



CAPITAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

ANNUAL RESEARCH BOOK 2017



Dean ORIC Message

Capital University of Science & Technology (CUST) Islamabad is a progressive academic institution that believes in actively contributing to the society through strong emphasis on research, innovation and commercialization. The University believes in effective commercialization of its thorough research and innovation endeavors. We have a strong faith that our development efforts should be based on the solid footing of world class research. In this context, the 2017 Annual Research Book is in your hands. This book entails the contribution of CUST towards the body of the world of scientific and engineering literature.

It is heartening to see that our research contributions are growing at a satisfactory pace and I expect our highly capable faculty and motivated students to do equally well in taking this research to the footsteps of society through the wheels of commercialization.

The Office of Research, Innovation and Commercialization has done great work in compiling this document of great value, especially the day and night efforts of Assistant Director ORIC deserve special appreciation.



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1. Introduction

1.1 Capital University of Science and Technology

Formerly known as Muhammad Ali Jinnah University, Capital University of Science & Technology was authorized by the Federal Government through an Act of Parliament to award degrees at all levels, from Bachelor to Doctorate, in all disciplines.

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 pro-actively 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. CUST is famous for research excellence and solving real-world problems through a network of partnerships and collaborations.

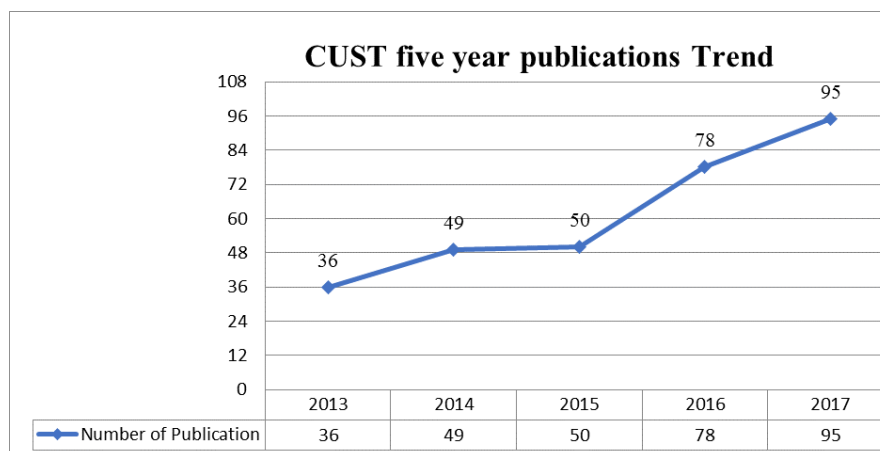


Figure 1.1: CUST Five Year Publications Trend

CUST aims to bring the highest possible excellence in research and innovation to transform understanding of humanity, the world we live in and the universe around us. CUST has a multidisciplinary research culture with specialization in the field of Engineering, Computing and Social Sciences. The University is investing heavily in facilities, technology and faculty development to promote research in a meaningful and a purposeful manner. Figure 1.1 shows the university yearly growth in terms of publications, where a growing trend is seen. Similarly the quality of applied research carried out at university can be seen from Figure 1.2, which shows the departmental impact factor to date.

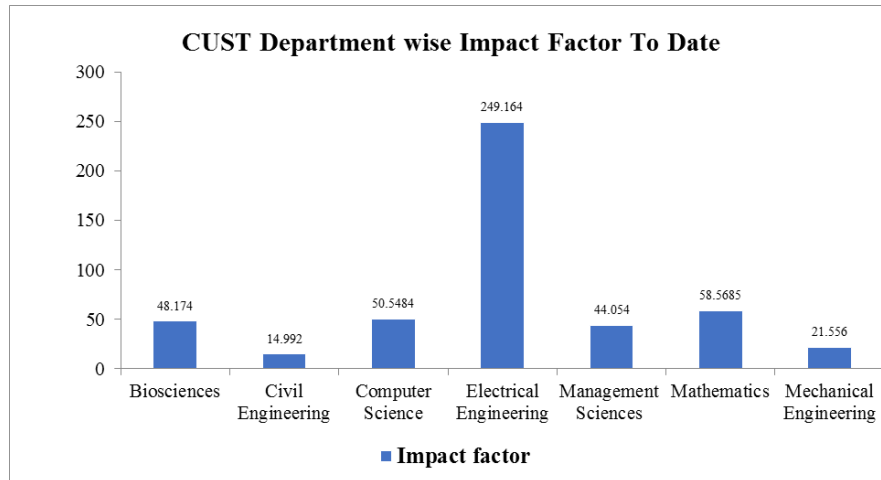


Figure 1.2: CUST Department Wise Impact factor - To Date

1.2 Vision

“To be recognized as a leading institution for producing competent professionals who are instrumental in development of a prosperous society.”

1.3 Mission

“Capital University of Science and Technology, through the pursuit of excellence in an ethical environment, is committed to providing to a diverse student population the intellectual and technological tools necessary to meet the challenges of the future.”



2. CUST Journal Publications, 2017

Capital University of Science and Technology has always been proactive in the field of practical research. It has been through the hard work of CUST faculty and extreme dedication of students that CUST has been successful in publishing its work in renowned Impact Factor (IF) National and International Journals. The department wise publications of CUST in the year 2017 are¹.

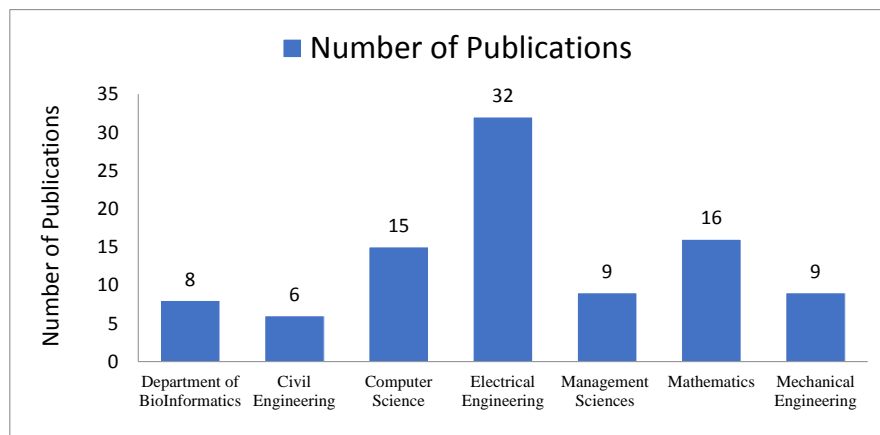


Figure 2.1: CUST Department Wise Number of Publications

2.1 Biosciences

1. A. Kanwal and S. Fazal, “Construction and analysis of protein-protein interaction network correlated with ankylosing spondylitis,” *Gene*, vol. 638, pp. 41-51, 2018.

¹The publications that are published on-line and are not yet allotted the volume, issue number and page numbers are marked with “xx”.

2. 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.
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2.7 Mechanical Engineering

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3. CUST International Collaborations

3.1 Heavy Industry Taxila (2018)

MoU signed between Capital University of Science and Technology and Heavy Industries Taxila to promote industry-academia collaboration through joint research and development activities of mutual interest in accordance with their respective needs and objectives.

3.2 European Commissions Erasmus Mundus Programs (2017-2021)

The institutions agree to cooperate for the exchange of students and/or staff in the context of the Erasmus+ program they commit to respect the quality requirements of the Erasmus charter for Higher Education in all aspects of the organization and management on the mobility, in particular the recognition of the credits awarded to students by the partner institution. The institution also commit to sound and transparent management of funds allocated to them through Erasmus+.

3.3 Bremen Research Cluster for Dynamics in Logistics of the University of Bremen (2017)

MoU signed between Bremen Research Cluster for Dynamics in Logistics of the University of Bremen and Capital University of Science & Technology, Islamabad for exchange of faculty, researchers, scientists, students and implementation of joint research projects. The collaboration also includes organization and conduction of mutual conferences and exchange of publications and other material.

3.4 The Università' degli studi di Brescia (2017)

MoU signed between the Università' degli studi di Brescia, Department of Industrial & Mechanical Engineering and Capital University of Science & Technology, Islamabad, Department of Mechanical Engineering to promote academic collaboration including exchange of professors, researchers and students. In particular the research activity will be carried out in the fields of industrial engineering

and service and supply chain management with the purpose to promote, develop and coordinate joint research programs and encourage the exchange between researchers in these fields.

3.5 Graz University of Technology (2016)

MoU between between Graz University of Technology, Graz Austria and Capital University of Science & Technology, Islamabad, Pakistan for research and development collaboration. The collaboration possibilities both parties agreed upon includes exchange of students and faculty, co-supervision of MS thesis, participation in ERASMUS+ program, joint organizations of conferences and seminars, and invitation to speakers for conferences, workshops, seminars and research visits.

3.6 National Testing Service Pakistan (2016)

MoU signed between national Testing Service (NTS) Pakistan and Capital University of Science & Technology, Islamabad to accept NTS tests for admission at CUST in undergraduate and graduate level.

3.7 Gheorge Asachi Technical University of IASI (2016)

MoU signed between Gheorge Asachi Technical University of IASI and Capital University of Science & Technology, Islamabad to promote cooperation in teaching, research, international exchange of staff, students and Knowledge. Upon mutual consent of parties collaboration will be carried out for student exchange , articulation of students between award at the two universities, visit between universities by academic staff (Faculty), sharing of academic materials, joint organizations of conferences, seminars, joint production and delivery of courses programs.

3.8 University of Sciences and Technology (UST) Bannu (2016)

MoU signed between UST Bannu and Capital University of Science & Technology, Islamabad for sharing human and material resource to undertake scientific and technical collaboration for the exchange of ideas, skills and techniques on problem of mutual interest as agreed from time to time.

3.9 Career Pakistan (2016)

MoU signed between Capital University of Science & Technology, Islamabad and Career Pakistan for capacity building in areas of Management Sciences, Engineering, Computer Science, and Social Science and Corporate Social responsibility for mutual benefit of both organizations.

3.10 MoU between MAJU, UET Lahore and OHIO State University (2014)

In accordance to mutual desire to promote further cooperation in higher education between United States of America and Pakistan, the Controls and Signal Processing Research Group (CASPR) at Department of Electronic Engineering at the M A Jinnah University and the Center of Energy Research and Development (CERAD) at the Kala Shah Kaku Campus, University of Engineering and Technology, and the Ohio State University (OSU) on behalf of its Center of Automotive Research (CAR) in the OSU College of Engineering, Columbus, Ohio, USA enter into formal agreement for the purpose of educational and cultural exchange.

3.11 SAP University Alliances (2014)

SAP grants to Educational Institution the right to use SAP University Alliances Academic Educational Material for teaching purpose only. SAP will provide access to the required SAP UA Academic Educational Material that Education Institution, as an associate member of University Alliances, may use in compliance with the restrictions agreed between SAP and educational institutions in the contract.

3.12 Defence Science and Technology (DESTO) Rawalpindi (2008)

MoU signed between Muhammad Ali Jinnah University and DESTO to recognize the value to technical and scientific collaborations between universities and Research and Development (R&D) organizations of Pakistan. Both parties agreed for joint submission of proposals, information exchange and invite on voluntary basis representatives of other institutions to participate in scholarly conferences and colloquia.

3.13 University of California Berkeley USA (2007)

MoU signed between University of California Berkeley USA and Muhammad Ali Jinnah University, Islamabad Campus for exchange of faculty, researchers and graduate students. Both the universities agreed to exchange academic materials of mutual interest, invite representatives to participate in scholarly conferences and colloquia.

3.14 Institut Telecom ParisTech, France

MoU signed for research collaboration between Capital University of Science & Technology and Institut Telecom ParisTech, France.

3.15 Sustainable Development Policy Institute (SDPI)

MoU signed between Capital University of Science & Technology, Islamabad and SDPI for launching new research and training initiatives. The proposed areas of cooperation may include any program or project, nature of which shall be mutually agreed upon by the parties.

Both parties agreed upon development of joint research proposals, activities and publications, joint organization and participating in seminars, conferences, workshops and academic professional meetings.



4. CUST 2017 Industrial Projects

4.1 Vehicle Based Road/Environment Condition Warning System using Vehicular Ad hoc Networks (VANETs)

Project Status:	In Progress
Project Director:	Prof. Amir Qayyum
In Collaboration:	Telecom Sud Paris, France and Universiti Teknologi Petronas Malaysia
Total Budget:	PKR 11.9 Million
Project Funded:	Govt of France, under the ICT-ASIA Program and in Collaboration With three project partners
Commercialization:	Prototype Development

4.2 3GPP-IMS Complaint E2E Mobile IPTV Solution for 4G/LTE Networks

Project Status:	In Progress
Project Director:	Prof. Amir Qayyum
In Collaboration:	M.A. Jinnah University Islamabad
Duration:	Nov 2017 – Aug 2019
Total Budget:	PKR 31 Million
Project Funded:	EMI Networks Pvt. Ltd
Commercialization:	Prototype Development

4.3 Framework for Control and Monitoring of Wireless Mesh Networks (WMN) using Software Defined Networking (SDN)

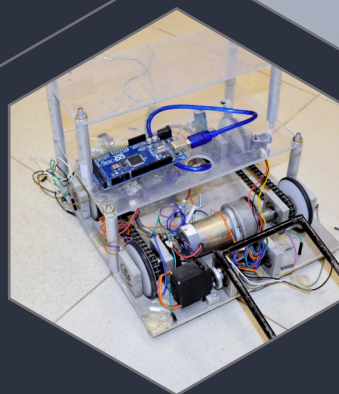
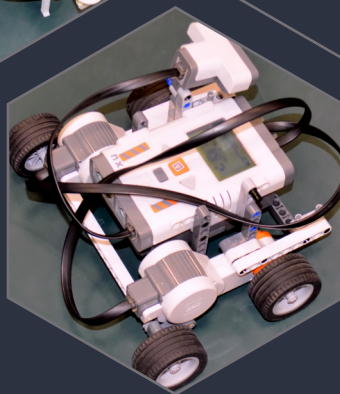
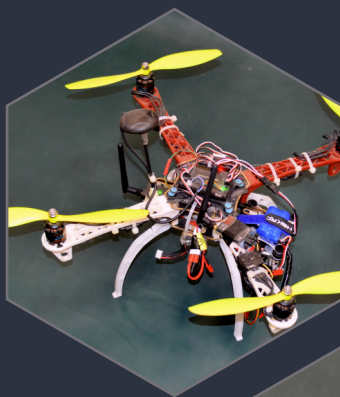
Project Status:	In Progress
Project Director:	Prof. Amir Qayyum
In Collaboration:	Government of France
Duration:	2015 – 2018
Total Budget:	PKR 2.3 Million
Project Funded:	Govt. of France & HEC

4.4 Development of Phased Array Radar

Project Status:	In Progress
Project Director:	Prof. Aamer Iqbal Bhatti
Duration:	2009 - to date
Total Budget:	PKR 12.6 Million
Project Funded:	Public Sector Organization
Commercialization:	Prototype Development.

4.5 Autonomous Landing/Takeoff of Unmanned Aerial Vehicle (UAV)

Project Status:	In Progress
Project Director:	Prof. Aamer Iqbal Bhatti
Duration:	Sept 2017 – Aug 2020
Total Budget:	PKR 2.86 Million
Project Funded:	Public Sector Organization



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