr. Noor Muhammad Memon

Thesis Title: Modeling Techniques of Submicron GaAs MESFET and HEMTs.
Year: 2009

Dr. Imtiaz Ahmad Sajid

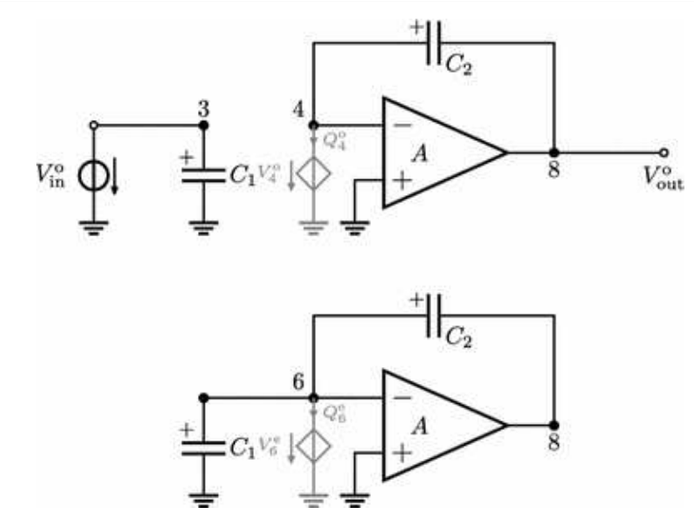
Thesis Title: Time Efficient Face Recognition for Real Time Applications.
Year: 2010

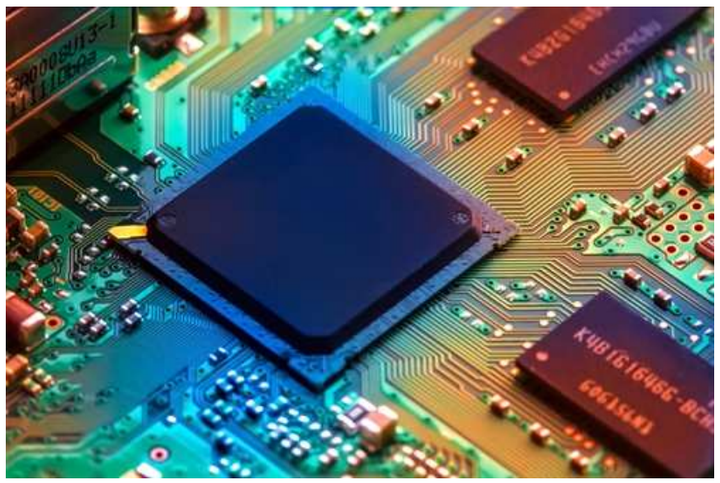
Dr. Muhammad Riaz

Thesis Title: Analytical and Optimization Based Modeling Techniques to Assess the Performance of Submicron SiC MESFETs
Year: 2017

Dr. Noshin Fatima

Thesis Title: Organic Dye Based Opto-Electronic Devices and Sensors
Year: 2018





Selected Publications

- S. Rehman, M. M. Ahmed, U. Rafique, and M. N. Khan, "A nonlinear model to assess DC/AC performance reliability of submicron SiC MESFETs", **Journal of Computational Electronics**, vol. 17, no. 3, pp. 1199-1209, September 2018.
- M. N. Khan, U. F. Ahmed, M. M. Ahmed, and S. Rehman, "An improved model to assess temperature-dependent DC characteristics of submicron GaN HEMTs", **Journal of Computational Electronics**, vol. 17, no. 2, pp. 653-662, June 2018.
- M. Riaz, M. M. Ahmed, U. Rafique, and U. F. Ahmed, "Assessment of intrinsic small signal parameters of submicron SiC MESFETs", **Solid State Electronics**, vol. 139, pp. 80-87, January 2018.
- N. Fatima, M. M. Ahmed, and Kh. S. Karimov, "Effects of humidity and temperature on Orange Dye-based organic field effect transistors fabricated at different gravity", **Journal of Electronic Materials**, vol. 46, no. 11, pp. 6588-6594, November 2017.
- M. M. Ahmed, M. Riaz, and U. F. Ahmed, "An improved model for the $I-V$ characteristics of submicron SiC MESFETs by evaluating the potential distribution inside the channel", **Journal of Computational Electronics**, vol. 16, no. 3, pp. 514-525, September 2017.
- N. Fatima, M. M. Ahmed, Kh. S. Karimov, Z. Ahmad, F. F. Muhammad, "Optical sensors based on the NiPC-CoPc composite films deposited by drop casting and under the action of centrifugal force", **Chinese Physics B**, vol. 26, no. 6, June 2017.
- J. S. Malik, U. Rafique, S. A. Ali, and M. A. Khan, "Novel patch antenna for multiband cellular, WiMAX, and WLAN applications", **Turkish Journal of Electrical Engineering and Computer Sciences**, vol. 25, no. 3, pp. 2005-2014, May 2017.
- N. Fatima, F. Aziz, Z. Ahmad, M. Najeeb, M. Azmeer, K. S. Karimov, M. M. Ahmed, S. Basheer, R. Shakoor, and K. Sulaiman, Compositional engineering of the pi-conjugated small molecular VOPcPhO: Alq 3 complex to boost humidity sensing," **RSC Advances**, vol. 7, no. 32, pp. 19780-19786, 2017
- Q. Zafar, N. Fatima, K. S. Karimov, M. M. Ahmed, and K. Sulaiman, Realizing broad-bandwidth visible wavelength photodiode based on solution-processed ZnPc/PC 71 BM dyad," **Optical Materials**, vol. 64, pp. 131-136, 2017
- M. Riaz, M. M Ahmed and U. Munir, An improved model for current voltage characteristics of submicron SiC MESFETs," **Solid-State Electronics**, vol. 121, pp. 54-61, 2016.

Conference Proceedings

- S. Rehman, U. Rafique, U. F. Ahmed, M. N. Khan, and M. M. Ahmed, "Effects of substrate on the AC performance of submicron GaN HEMTs", **13th International Conference on Emerging Technologies (ICET 2017)**, pp. 1-7, Islamabad, Pakistan, 2017.
- U. Rafique, H. Khahlil, and S. Rehman, "Dual-band microstrip patch antenna array for 5G mobile communications", **2017 Progress In Electromagnetics Research Symposium-Fall (PIERS)**, pp. 55-59, Singapore, 2017.
- H. Khalil, S. Rahman, M. M. Ahmed, and U. Rafique, "Design of slot antenna array for tracking radar using particle swarm optimization", **2017 Progress In Electromagnetics Research Symposium-Fall (PIERS)**, pp. 2985-2987, Singapore, 2017.
- H. Khalil, S. Rahman, M. M. Ahmed, Q. Cao, and I. Hussain, "Design of waveguide slot array to generate sum and difference pattern for synthetic aperture radar", **2017 Progress In Electromagnetics Research Symposium-Spring (PIERS)**, pp. 3632-3636, St. Petersburg, Russia, 2017.
- S. S. Saleem, M. M. Ahmed, U. Rafique, and U. F. Ahmed, "Optimization of linear antenna array for low SLL and high directivity. **In Multi-Topic Conference (INMIC), 2016 19th International**,pp. 1-6. IEEE, 2016.

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

No.24/CUST/ORIC/2019
Dated: 28th January 2019

HEC STEM Open House Project

In reference to the 11th Meeting of Executive Committee (Senate) held on 16th October, 2018 ref no: *CUST-Reg(6)/EC-2018* in which a committee was constituted to evaluate the projects for selection of best project to be placed in HEC STEM open house. Convener of the committee was Dr. Abdul Qadir, Dean FoC. The project selected for placement at HEC STEM open house at the internal meeting of the STEM committee was "Pakistan's first ever shake table with local resources understanding behavior of plastic-block pillar against earthquakes". STEM committee meeting requested ORIC to further facilitate and improve the project. In this regard a team consisting of one member from Civil Engineering, Mechanical Engineering, Electrical Engineering, Computer Science and Management Science Department was formulated by ORIC and meetings are held on regular basis towards the improvement of the project.

Prof. Aamer Iqbal Bhatti
Dean ORIC

List of Conference Publications 2018

Capital University of Science and Technology

[1] H. Khalil, M. M. Ahmed, S. Rahman, and U. Rafique, "Nose cone conformal antenna array design for X-band Radar applications," in *Proceedings of Progress In Electromagnetics Research Symposium (PIERS), Toyama, Japan*, pp. 1–3, 2018.

[2] U. Rafique, M. M. Ahmed, M. M. Hassan, and H. Khalil, "A modified super-wideband planar elliptical monopole antenna," in *Proceedings of Progress In Electromagnetics Research Symposium (PIERS), Toyama, Japan*, pp. 1–6, 2018.

[3] U. Rafique and S. Agarwal, "A modified Frequency Selective Surface band-stop filter for ultra-wideband applications," in *Proceedings of Second Symposium on Recent Advances in Communication Theory, Antennas and Propagation (CIAP 2018), Bangalore, India*, pp. 891–894, 2018.

[4] H. Khalil, M. M. Ahmed, U. Rafique, S. Rahman, and M. Latif, "Design of X-band cylindrical conformal substrate integrated waveguide slot antenna array," in *Proceedings of 21st Saudi Computer Society National Computer Conference*, pp. 1–4, 2018.

[5] S. A. Abbas, R. Samar, M. A. Rizvi, and A. I. Bhatti, "A method for multimodal optimization with application to signal processing," in *2018 15th International Bhurban Conference on Applied Sciences and Technology (IBCAST)*, pp. 357–364, IEEE, 2018.

[6] W. Abbasi, I. Shah, and F. u. Rehman, "Steering algorithm for nonholonomic mechanical systems using sliding mode control," in *International Bhurban Conference on Applied Sciences and Technology*, 2018.

[7] M. Ashraf, A. Rehman, *et al.*, "Performance analysis of current injection techniques for shunt active power filter," in *IOP Conference Series: Earth and Environmental Science*, vol. 168, p. 012014, IOP Publishing, 2018.

[8] U. Maqbool and U. A. Khan, "Dynamic and transient analysis of a wavelet based protection scheme," in *5th International Conference on Electrical Engineering (ICEE), Lahore, Pakistan*, pp. 1–5, 2018.

[9] U. Maqbool and U. A. Khan, "Wavelet based feature analysis of fault signals in a microgrid," in *Power Generation Systems and Renewable Energy Technologies*, 2018.

[10] R. Ara and U. A. Khan, "An alternate grid-splitting scheme and efficient algorithm for voltage source converter based multiterminal dc grid protection and restoration control," in *Power Generation Systems and Renewable Energy Technologies*, 2018.

[11] I. Hassan, "Simulating precipitation and temperature trends in pakistan using three gcms under rcp8.5 scenario," in *7th International Conference on Advances in Civil, Structural and Mechanical Engineering - CSM 2018, Rome Italy*, 2018.

[12] N. Sohaib and Hamdanullah, "Finite element analysis of piled-raft foundation in clayey soil," in *3rd International Conference on Emerging Trends in Engineering, Management & Sciences (ICETEMS-2018), Pakistan*, 2018.

[13] N. Sohaib, F. Seemab, G. Sana, and R. Mamoon, "Using polypropylene fibers in concrete to achieve maximum strength," in *Eighth International Conference On Advances in Civil and Structural Engineering-CSE*, 2018.

[14] S. Ismail, S. Tariq, S. Gul, and M. Ali, "Seismic construction practices of commercial RCC buildings via visual inspection in developing countries," in *Annual New Zealand Society for Earthquake Engineering Technical Conference, Auckland, New Zealand*, p. Paper P1.35, 2018.

[15] F. Qamar, S. Qin, and M. Ali, "Estimating seismic resistance of fibrous plastering effect on mortar less interlocked masonry walling with finite element modelling," in *Annual Australian Earthquake Engineering Society Conference*, 2018.

[16] M. U. Farooqi and M. Ali, "Effect of fibre content on splitting-tensile strength of wheat straw reinforced concrete for pavement applications," in *Key Engineering Materials*, vol. 765, pp. 349–354, Trans Tech Publ, 2018.

[17] U. A. Khan, H. M. Jahanzaib, M. Khan, and M. Ali, "Improving the tensile energy absorption of high strength natural fiber reinforced concrete with fly-ash for bridge girders," in *Key Engineering Materials*, vol. 765, pp. 335–342, Trans Tech Publ, 2018.

[18] F. Qamar, T. Thomas, and M. Ali, "Contribution of sisal reinforced plaster in out of plane resistance of masonry column," in *Key Engineering Materials*, vol. 765, pp. 343–348, Trans Tech Publ, 2018.

[19] A. Zia and M. Ali, "Effectiveness of polypropylene fiber reinforced concrete in enhancement of long-term durability of hydraulic structures," in *Materials Science Forum*, vol. 923, pp. 125–129, Trans Tech Publ, 2018.

[20] M. Khan, M. Cao, , and M. Ali, "Hybrid fiber reinforced concrete for the application of bridge deck," in *3rd FRC International Workshop on Fibre Reinforced Concrete: from Design to Structural Applications-ACI-fib-RILEM Joint Workshop, Desenzano, Lake Garda, Italy*, p. Paper 53, 2018.

[21] T. Hussain and M. Ali, "Utilization of FRC tension zone for reinforcement reduction in slabs-a simplified approach," in *Annual Canadian Society for Civil Engineering Technical Conference, Fredericton, Canada*, p. Paper MA22, 2018.

[22] M. Khan, M. Cao, and M. Ali, "Experimental and empirical study of basalt fiber reinforced concrete," in *Annual Canadian Society for Civil Engineering Technical Conference, Fredericton, Canada*, p. Paper MA39, 2018.

[23] F. Qamar, T. Thomson, and M. Ali, "Effect of sisal fibrous mortar in improving out of-plane resistance and damping ratio of masonry column," in *Annual Canadian Society for Civil Engg Technical Conference, Fredericton, Canada*, p. Paper ST119, 2018.

[24] M. Sudheer, M. U. Farooqi, and M. Ali, "Case study: Flaws of concrete roads in Pakistan-possible reasons and remedial measures," in *Annual Canadian Society for Civil Engg Technical Conference, Fredericton, Canada*, p. Paper TR47, 2018.

[25] K. Batool, , and M. Ali, "Construction practices of masonry houses in private societies of developing countries from seismic resistance aspects," in *Annual New Zealand Society for Earthquake Engg Technical Conference, Auckland, New Zealand*, p. Paper P2.01, 2018.

[26] F. Qamar, T. Thomas, and M. Ali, "Effect of rice straw reinforced plaster in improving out-of-plane resistance of mortar-free interlocking column," in *Annual New Zealand Society for Earthquake Engg Technical Conference, Auckland, New Zealand*, p. Paper P1.12, 2018.

[27] M. Khan, M. Cao, and M. Ali, "Effect of $CaCO_3$ whisker, steel fiber and basalt fiber content on compressive energy absorption of concrete," in *Annual New Zealand Society for Earthquake Engg Technical Conference, Auckland, New Zealand*, p. Paper P1.10, 2018.

[28] M. Khan, U. A. Khan, and M. Ali, "Flexural properties of high strength coconut fiber reinforced concrete for earthquake resistant structures," in *Annual New Zealand Society for Earthquake Engg Technical Conference, Auckland, New Zealand*, p. Paper P1.11, 2018.

[29] M. B. Ali, K. Ateeq, H. M. Ali, and S. S. S. Gardezi, "Construction delays assessment-a case study of interchange project in Pakistan," in *13th International Congress on Advances in Civil Engineering, 12-14 September 2018, Izmir/TURKEY*, 2018.

[30] S. Gardezi, N. Shafiq, and A. Mazhar, "Transformation of 3ds jobs using building information modeling (bim) – a prospective of malaysian construction industry," in *3rd International Conference On Emerging Trends in Engineering, Management & Sciences (ICETEMS-2018)*, 2018.

[31] K. Farheen and M. ahmed, "Evaluation of response modification factors in moment resisting frame buildings considering soil-structure interaction," in *40th IABSE symposium, on Sep, 19-21*, 2018.

[32] K. Farheen and M. ahmed, "Simplified procedure for estimating modified response modification factor of a complex high-rise building," in *40th Symposium, 19-21 September 2018, Nantes, France Tomorrow's Megastructures*, 2018.

[33] A. Ayuba, N. A. Sheikhb, R. Tariqb, and M. M. Khan, "Thermodynamic optimization of air bottoming cycle for waste heat recovery," in *Energy Systems for Sustainable Development, Lahore*, 2018.

[34] S. Islam, L. Khan, A. Khalid, and W. Lughmani, "A smart micro factory design: An integrated approach"", 1st international workshop on functional reverse engineering of machine tools," in *WRE 2018, GIKI, Topi, KP, Pakistan*, 2018.

[35] S. Islam, L. Khan, A. Khalid, and W. Lughmani, "A smart micro factory design: An integrated approach, 1st international workshop on functional reverse engineering of machine tools," in *WRE 2018, GIKI, Topi, KP, Pakistan*, 2018.

[36] O. Ghayyur, M. Aleem, and M. A. Islam, "Time efficient novel parallel technique for Needleman Wunsch and Smith Waterman algorithms," in *2018 International Conference on Computing, Mathematics and Engineering Technologies (iCoMET)*, pp. 1–6, IEEE, 2018.

[37] N. Sharif, M. T. Afzal, and U. Ahmed, "Twitter recommendation: Unary metadata features evaluation with TF/IDF using n-grams," in *34th Information Systems Education Conference (ISECON)*, pp. 117–125, 2018.

[38] N. Sharif and M. T. Afzal, "Metadata features evaluation for Twitter based e-learning recommendation," in *34th Information Systems Education Conference (ISECON)*, pp. 109–116, 2018.

[39] N. Afzal, H. Qayyum, N. I. Soomro, and S. M. Bakhtiar, "mirna silencing of streptococcus gallolyticus: a potential treatment strategy against endocarditis," in *1st international conference on medicinal chemistry and drug discovery, Islamabad*, 2018.

[40] H. A. Butt, S. M. Bakhtiar, A. Noor, and I. Riasat, "Genetic heterogeniety in pakistani obese families," in *1st Annual Health Research Conference, Islamabad*, 2018.

[41] S. I. Soomro, H. Safdar, N. I. Soomro, H. A. Butt, and S. M. Bakhtiar, "The prevalence pf inflamatory disorders in obese and non-obese subjects of kahuta region," in *1st Annual Health Research Conference*, 2018.

[42] S. Sojla, Z. Bashir, and E. Dilshad, "Green synthesis and characterization of silver nanoparticles using alovera plant gel and their biological evaluation," in *1st National Conference on Medicinal Plant Research, 29-31 Aug 2018 at Department of Chemistry, Karakoram International University Gilgit)*, 2018.

[43] T. D. Hooi and A. Z. Abbasi, "Place attachment of the indigenous community: Trust and readiness towards development," in *Accepted in Association for Consumer Research, Dallas, USA*, 2018.

[44] P. Arshad and F. Anwar, "HR leading through lean management and customer centricity at telenor shared services," in *The European Proceedings of Social and Behavioral Sciences*, vol. XL, pp. 969–990, 2018.

[45] S. Fatima, M. M. Hassan, and A. S. Khattak, "Knowledge diversity in the creation of project team social capital for project innovation outcome: Moderated mediating role of the type of structure," in *3rd international conference on business management perspectives in the asian context Lahore Business School*, 2018.

[46] A. Hashmi, A. Ahmed. S, and A. I. Bhatti, "Using IBMR for provincial water distribution," in *International Sustainable Development Conference*, 2018.

[47] S. Ahmed and A. Mehmood, "Prioritizing human development under CPEC," in *International Conference on Sustainable Development through innovationin Economics and Management Sciences (ICSDIEMS)*, 2018.

List of Journal Publications Year 2018

Capital University of Science and Technology

[1] S. Rehman, M. M. Ahmed, U. Rafique, and M. N. Khan, "A nonlinear model to assess DC/AC performance reliability of submicron SiC MESFETs," *Journal of Computational Electronics*, pp. 1–11, 2018.

[2] Z. Ahmed, M. M. Ahmed, and M. B. Ihsan, "A novel differential fed high gain patch antenna using resonant slot loading," *Radioengineering*, vol. 27, no. 3, pp. 662–670, 2018.

[3] Z. Ahmed, M. M. Ahmed, M. B. Ihsan, A. A. Chaudhary, and J. K. Arif, "Novel dual band patch antenna with gap coupled composite right/left-handed transmission line," *International Journal of Microwave and Wireless Technologies*, pp. 1–7, 2018.

[4] M. N. Khan, U. F. Ahmed, M. M. Ahmed, and S. Rehman, "An improved model to assess temperature-dependent DC characteristics of submicron GaN HEMTs," *Journal of Computational Electronics*, vol. 17, no. 2, pp. 653–662, 2018.

[5] M. Riaz, M. M. Ahmed, U. Rafique, and U. F. Ahmed, "Assessment of intrinsic small signal parameters of submicron SiC MESFETs," *Solid-State Electronics*, vol. 139, pp. 80–87, 2018.

[6] U. Qazi, M. R. Ali, and A. Moqueet, "An estimation of the impact of uninterpretable power supply systems on electricity distribution utility of Pakistan," *Journal of Basic and Applied Sciences*, vol. 14, pp. 92–97, 2018.

[7] S. M. Shah, R. Samar, and M. A. Z. Raja, "Fractional-order algorithms for tracking rayleigh fading channels," *Nonlinear Dynamics*, vol. 92, no. 3, pp. 1243–1259, 2018.

[8] Z. Masood, K. Majeed, R. Samar, and M. A. Z. Raja, "Design of epidemic computer virus model with effect of quarantine in the presence of immunity," *Fundamenta Informaticae*, vol. 161, no. 3, pp. 249–273, 2018.

[9] A. Yar, A. I. Bhatti, and Q. Ahmed, "First principle based control oriented model of a gasoline engine including multi-cylinder dynamics," *Control Engineering Practice*, vol. 70, pp. 63–76, 2018.

[10] M. R. Azam, S. Fazal, M. Ullah, and A. I. Bhatti, "System-based strategies for p53 recovery," *IET Systems Biology*, vol. 12, no. 3, pp. 101–107, 2018.

[11] A. Yar, A. I. Bhatti, and Q. Ahmed, "First principle based control oriented gasoline engine model including lumped cylinder dynamics," *Journal of Dynamic Systems, Measurement, and Control*, vol. 140, no. 8, pp. 1–9, 2018.

[12] A. Jafar, A. I. Bhatti, A. S. M, and N. Ahmed, "Robust gain scheduled control algorithm for lab helicopter: An LMI based approach," *IMECH Journal of Systems and Control Engineering*, pp. 1–14, 2018.

[13] M. T. Khan, S. I. Malik, A. I. Bhatti, S. Ali, A. S. Khan, M. T. Zeb, T. Nadeem, and S. Fazal, "Pyrazinamide-resistant mycobacterium tuberculosis isolates from Khyber Pakhtunkhwa and rpsA mutations," *Journal of Biological Regulators and Homeostatic Agents*, vol. 32, no. 3, pp. 705–709, 2018.

[14] A. Munir, S. Azam, S. Fazal, and A. I. Bhatti, "Evaluation of the whole body physiologically based pharmacokinetic (wb-pbpk) modeling of drugs," *Journal of Theoretical Biology*, vol. 451, pp. 1–9, 2018.

[15] A. Jafar, A. I. Bhatti, S. M. Ahmad, and N. Ahmed, "H∞ optimization-based robust decoupling control algorithm in linear parameter varying systems using hadamard weighting," *Transactions of the Institute of Measurement and Control*, pp. 1–16, 2018.

[16] A. M. Chaudhry, A. Arshad Uppal, Y. M. Alsmadi, A. I. Bhatti, and V. I. Utkin, "Robust multi-objective control design for underground coal gasification energy conversion process," *International Journal of Control*, pp. 1–17, 2018.

[17] U. Rafique and S. U. Din, "Beveled-shaped super-wideband planar antenna," *Turkish Journal of Electrical Engineering and Computer Sciences*, pp. 1–9, 2018.

[18] S. Naz, R. N. B. Rais, P. A. Shah, S. Yasmin, A. Qayyum, S. Rho, and Y. Nam, "A dynamic caching strategy for CCN-based MANETs," *Computer Networks*, vol. 142, pp. 93–107, 2018.

[19] K. A. Khaliq, S. M. Raza, O. Chughtai, A. Qayyum, and J. Pannek, "Experimental validation of an accident detection and management application in vehicular environment," *Computers & Electrical Engineering*, vol. 71, pp. 137–150, 2018.

[20] M. Raza, N. Aslam, H. Le-Minh, S. Hussain, Y. Cao, and N. M. Khan, "A critical analysis of research potential, challenges, and future directives in industrial wireless sensor networks," *IEEE Communications Surveys & Tutorials*, vol. 20, no. 1, pp. 39–95, 2018.

[21] M. Y. M. Mirza, N. M. Khan, A. Jamal, and R. Ramer, "Characterization of spatial reflection co-efficient for ground-to-aircraft and satellite-to-aircraft communication." *Applied Computational Electromagnetics Society Journal*, vol. 33, no. 1, 2018.

[22] M. Y. Wani, M. Riaz, and N. M. Khan, "Geometrical modeling of scattering environment for highways in umbrella cell based MIMO communication systems," *Wireless Personal Communications*, vol. 101, no. 1, pp. 59–74, 2018.

[23] A. Yasin, M. Ashraf, and A. Bhatti, "Fixed frequency sliding mode control of power converters for improved dynamic response in dc micro-grids," *Energies*, vol. 11, no. 10, p. 2799, 2018.

[24] M. Rashad, M. Ashraf, A. I. Bhatti, D. M. Minhas, and B. A. Ahmed, "Mathematical modeling and stability analysis of DC microgrid using SM hysteresis controller," *International Journal of Electrical Power & Energy Systems*, vol. 95, pp. 507–522, 2018.

[25] M. Rashad, U. Raoof, M. Ashraf, and B. Ashfaq Ahmed, "Proportional load sharing and stability of dc microgrid with distributed architecture using SM controller," *Mathematical Problems in Engineering*, vol. 2018, 2018.

[26] 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*, 2018.

[27] 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*, 2018.

[28] M. Ghafoor, S. Iqbal, S. A. Tariq, and N. M. Taj, Imtiaz A Jafri, "Efficient fingerprint matching using graphical processing unit," *IET Image Processing*, vol. 12, no. 2, p. 274, 2018.

[29] N. Ratyal, I. Taj, U. Bajwa, and M. Sajid, "Pose and expression invariant alignment based multi-view 3D face recognition." *KSII Transactions on Internet & Information Systems*, vol. 12, no. 10, 2018.

[30] M. R. Mufti, H. Afzal, F. U. Rehman, Q. R. Butt, and M. I. Qureshi, "Synchronization and antisynchronization between two non-identical chua oscillators via sliding mode control," *IEEE Access*, vol. 6, pp. 45 270–45 280, 2018.

[31] M. R. Mufti, H. Afzal, F.-u. Rehman, and N. Ahmed, "Stabilization and synchronization of 5-d memristor oscillator using sliding mode control," *Journal of the Chinese Institute of Engineers*, vol. 41, no. 8, pp. 667–677, 2018.

[32] N. Siddique *et al.*, "Parameter identification and hybrid synchronization in an array of coupled chaotic systems with ring connection: An adaptive integral sliding mode approach," *Mathematical Problems in Engineering*, vol. 2018, 2018.

[33] F. ur Rehman, A. B. Satti, and A. A. Saleem, "Continuous stabilizing control for a class of non-holonomic systems: Brockett System Example," *Journal of Vibration Testing and System Dynamics*, vol. 2, pp. 167–172, 2018.

[34] W. Abbasi, I. Shah *et al.*, "Smooth super twisting sliding mode based steering control for nonholonomic systems transformable into chained form," *Kybernetika*, vol. 54, no. 3, pp. 476–495, 2018.

[35] S. ud Din and F. ur Rehman, "Synchronization of a novel 4-D hyperchaotic rikitake dynamo system along with unknown parameters via adaptive integral sliding mode," *Journal of Control Engineering and Applied Informatics*, vol. 20, no. 1, pp. 108–118, 2018.

[36] S. ud Din, F. ur Rehman, and Q. Khan, "Smooth super-twisting sliding mode control for the class of underactuated systems," *PloS one*, vol. 13, no. 10, p. e0203667, 2018.

[37] I. Shah and F. U. Rehman, "Smooth second order sliding mode control of a class of underactuated mechanical systems," *IEEE Access*, vol. 6, pp. 7759–7771, 2018.

[38] M. Asif, H.-Y. Lee, U. A. Khan, K.-H. Park, and B. W. Lee, "Analysis of transient behavior of mixed high voltage dc transmission line under lightning strikes," *IEEE Access*, vol. 7, pp. 7194–7205, 2018.

[39] R. Ara, U. A. Khan, and B. W. Bhatti, Aamer Iqbal Lee, "A highly selective protection scheme for fast fault discrimination in a meshed multi-terminal high voltage dc (mtdc) grid," 2018.

[40] M. Khan, M. Cao, and M. Ali, "Effect of basalt fibers on mechanical properties of calcium carbonate whisker-steel fiber reinforced concrete," *Construction and Building Materials*, vol. 192, pp. 742–753, 2018.

[41] M. Khan and M. Ali, "Effect of super plasticizer on the properties of medium strength concrete prepared with coconut fiber," *Construction and Building Materials*, vol. 182, pp. 703–715, 2018.

[42] M. U. Farooqi and M. Ali, "Contribution of plant fibers in improving the behavior and capacity of reinforced concrete for structural applications," *Construction and Building Materials*, vol. 182, pp. 94–107, 2018.

[43] F. Qamar, T. Thomas, and M. Ali, "Use of natural fibrous plaster for improving the out of plane lateral resistance of mortarless interlocked masonry walling," *Construction and Building Materials*, vol. 174, pp. 320–329, 2018.

[44] M. Khan and M. Ali, "Effectiveness of hair and wave polypropylene fibers for concrete roads," *Construction and Building Materials*, vol. 166, pp. 581–591, 2018.

[45] M. Ali, "Role of post-tensioned coconut-fibre ropes in mortar-free interlocking concrete construction during seismic loadings," *KSCE Journal of Civil Engineering*, vol. 22, no. 4, pp. 1336–1343, 2018.

[46] M. Ahmed and T. Mahmood, "Elastic-displacement-based multi-modal pushover analysis in high-rise core wall buildings," *Proceedings of the Institution of Civil Engineers-Structures and Buildings*, pp. 1–22, 2018.

[47] S. Naseer, M. S. Faiz, and S. Gul, "Use of acrylic polymer for stabilization of clayey soil," *International Journal of Scientific & Engineering Research*, vol. 9, no. 11, pp. 433–438, 2018.

[48] 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.

[49] M. Ebrahem, S. Manzoor, N. A. Sheikh, 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.

[50] S. S. Warsi, S. H. I. Jaffery, R. Ahmad, M. Khan, M. H. Agha, and L. Ali, "Development and analysis of energy consumption map for high-speed machining of Al 6061-T6 alloy," *The International Journal of Advanced Manufacturing Technology*, pp. 1–12, 2018.

[51] A. Ayub, N. A. Sheikh, R. Tariq, M. M. Khan, and C. M. Invernizzi, "Exergetic optimization and comparison of combined gas turbine supercritical CO_2 power cycles," *Journal of Renewable and Sustainable Energy*, vol. 10, no. 4, pp. 1–23, 2018.

[52] M. Irfan and M. Muradoglu, "A front tracking method for particle-resolved simulation of evaporation and combustion of a fuel droplet," *Computers & Fluids*, 2018.

[53] M. M. Khan, N. A. Sheikh, A. Khalid, and W. A. Lughmani, "Experimental characterization of gasoline sprays under highly evaporating conditions," *Heat and Mass Transfer*, vol. 54, no. 5, pp. 1531–1543, 2018.

[54] H. Rafiq, M. Aleem, and M. A. Islam, "On the evaluation of android malware detectors," *Sukkur IBA Journal of Computing and Mathematical Sciences*, vol. 2, no. 1, pp. 20–28, 2018.

[55] H. Murtaza, M. A. Iqbal, M. A. Islam, and M. Aleem, "Content-aware reliable and energy-efficient MAC (CARE-MAC) protocol for wireless body area networks," *Ad Hoc & Sensor Wireless Networks*, 2018.

[56] M. A. Iqbal, B. Dai, M. A. Islam, M. Aleem, and N.-S. Vo, "Topology-based flow-oriented adaptive network coding-aware routing scheme for VANETs," *KSII Transactions on Internet & Information Systems*, vol. 12, no. 5, pp. 2044–2062, 2018.

[57] M. Ibrahim, M. A. Iqbal, M. Aleem, and M. A. Islam, "SIM-cumulus: An academic cloud for the provisioning of Network-Simulation-as-a-Service (NSaaS)," *IEEE Access*, vol. 6, pp. 27 313–27 323, 2018.

[58] A. Hussain, M. Aleem, A. Khan, M. A. Iqbal, and M. A. Islam, "RALBA: A computation-aware load balancing scheduler for cloud computing," *Cluster Computing*, pp. 1–14, 2018.

[59] Y. N. Khalid, M. Aleem, R. Prodan, M. A. Iqbal, and M. A. Islam, "E-OSched: A load balancing scheduler for heterogeneous multicores," *The Journal of Supercomputing*, pp. 1–33, 2018.

[60] M. A. Jaffar, M. S. Zia, M. Hussain, A. B. Siddiqui, S. Akram, and U. Jamil, "An ensemble shape gradient features descriptor based nodule detection paradigm: A novel model to augment complex diagnostic decisions assistance," *Multimedia Tools and Applications*, pp. 1–27, 2018.

[61] S. U. R. Khan, M. A. Islam, M. Aleem, and M. A. Iqbal, "Temporal specificity based text classification for information retrieval," *Turkish Journal of Electrical Engineering & Computer Science*, 2018.

[62] M. Raheel, S. Ayaz, and M. T. Afzal, "Evaluation of h-index, its variants and extensions based on publication age & citation intensity in civil engineering," *Scientometrics*, vol. 114, no. 3, pp. 1107–1127, 2018.

[63] M. T. Ikram, M. T. Afzal, and N. A. Butt, "Automated citation sentiment analysis using high order n-grams: A preliminary investigation," *Turkish Journal of Electrical Engineering & Computer Sciences*, vol. 26, no. 4, pp. 1922–1932, 2018.

[64] M. T. Khan, S. I. Malik, S. Ali, A. Sheed Khan, T. Nadeem, M. T. Zeb, N. Masood, and M. T. Afzal, "Prevalence of pyrazinamide resistance in Khyber Pakhtunkhwa, Pakistan," *Microbial Drug Resistance*, 2018.

[65] M. Glatz, H. Maurer, and M. Tanvir Azfal, "Finding reliable information on the web should and can still be improved," *Journal of computing and information technology*, vol. 26, no. 1, pp. 1–6, 2018.

[66] S. Haider, M. Tanvir Afzal, M. Asif, H. Maurer, A. Ahmad, and A. Abuarqoub, "Impact analysis of adverbs for sentiment classification on twitter product reviews," *Concurrency and Computation: Practice and Experience*, p. e4956, 2018.

[67] F. Qayyum and M. T. Afzal, "Identification of important citations by exploiting research articles metadata and cue-terms from content," *Scientometrics*, pp. 1–23, 2018.

[68] A. Y. Khan, A. S. Khattak, and M. T. Afzal, "Extending co-citation using sections of research articles," *Turkish Journal of Electrical Engineering & Computer Sciences*, vol. 26, no. 6, pp. 3345–3355, 2018.

[69] R. Ahmad and M. T. Afzal, "CAD: an algorithm for citation anchors detection in research papers," *Scientometrics*, vol. 117, no. 3, pp. 1405–1423, 2018.

[70] A. Hussain, M. Aleem, M. A. Islam, and M. A. Iqbal, "A rigorous evaluation of state-of-the-art scheduling algorithms for cloud computing," *IEEE Access*, 2018.

[71] S. U. R. Khan, M. A. Islam, M. Aleem, M. A. Iqbal, and U. Ahmed, "Section-based focus time estimation of news articles," *IEEE Access*, vol. 6, pp. 75 452–75 460, 2018.

[72] A. Kanwal and S. Fazal, "Construction and analysis of protein-protein interaction network correlated with ankylosing spondylitis," *Gene*, vol. 638, pp. 41–51, 2018.

[73] A. Munir, S. Azam, S. Aslam, A. Mehmood, G. M. Shah, S. Amjad, M. Younis, and S. Fazal, "Computational design of small interfering rnas and small hairpin rnas to silence mutated p53 gene expressions," *Informatics in Medicine Unlocked*, vol. 12, pp. 1–5, 2018.

[74] N. Noureen, S. Fazal, A. M. Qaider, and A. Tanvir, "Hcvs: Pinpointing chromatin states through hierarchical clustering and visualization scheme," *Current Bioinformatics*, 2018.

[75] F. A. Larik, A. Saeed, M. Faisal, P. A. Channar, S. S. Azam, H. Ismail, E. Dilshad, and B. Mirza, "Synthesis, molecular docking and comparative efficacy of various alkyl/aryl thioureas as antibacterial, antifungal and α-amylase inhibitors," *Computational biology and chemistry*, vol. 77, pp. 193–198, 2018.

[76] W. K. Kayani, B. H. Kiani, E. Dilshad, and B. Mirza, "Biotechnological approaches for artemisinin production in artemisia," *World Journal of Microbiology and Biotechnology*, vol. 34, no. 4, p. 54, 2018.

[77] A. Munir, S. Hussain, and E. Dilshad, "Silver nanoparticles conjugated with neurotrophin 3 upregulate myelin gene transcription pathway," *Journal of theoretical biology*, vol. 459, pp. 111–118, 2018.

[78] S. Hussain, J. Z. K. Khattak, M. Ismail, Q. Mansoor, and M. H. Khan, "Molecular characterization of deafness in autosomal recessive pedigrees of Khyber Pakhtunkhwa Pakistan," *Pakistan Journal of Pharmaceutical Sciences*, vol. 31, no. 1, pp. 51–56, 2018.

[79] M. T. Khan, A. U. Rehaman, M. Junaid, S. I. Malik, and D.-Q. Wei, "Insight into novel clinical mutants of RpsA-S324F, E325K, and G341R of mycobacterium tuberculosis associated with pyrazinamide resistance," *Computational and structural biotechnology journal*, vol. 16, pp. 379–387, 2018.

[80] M. Anum, S. I. Malik, and K. A. Malik, "Proteome mining for the identification of putative drug targets for human pathogen clostridium tetani," *Current Bioinformatics*, 2018.

[81] A. Munir, S. I. Malik, and K. A. Malik, "De-novo ligand design against mutated huntington gene by ligand-based pharmacophore modeling approach." *Current computer-aided drug design*, 2018.

[82] M. Bilal, M. Sagheer, and S. Hussain, "Numerical study of magnetohydrodynamics and thermal radiation on williamson nanofluid flow over a stretching cylinder with variable thermal conductivity," *Alexandria engineering journal*, vol. 57, no. 4, pp. 3281–3289, 2018.

[83] D.-C. Lu, M. Ramzan, M. Bilal, J. D. Chung, and U. Farooq, "A numerical investigation of 3D MHD rotating flow with binary chemical reaction, activation energy and non-fourier heat flux," *Communications in Theoretical Physics*, vol. 70, pp. 89–96, 2018.

[84] D.-C. Lu, M. Ramzan, M. Bilal, J. D. Chung, and U. Farooq, "Upshot of chemical species and nonlinear thermal radiation on oldroyd-B nanofluid flow past a bidirectional stretched surface with heat generation/absorption in a porous media," *Communications in Theoretical Physics*, vol. 70, pp. 71–80, 2018.

[85] T. Sajid, M. Sagheer, S. Hussain, and M. Bilal, "Darcy-forchheimer flow of Maxwell nanofluid flow with nonlinear thermal radiation and activation energy," *AIP Advances*, vol. 8, no. 3, p. 035102, 2018.

[86] M. Sagheer, M. Bilal, S. Hussain, and R. N. Ahmed, "Thermally radiative rotating magneto-nanofluid flow over an exponential sheet with heat generation and viscous dissipation: A comparative study," *Communications in Theoretical Physics*, vol. 69, no. 3, p. 317, 2018.

[87] S. Atif, S. Hussain, and M. Sagheer, "Numerical study of mhd micropolar carreau nanofluid in the presence of induced magnetic field," *AIP Advances*, vol. 8, no. 3, p. 035219, 2018.

[88] M. Atlas, S. Hussain, and M. Sagheer, "Entropy generation and squeezing flow past a riga plate with cattaneo-christov heat flux," *Bulletin of the Polish Academy of Sciences: Technical Sciences*, 2018.

[89] S. Shah, S. Hussain, and M. Sagheer, "Thermal stratification effects on mixed convective maxwell fluid flow with variable thermal conductivity and homogeneous/heterogeneous reactions," *Journal of the Brazilian Society of Mechanical Sciences and Engineering*, vol. 40, no. 9, p. 452, 2018.

[90] S. Hussain, H. F. Öztop, K. Mehmood, and M. E. Ali, "Control of combined convection in a nanofluid-filled lid-driven closed space via rectangular bar in the presence of magnetic field," *Journal of Thermal Analysis and Calorimetry*, pp. 1–18, 2018.

[91] A. Kamran, S. Hussain, and M. Sagheer, "Impact of induced magnetic field on free convective flow of kerosene/water based single and multiwalled carbon nanotubes," *AIP Advances*, vol. 8, no. 10, p. 105130, 2018.

[92] S. Hussain, S. E. Ahmed, and F. Saleem, "Impact of periodic magnetic field on entropy generation and mixed convection," *Journal of Thermophysics and Heat Transfer*, pp. 1–14, 2018.

[93] T. Sajjad and R. Ali, "A new chaos based color image encryption algorithm using permutation substitution and boolean operation," 2018.

[94] T. Sajjad and R. Ali, "An image encryption scheme based on s-box and chaotic logistic map," 2018.

[95] M. Sohail Ashraf, R. Ali, and N. Hussain, "Geraghty type contractions in fuzzy bmetric spaces with application to integral equations," 2018.

[96] M. Zia and R. Ali, "Cryptanalysis and improvement of an elliptic curve based signcryption scheme for firewalls," *PloS one*, vol. 13, no. 12, p. e0208857, 2018.

[97] D. Shehwar, S. Batul, and R. Ali, "The c*-algebra valued caristi's fixed point theorem: A graphic version," *Journal of Mathematical Analysis*, vol. 9, pp. 1–9, 2018.

[98] M. Afzal and H. Bilal, "Acoustic wave scattering from a wave-bearing cavity in a rectangular waveguide," *The Journal of the Acoustical Society of America*, vol. 144, no. 3, pp. 1681–1681, 2018.

[99] B. Javed, A. K. Khan, S. Arjoon, M. Mashkoor, and A. u. Haque, "Openness to experience, ethical leadership, and innovative work behavior," *The Journal of Creative Behavior*, 2018.

[100] M. B. Saeed, M. M. Iqbal, and K. S. Syed, "Corporate governance mechanisms and conservatism; evidence from Pakistan," *NICE Research Journal of Social Sciences*, vol. 11, pp. 18–38, 2018.

[101] A. Khan and S. M. M. R. Naqvi, "The impact of internalized stigma at workplace through interlinking mechanism of self-esteem of tuberculosis patients in Pakistan," *Journal of Managerial Sciences*, vol. 9, pp. 323–342, 2018.

[102] Q. Hayat and S. M. M. R. Naqvi, "Job strain, employee greed, and employee envy: Moderating role of self-monitoring in the banking sector of Pakistan," *Journal of Managerial Sciences*, vol. 9, pp. 221–224, 2018.

[103] B. Javed, M. Y. A. Rawwas, S. Khandai, K. Shahid, and H. H. Tayyeb, "Ethical leadership, trust in leader and creativity: The mediated mechanism and an interacting effect," *Journal of Management & Organization*, pp. 1–18, 2018.

[104] J. Ahmed and M. Mughal, "They earn and send; we spend: Consumption patterns of Pakistani migrant households," *International Journal of Social Economics*, vol. 45, no. 7, pp. 1092–1108, 2018.

[105] S. Rizwan, J. Ahmed, and R. Rasiah, "The devil made me do it: Environmental factors leading to corporate financial fraud," *Journal of Managerial Sciences*, vol. 11, no. 03, pp. 321–353, 2018.

[106] S. Fatima and M. A. Zafar, "Servant leadership and meaningfulness at work: The contingency effect of leader ethical sensitivity," *Pakistan Journal of Social Sciences*, vol. 38, no. 1, 2018.

[107] M. Khalid, S. Bashir, A. K. Khan, and N. Abbas, "When and how abusive supervision leads to knowledge hiding behaviors: An islamic work ethics perspective," *Leadership & Organization Development Journal*, vol. 39, no. 6, pp. 794–806, 2018.

[108] S. A. Khattak and S. Bashir, "Evaluation of union commitment in public sector organizations of pakistan: A time lagged study." *Abasyn University Journal of Social Sciences*, vol. 11, no. 1, 2018.

[109] A. Majeed and S. Ahmed, "Do board audit and cultural dynamics affect firm performance? evidence from karachi meezan index," *Journal of Islamic Business and Management*, vol. 8, no. 2, 2018.

[110] T. Ahmed, A.-u. Khan, M. Abbass, E. Rodrigues Filho, Z. U. Din, and A. Khan, "Synthesis, characterization, molecular docking, analgesic, antiplatelet and anticoagulant effects of dibenzylidene ketone derivatives," *Chemistry Central Journal*, vol. 12, no. 1, p. 134, 2018.

[111] S. Bashir, S. Abbas, and A. Khan, "Pharmacological studies on prokinetic and laxative effects of trianthema portulacastrum linn," *International Journal of Complementary & Alternative Medicine*, vol. 11, 2018.

[112] S. Bashir, S. Abbas, S. R. Mandukhail, and A. H. Gilani, "The airway relaxant effect of horse purslane, trianthema portulacastrum, linn.(aizoaceae), is mediated through dual blockade of muscarinic receptors and ca2+ influx," *Journal of Pharmaceutical Research International*, pp. 1–9, 2018.

[113] M. T. Khan, M. T. Razi, S. U. Jan, M. Mukhtiar, R. Gul, A. Hussain, A. M. Hashmi, M. T. Ahmad, N. A. Shahwani, I. Rabbani *et al.*, "Synthesis, characterization and antihypertensive activity of 2-phenyl substituted benzimidazoles." *Pakistan journal of pharmaceutical sciences*, vol. 31, no. 3 (Supplementary), pp. 1067–1074, 2018.

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

No.23/CUST/ORIC/2018
Dated: 1st Oct, 2018

MOU signing ceremony between Capital University of Science and Technology and H-Cube Group of Companies

Capital University of Science and Technology (CUST), Islamabad a federally Chartered University established through an Act No XVI of 2015 of parliament, is a research centered University. H-Cube BMG is an emerging platform providing total construction industrial Solution under one umbrella. To formalize collaborationbetween CUST and H-Cube andto make it durable and sustainable Director H-Cube Mr. Saeed Ashraf along with his team visited CUST and signed anMOU on 26 Sep, 2018.On this auspicious occasion Dean Research& Innovation, HoD CE and Faculty of CE were present. Both parties agreed to establish multiple fronts via initiating internationally recognizedcertifications along with diplomas and professional development coursesthrough deploymentof H-Cube's international industrial partners' tools, products and services in accordance withCUST's respective needs and objectives. The establishment of Autodesk Building Information Modeling (BIM) Centre of Excellence (**CoE**) was also agreed through this joint agreement.

The ceremony started with recitation from the holy Quran, followed by welcome note to the guests by Dr. IshtiaqHassaan, HoD CE. He said that BIM center would be a good addition to CUST portfolio. Mr. Saeed Ashraf introduced H-Cube to the participants, he also showed his gratitude to CUST for collaboration. For the establishment of BIM Center both parties agreed to identify their milestones and settled on the decision that inaugural ceremony of BIM Center should be in the fall 2018 semester.

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation

Distribution:-

- VC
- Registrar
- Dean FoE
- HoD CE

MEMORANDUM OF UNDERSTANDING

By and between

CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY,

AND

H-CUBE BMG PVT. LTD.

Joint Venture for Construction Industry Certifications, Diplomas
And
Professional Courses

DATED SEP 26, 2018

Memorandum of Understanding (MoU)

THIS MEMORANDUM OF UNDERSTANDING (the "**MoU**") is made at _____ on the ___ day of _____, 2018 (the "**Execution Date**") by and between:

Capital University of Science and Technology a federally Chartered University established through an **Act No XVI of 2015** of parliament, published by the Senate secretariat, Government of Pakistan vide **No. F.9 (19)/2015-Legis** dated 22-09-2015 through its authorized representative Dr. Syed Shujaa Safdar holding CNIC No. 61101-1936661-3 (hereinafter referred to as **"CUST"** which term shall, unless repugnant to the context, include its successors in interest and permitted assigns and all persons claiming title through under or in trust for it) of the FIRST PART.

And

H-Cube BMG Pvt. Ltd., a company duly incorporated under the laws of Pakistan, with its registered office at Rauf Tower 20 Jinnah Boulevard West Sector A, DHA Phase II, Opposite Froebels School, G.T Road Islamabad through its authorized representative Mr. Murtaza Ali Shah, holding CNIC No. _____ (hereinafter referred to as the **"H-Cube"** which term shall, unless repugnant to the context, include its authorized representatives, successors-in-interest and permitted assigns) OF THE SECOND PART

(CUST and H-Cube shall hereinafter collectively be referred to as the "**Parties**" and each individually as the **"Party"**).

Whereas:

The Parties agree to establish multiple fronts via initiating internationally recognized certifications along with diplomas and professional development courses through deployment of H-Cube's international industrial partners' tools, products and services in accordance with CUST's respective needs and objectives and shall, by joint agreement determine the area and subject of such collaboration, on the basis of the understanding set out in this Memorandum of Understanding (MoU).

NOW THEREFORE, in considerations of the mutual covenants and promises contained herein, the Parties hereby agree as follows:

1. DEFINITIONS

1.1 In this MoU:

(a). "Effective Date" means the later of the two signatures dates of the authorized signatories set out at the end of this MoU.

(b). "BIM" stands for Building Information Modelling

(c). "CUST Academic Regulations" shall mean the internal regulations promulgated by CUST, as may be amended from time to time.

2. AREAS OF COLLABORATION:

2.1 The Parties agree to collaborate in the following relevant areas:

(a). to facilitate CUST Civil Engineering Dept. with H-Cube principals' products, services and knowledge;

(b). international joint academic and industrial training workshops, webinars and short courses;

(c). the establishment of Autodesk BIM Centre of Excellences (**CoE**) through this joint agreement;

(d). H-Cube shall have presence in CUST for management of it's principal's technology

(e). initiation of revenue generation activities via BIM CoE

(f). other areas and activities that are mutually agreed upon by both the Parties through a joint agreement to be executed later in time;

3. MANAGEMENT COMMITTEE

3.1 Each of the Parties shall appoint one (1) representative to form a Management Committee to manage and oversee the collaborative activities contemplated under this MoU. The representatives of the Parties shall meet as and when necessary to review progress in the implementation of activities related to the areas of collaboration, identify and approve new projects, identity new areas and programs of collaboration as well as discuss matters related to this MoU.

Representatives of CUST:	Representative of H-Cube
Head of Department Civil	Managing Partner

4. Autodesk BIM CENTER OF EXCELLENCE

4.1 H-Cube will promptly provide Civil department of CUST with free academic licenses for its labs for the following: -

4.1.1 Autodesk Revit & BIM360

4.1.2 Autodesk AutoCAD

4.1.3 Autodesk Infraworks

4.1.4 Autodesk Navisworks

4.1.5 Autodesk ReCap

4.2 H-Cube will provide access of CUST students to:

4.2.1 Autodesk Design Academy

4.2.2 Free online design and entrepreneurship courses

4.2.3 Access to participate in international competitions

4.2.4 Free 3 year academic licensed software

4.3 H-Cube will arrange paid training software workshops:
4.3.1 For CUST students and faculty
4.3.2 Provide substantial discount to CUST students and faculty

4.4 H-Cube will conduct Autodesk online international certification exam
4.4.1 10% lifetime discount to CUST students and faculty

4.5 H-Cube will support relevant Final Year Design Projects (FYDPs), provide internships and industrial projects technically to CUST students

5. Construction Management Professional Courses

5.1 H-Cube and CUST shall provide construction management short courses, diploma and certifications to construction professionals jointly

5.2 H-Cube will provide:

5.2.1 Curriculum design (to be approved by CUST)

5.2.2 Training materials

5.2.3 Case studies

5.2.4 Field trips

5.2.5 Course conductor

5.2.6 Virtual project management application

5.3 Course curriculum shall comply with PMI, AACEI, LEED, SAVE, CMAA and RICS standards. Accreditation can be obtained from above institutions upon payment of a fee

5.4 H-Cube shall work with CUST to assign best fit faculty and capacity building of CUST faculty through a process

5.5 Accreditation of courses shall be acquired jointly from PEC for Continuing Professional Development (CPD) points.

6. FINANCIAL MATTERS

6.1 Depending upon the number of students and the number of days, Autodesk training workshop fee will vary between 5,000 PKR – 8,000 PKR/ student or as mutually discussed and agreed.

6.2 Autodesk User Certification Exam/ candidate = 80$ (10% discount added)

6.3 Autodesk Professional Certification Exam/ candidate = 162$ (10% discount added)

6.4 The profit share between both the parties shall be according to the table given as:

BIM CoE Autodesk Courses									
Sr. No.	**Trainer**	**Venue**	**Targeted Audience**	**Discount to CUST Students**	**Profit Share**		**Course Content**	**Training Certificate**	**Certification Exam**
					H-Cube	CUST			
1	H-Cube	CUST	Professionals / Graduates	10-20%	60%	40%	Autodesk Authorized Curriculum	Autodesk Authorized Training Center	Autodesk
2	CUST	CUST	Professionals / Graduates	10-20%	30%	70%	Autodesk Authorized Curriculum	Autodesk Authorized Training Center	Autodesk

7. ARRANGEMENT AND FUNDING

7.1 To implement the collaborative activities envisaged under this MoU, representative of the Parties may meet periodically to negotiate and conclude specific programs of cooperation, including the terms of their financing with each other and with other parties provided that neither Party shall have the power to bind the other Party without the other Party's consent in writing.

7.2 The financial arrangement relating to each collaborative activity will be made by the Parties in accordance with the specific project agreement and program of cooperation covering each such collaborative activity. The Parties agree that in the absence of any specific agreement to the contrary, all expenses, including but not limited to, salary, travel, living and allied costs relating to each collaborative activity shall be borne by the Party who incurs such expenses.

8. INTELLECTUAL PROPERTY, INVENTIONS AND INNOVATIONS

8.1 The terms with respect to any title to and exploitation of intellectual property, inventions and innovations (including but not limited to trademarks and service marks, copyright, patents, know-how designs and confidential information on the subject of such intellectual property, inventions and innovations) will be negotiated on a project-by-project basis in the specific project agreements and programs of cooperation referred to in Clause 3 of this MoU. Save as aforesaid, nothing in this MoU shall be construed as a license or transfer or an obligation to enter into any further agreement with respect to any intellectual property, invention and innovation currently licensed to or belonging to either Party.

8.2 For sharing of the intellectual property both parties would join a non-disclosure agreement on project to project basis.

9. PUBLICATION OF ARTICLES

9.1 The University shall have the right to publish the results of the Research after providing the Sponsor with a thirty (30) days period in which to review each publication to identify patentable subject matter and to identify any inadvertent disclosure of the Sponsor's proprietary information. After review, the Sponsor may approve the publication or suggest the use of alternate language for the language employed in the publication; The University may incorporate the alternate language suggested by the Sponsor or recommend its own alternate language and send the reworded publication to the Sponsor for review. This process shall continue until the Parties reach a consensus, subject to a maximum period of thirty (30) days or such other period as may be agreed upon between the Parties.

10. REPRESENTATION TO THE PUBLIC AND CONFIDENTIALLY

10.1 Neither Party shall use the name or logo of the other Party for any purpose whether in relation to any advertisement or other form of publicity without obtaining the prior written consent of the other party.

10.2 Notwithstanding the generality of the above, the Parties may notify third parties of the fact that this MoU is in effect.

10.3 All information furnished in relation to this MoU by one Party to the other, which is clearly identified as proprietary or confidential at the time of disclosure, will be kept confidential by the receiving Party and will not be disclosed to any third party otherwise than to carry out the provisions of this MoU, subject to prior agreement in writing between the Parties.

10.4 The provisions of Clause 10.3 above will not apply to information in the public domains, information in the possession of the receiving Party prior to the disclosure of the information, information which is independently developed by the receiving Party, information required to be released by law and information which is rightfully received by the receiving Party from third parties without any breach of confidentially obligations set forth in this MoU.

10.5 Clause10.3, 10.4 and 10.5 will survive the expiry or termination of this MoU for two (2) years from the date of expiry or termination of this MoU.

11. KEY POINTS OF CONTACT

11.1 For the purpose of facilitating effective communication between the Parties in respect of this MoU, H-Cube appoints Director Emerging Innovation, Mr. Hamza Ashraf the overall key point of contact, who will be responsible for coordinating all actions under this MoU for and on behalf of H-Cube whereas CUST appoints Dr. Shujaa Safdar Gardezi as the overall key point of contact, who will be responsible for coordinating all actions under this MoU for and on behalf of CUST.

12. AMENDMENTS

12.1 This MoU may be amended and supplemented in writing at any time by the mutual consent of the Parties in writing.

13. TERM OF MOU

13.1 This MoU shall commence on the Effective Date and shall remain in force for a period of five (05) years. Thereafter, it shall renew itself automatically for successive periods of five (05) years unless either Party notifies the other Party in writing of its desire to terminate this MoU at least six (6) months before the expiry of the initial or the relevant extended period.

13.2 Any party can terminate this MOU through a written communication with a notice period of 60 days.

13.3 The termination of this MoU shall not affect the implementation of the projects or programs established under it prior to such termination.

14. DISPUTE RESOLUTION

14.1 A Dispute will be settled by heads of the two organizations”

15. GOVERNING LAW

15.1 This MoU shall be governed by, and its provisions be construed in accordance with the laws of Pakistan.

16. NON-BINDING NATURE OF THIS MOU

16.1 Despite the statements and obligations expressed herein, and save for Clauses 8, 9, 10 and 13, this MoU is a non-binding expression of the current intentions of the Parties and neither Party will incur nor be bound to any legal obligations or expense hereunder to the other Party until and unless definitive agreements have

been negotiated approved by the necessary management levels of each Party and executed and delivered by authorized representatives of both Parties. Clauses 8, 9, 10, and 13 shall survive the expiry or termination of this MoU and shall be legally enforceable in accordance with their terms in any court of competent jurisdiction.

17. ENTIRE AGREEMENT

17.1 This MoU constitutes the entire agreement of the Parties relating to the subject matter addressed in this MoU and supersedes any previous representations and negotiations on the subject matter.

Signed for & on Behalf of CUST By its authorized signatories	Signed for & on Behalf of H-Cube By its authorized signatories
_____ Name: Prof. Aamer Iqbal Bhatti Dean Research & Innovation Capital University of Science and Technology, Islamabad	_____ Mr. Saeed Ashraf Director H-Cube Group of Companies.

Witnesses:

1. _____ **Witness** Name: CNIC:	**2. _____** **Witness** Name: CNIC:

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

No.22/CUST/ORIC/2018
19th Sep, 2018

Visit to National Incubation Center

Capital University of Science & Technology (CUST) Islamabad is a dynamic institution that acts as a catalyst of change to mould the society in the cast of knowledge based economy by proactively contributing towards the troika of industry, academia and the government. These multi-dimensional objectives are achieved by flourishing a culture of research and innovation in the university. In this regard Prof. Aamer Iqbal Bhatti, Dean ORIC visited National Incubation Center with the aim to establish an incubation center for CUST students that would provide a whole new startup ecosystem for the young entrepreneur. The visit to National Incubation Center (NIC) is planned with an objective to get an overall picture of the facilities provided to the young entrepreneur and to witness activities carried at NIC.

Prof. Aamer Iqbal Bhatti
Dean ORIC

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

No.23/CUST/ORIC/2018
16th Nov, 2018

Seminar on "Entrepreneurship and Innovation"

Office of Research Innovation and Commercialization (ORIC) organized a seminar for faculty on "Entrepreneurship and Innovation"on Tuesday November 06, 2018. The guest speaker of the seminar was Mr Pervaiz Abbasi, Project Director National Incubation Center (NIC) Islamabad.

The guest speaker was welcomed to Capital University of Science and Technology (CUST) by Dr. Ansir Ali Rajput, Associate Dean Corporate Linkages. Dr. Ansir Ali Rajputstarted the proceedings of the seminar with the brief introduction of the guest speaker followed by an interesting and interactive session by Mr. Pervaiz Abbasi. He focused on that economy is composed of enterprises and businesses. The economy survives onlywhen the industry leaders adapt to the changing times and supply mostly the communities' needs. Any small business is integral to the economy, without it, the economy would not survive. But a business must also sustain itself, be able to constantly evolve to fulfill the demands of the community and the people. In every business, it is imperative to be industrious, innovative and resourceful.

Mr. Pervaiz Abbasi offered CUST faculty and students to visit NIC and see the projects going over there, he also expressed his desire to provide his hand in excelling the innovative ideas of CUST student. Associate Dean Corporate Linkages showed his gratitude to Mr. Pervaiz Abbasi and presented university memento to the guest speaker.

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

No.23/CUST/ORIC/2018
December 13th, 2018

Three Days Autodesk REVIT Electrical Workshop

Capital University of Science and Technology hosted a 3 days workshop entitled "Autodesk REVIT Electrical Workshop" on Nov 29th, Dec 01st and Dec 03rd, 2018. 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 Electrical Engineering organized the workshop aiming to equip students with the knowledge of modern engineering tools.

The students were provided hands on experience of complete building electrification using REVIT by the Instructor Mr. Shafaqat, 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.

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

No.27/CUST/ORIC/2019
Dated: 29th Jan 2019

Establishment of BIM Centre of Excellence at CUST, Islamabad

Capital University of Science and Technology (CUST) through its outstanding faculty and state of the art lab facilities ensures that the engineers of tomorrow are not only well equipped theoretically but also have hands-on training of modern engineering tools. Keeping in view the future concerns, the Department of Civil Engineering and office of Research Innovation and Commercialization (ORIC) at Capital University of Science and Technology (CUST) in collaboration with H-CUBE has achieved another milestone towards Industry Academia Linkage by establishing "BIM Centre of Excellence (BIM CoE)" at its campus to offer international courses and certifications.

Dr. Engr. Muhammad Mansoor Ahmed, the respected Vice Chancellor, CUST Islamabad inaugurated the facility during the ceremony held on December 15, 2018 at the university campus. The respected VC emphasized the importance of innovative technology implementations in construction sector. Engr. Abdul Qadeer, GM (Head), NESPAK Islamabad was the Chief Gest for the event. The initiative received a very profound response and support for this newly established facility as many higher officials, industry experts and professionals form different construction organizations along with senior academic researchers from various universities also participated in the event. The participants were also briefed about the tentative schedule of proposed trainings for the next year.

Prof. Aamer Iqbal Bhatti
Dean ORIC

Capital University of Science and Technology
Islamabad Expressway, Kahuta Road, Zone-V, Islamabad
Phone: +92 51 111 555 666, Fax: 92 51 4486705
Email: info@cust.edu.pk, Website: http"//www.cust.edu.pk

No.23/CUST/ORIC/2019
15th January, 2019

Session with Director Research STMU, Islamabad

Office of Research Innovation and Commercialization at Capital University of Science and Technology (CUST) has the ambition to brace the academic collaboration of the university. In this regard a brainstorming session with Dr. Fouzia Sadiq, Director Research, Shifa Tameer-e-Millat University (STMU) was held onWednesday 09thJanuary, 2019 during her visit to CUST. The aim of her visit was to identify areas of research in which both universities can collaborate. Meeting with Dr. Fouzia Sadiq was held in F-Block Conference Room at 11:00 AM.

Prof. Aamer Iqbal Bhatti, Dean Research & Innovation, chaired the meeting. Dr. Sahar Fazal, HoD Department of Biosciences, Dr. Muzaffar Abbas, HoD Department of Pharmacy, Faculty Members from Department of Biosciences and Pharmacy along with MS and PhD scholars attended the session. The key points of the session included.

- Collaboration in terms of research between CUST and STMU.
- Organizing Research Seminar for graduate students.
- Joint projects between CUST and STMU.

Fouzia Sadiq invited Prof. Aamer Iqbal Bhatti as invited speaker to STMU upon which Prof. Aamer Iqbal Bhatti showed his gratitude and accepted the invitation. The session ended with a vote of thanks to the chair and participants.

Prof. Aamer Iqbal Bhatti
Dean Research & Innovation

Report

Revit Architecture Fundamental - BIM CoE

Newly established 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 first training workshop on ***REVIT Architecture Fundamentals*** for two (02) days on 11 & 12 January, 2019.

Ten (10) individuals with different educational/industrial background participated in this training from various organizations (i.e. CDA, Designmen, PMO-NUST, IIUI etc.). During the two days, the participants were briefed about the fundamentals of BIM and experienced hands on training of Revit Architecture. At the end the training, certificates were distributed among the participants.