

International Center for Chemical and Biological Sciences

Established in 1966

Pakistan's Premier Academic Research Establishment

PROF. DR. FARZANA SHAHEEN

L'Oréal-UNESCO Fellow / Fulbright Fellow

Director,

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Links. www.iccs.edu



IMPACT OF RESEARCH & ACADEMIC PROGRAMS @ ICCBS

- ICCBS is a world class institute with a faculty with interdisciplinary expertise and instrumental facilities at par international standard
- Producing high quality M. Phil/ Ph. D. remains at the core of institutional mission.
- Institution is providing services to the society through SFDL, IAC, Diagnostic Lab and CBSCR etc.
- The Center has earned major recognitions from Pakistan and abroad for training of young researchers from home and abroad in frontiers areas of science and technology.

Area of Research

H.E.J. Research Institute of Chemistry:

(Chemical Sciences)

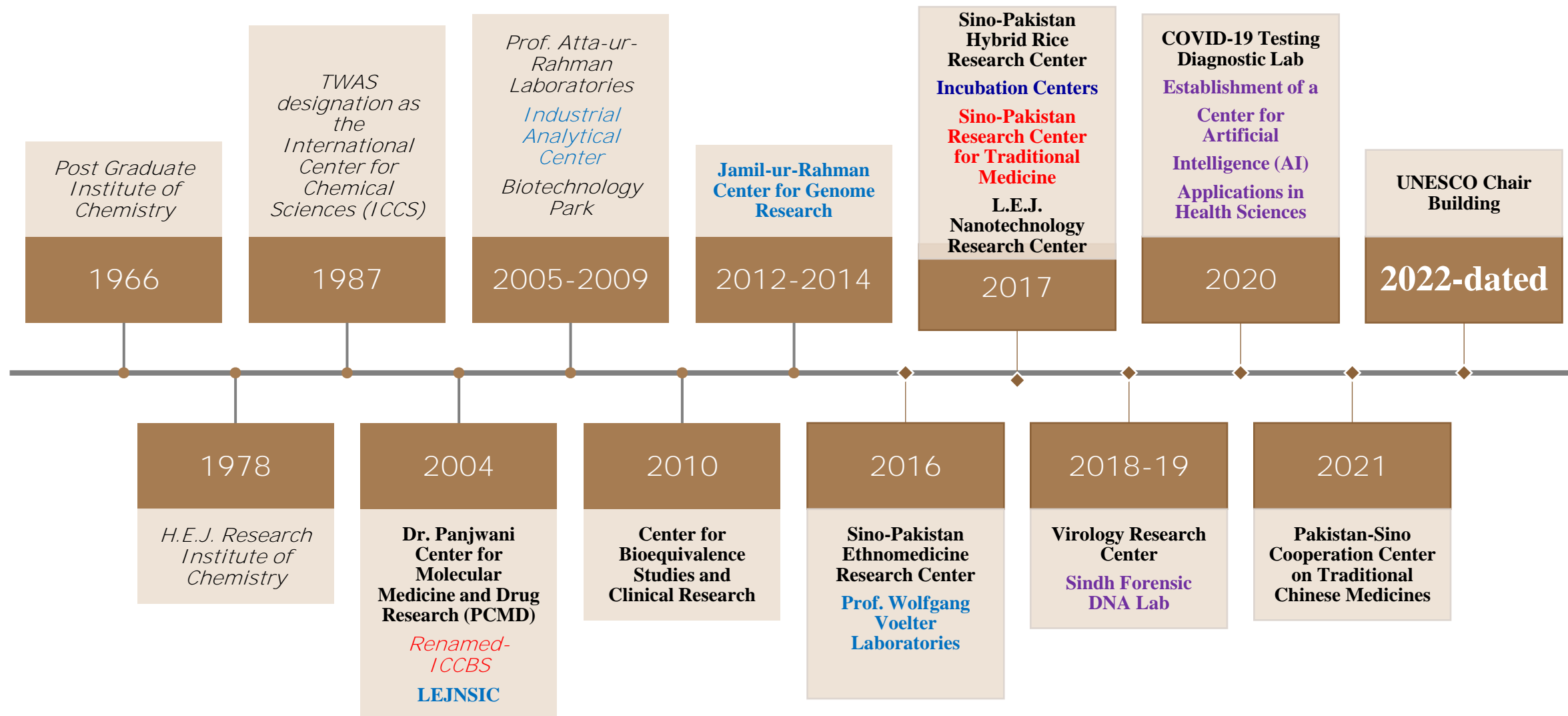
- Organic Synthesis
- Natural Product Chemistry
- Nanotechnology
- Polymer Chemistry
- Peptide Chemistry
- Computational Chemistry

Dr. Panjwani Center for Molecular Medicine and Drug Research:

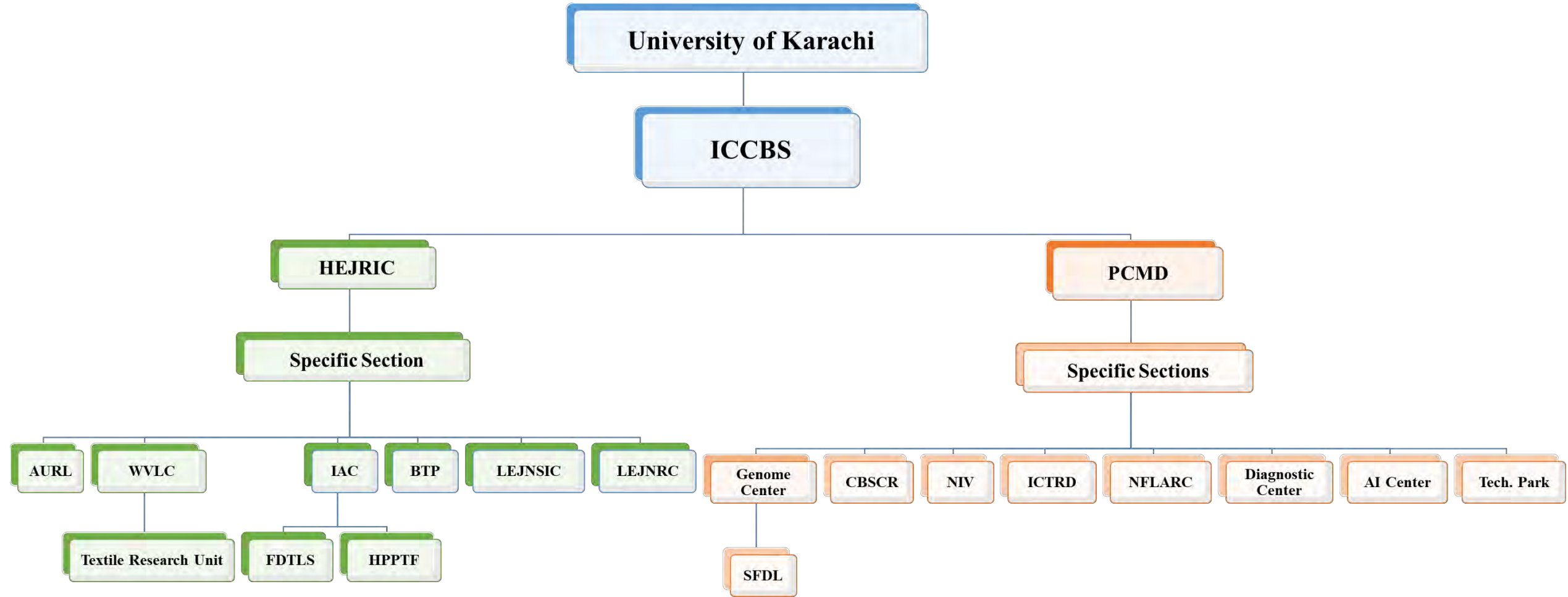
(Biological Sciences)

- Stem Cell Research
- Computational Biology and Bioinformatics
- Protein Chemistry
- Structural and Molecular Biology
- Immunology
- Microbiology
- Molecular Pharmacology
- Virology
- Genomics

Genesis of the ICCBS- 1966-Dated



ICCBS- ORGANOGRAM



- AURL: Prof. Dr. Atta-ur-Rahman Laboratories
- WVLC: Prof. Wolfgang Voelter Laboratories Complex
- IAC: Industrial Analytical Center
- BTP: Biotechnology Wing
- LEJNSIC: Latif Ebrahim Jamal National Science Information Center
- LEJNRC: LEJ Nanotechnology Center
- Genome Center: Jamil-ur-Rahman Center for Genome Research
- CBSCR: Center for Bioequivalence Studies and Clinical Research
- ICTRD: International Research Center for Tropical and Regional Diseases
- NIV: National Institute of Virology
- AI Center: Center for AI Applications in Health Sciences
- Tech. Park: ICCBS Technology Park and Technology Incubation Center
- SFDL: Sindh Forensic DNA and Serology Laboratory
- FDTLS: Food and Drug Testing Laboratory of Sindh
- HPPTF: Halal Products Research and Testing Facility



HEJ RESEARCH INSTITUTE OF CHEMISTRY



PROF. DR. ATTA-UR-RAHMAN LABORATORIES



L.E.J. NANOTECHNOLOGY CENTER



LATIF EBRAHIM JAMAL NATIONAL SCIENCE INFORMATION CENTER



BIOTECHNOLOGY PARK



PROF. DR. WOLFGANG VOELTER LABORATORY COMPLEX



NEW MURREE MEDICINAL PLANT RESEARCH CENTER



UNESCO CHAIR ON MEDICINAL AND BIO-ORGANIC NATURAL PRODUCT CHEMISTRY (UNDER CONSTRUCTION)



INDUSTRIAL ANALYTICAL CENTER



MARINE CHEMISTRY CENTER AND COLLECTION FACILITY



DR. PANJWANI CENTER FOR MOLECULAR MEDICINE AND DRUG RESEARCH



JAMIL-UR-RAHMAN CENTER FOR GENOME RESEARCH



THE NATIONAL INSTITUTE OF VIROLOGY



**NATIONAL FACILITY
FOR LABORATORY ANIMAL RESEARCH**



**CENTER FOR BIOEQUIVALENCE STUDIES AND
CLINICAL RESEARCH (PCMD)**



**CENTER FOR ARTIFICIAL INTELLIGENCE (AI)
APPLICATIONS IN HEALTH SCIENCES AND
TECHNOLOGY INCUBATION CENTERS**

ICCBS- *International Recognition*

- ❖ **Only OIC Center of Excellence in Chemical Sciences**
- ❖ **UNESCO Category II Center**
- ❖ **Islamic Development Bank (IsDB) Prize for Best Science Institution**
(2004 and 2010)
- ❖ **TWAS Center of Excellence for training of scholars**
- ❖ **COMSATS Center of Excellence**



Key Features and Strength of ICCBS

- **Research Programs in Chemical and Biological Sciences**
- **Analytical and Diagnostic Research at Genetic, cellular, and chemical levels**
- **State-of-the-art sophisticated instrumentation supporting research programs in chemical and biological sciences**
- **Capacity building of manpower in technical and research related programs**
- **Capacity to carry out full genome sequencing locally**
- **Capacity to analyse biological toxins and chemical poisons *of all kinds***
- **High quality Imaging and Material Testing Facilities**
- **Well maintained Molecular Bank, Bio-Bank, and Microbial Bank as national repositories of chemical and biological material**
- **Stem cell Bank and Virus Bank are in the process of establishment.**

High Quality and Trained Engineers

- **World class Engineers on higher grades and salaries**
- **Co-supervision of all Ph. D. students by foreign experts**
- **Strong international linkages**
- **Excellent Electronic/Mechanical Engineers**
- **Trained internationally**
- **Capable of Maintaining Sophisticated Scientific Instruments**

SCHOLARSHIPS TO ALL STUDENTS

ICCBS give scholarship to all our enrolled students and Foreign scholars

Vigorous theoretical and Practical Training

Over 1,100 foreign students trained

For local enrolled students: (in PKR)

M. Phil. 20,000/month

Ph.D. 50,000/month

For Foreign scholars: (in PKR)

Undergraduate 20,000/month

Masters 30,000/month

Ph. D. students 40,000/month

Post-doc 50,000/month

Facilities *ICCBS-World Class Infrastructure*

- Training on state-of-the-art facilities ----better than facilities in most European and US Universities !
- **13 Superconducting Nuclear Magnetic Resonance machines (operate at -269 °C)**
- Over 20 Mass spectrometers
- **State-of-the-art imaging facility (including Scanning Electron Microscope)**
- Industrial Analytical Center –Internationally accredited
- UPS/Generators/solar panels: ~8.5 MW

ICCBS - *Accreditations*

1. ISO 9001, 17025, and 2015 facilities
2. DRAP Accredited Clinical Trial, Bioequivalence, and CRO facility
3. Internationally accredited food testing laboratory
4. Halal Product Testing Accreditation

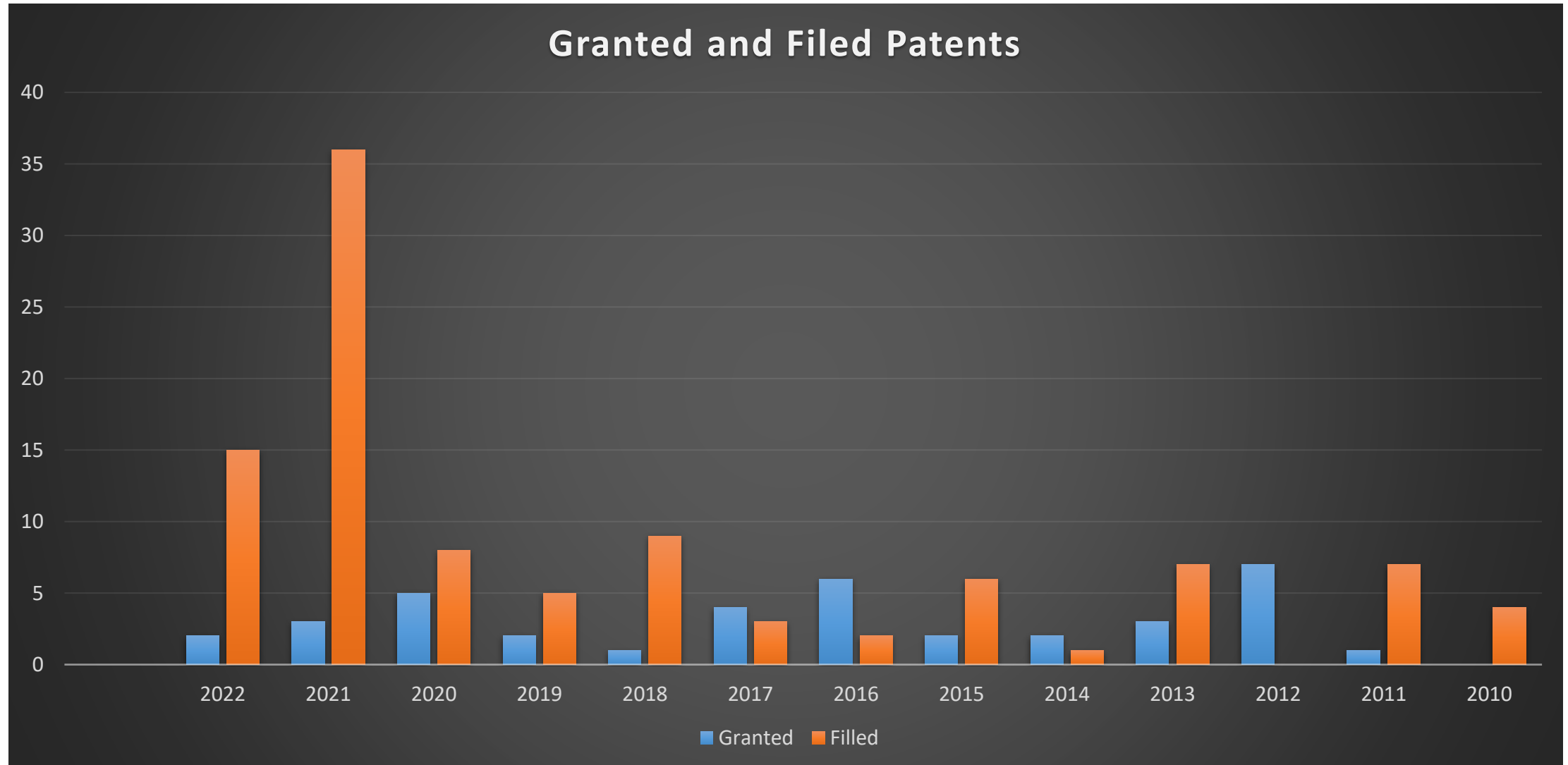


ICCBS - Research Output (Last 20 years)

- Research articles in reputed science journals
 - Patents (National and international)
 - Total Ph. D. / M. Phil. produced
 - Total Citations
- Over 10,000
 - 200
 - Over 1,500
 - Over 300,000



ICCBS Granted and Filed Patents (2010-2022)



ICCBS – GLOBAL LINKAGES

ICCBS has signed More than **200 MoUs** signed with International Partners and with National Institutions



ICCBS-HCTRS (ICCBS-Halal Certification, Testing, and Research Services)

Food industries working with us (few examples)



Research publications in Halal (few examples)

King Saud University
Arabian Journal of Chemistry
www.ku.edu.sa
www.sciencedirect.com

ORIGINAL ARTICLE

Untargeted-metabolomics differentiation between poultry samples slaughtered with and without detaching spinal cord

King Saud University
Arabian Journal of Chemistry
www.ku.edu.sa
www.sciencedirect.com

ORIGINAL ARTICLE

A simple and sensitive NGS-based method for pork detection in complex food samples

TÜBİTAK

Turkish Journal of Chemistry
http://journals.tubitak.gov.tr/chem/
Research Article

Türk J Chem
(2019) 43: 1098 – 1108
© TÜBİTAK
doi:10.3906/kim-1902-17

Detection of lard contamination in five different edible oils by FT-IR spectroscopy using a partial least squares calibration model

A large number of pharmaceutical industries are also working with us

Standardization for nutrition and hygiene in Halal certified food & other products, in accordance to international export quality standards/OIC-SMIIC Halal Standards.

ISO 17025-1700, PHA, and GCC Accreditations are in process.



ICCBS – *Public Services*

Serving as the:

- **Sindh Forensic DNA and Serology Laboratory.**
- **Food Testing Laboratory of Sindh.**
- **Drug Testing Laboratory of Sindh.**
- **Halal Products Research and Testing Facility**

Sindh Forensic DNA and Serology Laboratory (SFDL)-Few Examples

- **The Genome Center of ICCBS hosts Sindh Forensic and DNA Laboratory which is Pakistan's most modern Forensic DNA and Serology Lab (SFDL) established through the support of health Department, Government of Sindh and this is the only ISO 17025 certified Laboratory in the Country which is offering comprehensive DNA and Serology services in the province of Sindh.**

High Profiles Cases of the SFDL

- PIA Plane Crash Case (2020)
- Nooriabad Van Accident Case (2020)
- Baby Maham Rape and Murder Case (2021)
- Kidnapping and Murder Cases of teenage boy Malir (2022)
- Suicide Attack on Chinese Faculty Members at the University of Karachi (2022)
- Dia Bheel Murder Case (2022)
- Lasbela Bus Accident (2023)

SFDL- FEW PICTURES



Industrial Analytical Center, ICCBS - Support to Industries

- Over 600 industries are annually supported for analytical services, export certifications, raw material testing, and product improvement.
- World class analytical and synthetic facility which is approached by the higher courts for critical analytical assignments.
- Major industrial and development partners includes;

SERVICES PROVIDED TO GOVERNMENT AGENCIES

- 1) PAKISTAN CUSTOMS
- 2) ANIMAL QUARANTINE DEPARTMENT
- 3) PLANT PROTECTION DEPARTMENT
- 4) SINDH FOOD AUTHORITY GOVERNMENT OF SINDH
- 5) HEALTH DEPARTMENT GOVERNMENT OF SINDH
- 6) SINDH POLICE & THEIR RELEVANT LAW ENFORCEMENT AGENCIES (LEA'S)

SERVICES PROVIDED TO EXPORT & IMPORT BASED INDUSTRIES

- 1) PHARMACEUTICAL INDUSTRIES
- 2) POLYMER INDUSTRIES
- 3) TEXTILE INDUSTRIES
- 4) CHEMICAL INDUSTRIES
- 5) FOOD INDUSTRIES
- 6) LEATHER INDUSTRIES
- 7) METHOD DEVELOPMENT, VALIDATION & VERIFICATION PROVIDED TO VARIOUS PHARMACEUTICAL & FOOD INDUSTRIES.



Clinical Research Facility of the Country

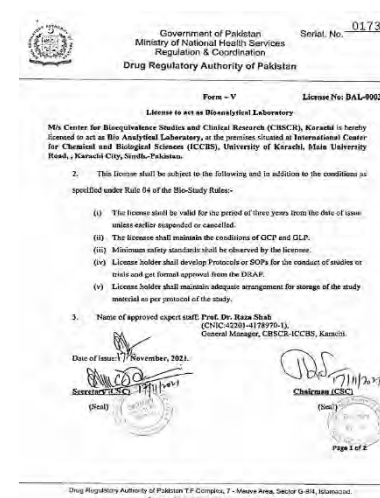
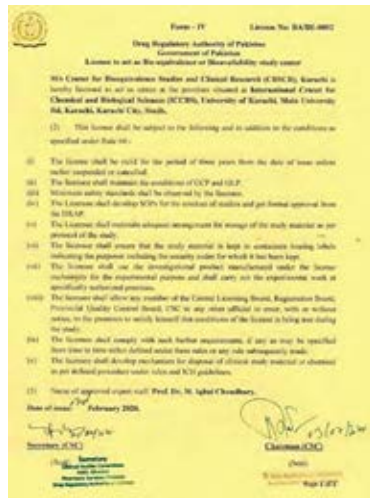
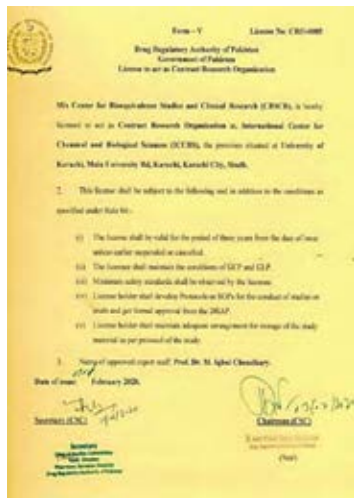


**CENTER FOR BIOEQUIVALENCE STUDIES AND CLINICAL RESEARCH
INTERNATIONAL CENTER FOR CHEMICAL AND BIOLOGICAL SCIENCES
UNIVERSITY OF KARACHI, PAKISTAN**

COVERED AREA: 32000 SFT

First ISO 17025 and ISO 9001 accredited

More 28 studies conducted/ more than 40 methods developed



CRO License from DRAP

BA/BE License from DRAP

CTU License from DRAP

Laboratory License from DRAP

ONLY CLINICAL RESEARCH CENTER IN THE COUNTRY HAVING FOUR LICENSE FROM DRAP

ISO 17025:2017 Certification from PNAC



ISO 17025:2017 Certification from PNAC

Clinical Trials on Traditional Chinese Medicine and COVID-19 Vaccine

- Clinical trial of Yinhuang Qingfei Capsules was successfully conducted.
- Clinical trial of Jin Hua Qing Gan Granules for COVID-19 is ongoing.
- Phase I clinical trial of COVID-19 vaccine.
- Phase III clinical trial of COVID-19 vaccine.
- Several TCM products are in preparation stage of clinical trials.



Anbang Pharmaceutical Yinhuang Qingfei Capsules



Jin Hua Qing Gan Granules



Fu Ke Qian Jin Pian



Hou Tou Jian Wei Capsule



COVID-19 vaccine

CLINICAL UNIT



7 Wards (110 beds)



Recreational Area



Intensive Care Unit (ICU)



Sample storage room



Medical Officer Room



Crash Cart

BIOANALYTICAL UNIT



LC-MS/MS



HPLC



Atomic Absorption Spectrophotometer



GC-MS/MS



Dissolution Testing



Disintegration

Data Management Services:

- Protocol development and /or review
- Regulatory submission and approval
- IEC/IRB submission, approval and communication
- Clinical execution
- Clinical data management
- Testing method development, validation and transfer
- High throughput analysis of biological specimens
- Statistical analysis
- Integrated report writing and electronic submission

BIOTECHNOLOGY PARK AT THE ICCBS



SEEDS IN SPACE PROJECT

• OBJECTIVE

To compare the effects of microgravity, cosmic radiation, and extreme temperatures encountered outside the space station on the genetic stability, germination, growth, flowering, fruiting, and medicinal/nutritional properties of seeds with those cultivated under earth conditions.

Plant Varieties

1. *Gossypium hirsutum* L. (Upland or Mexican cotton)
2. *Moringa oleifera* (Sohanjna)
3. *Lawsonia inermis* L. (Henna)
4. *Caesalpinia bonducella* L. (Karanjwa)
5. *Trigonella foenum-graecum* L. (Fenugreek)
6. *Withania somnifera* L. (Winter cherry)

Prof. Liu Xinmin

**Member, Expert Advisory Panel on Traditional Medicine, WHO
Chief Scientist, Institute of Drug Discovery Technology, Ningbo
University Ningbo, Zhejiang Province, China**



PUBLIC OUTREACH PROGRAMS

Public Awareness Lecture Series- 65 lectures delivered in local language on topics of public health/ hygiene etc

Open House Visit Program for Schools and Colleges-

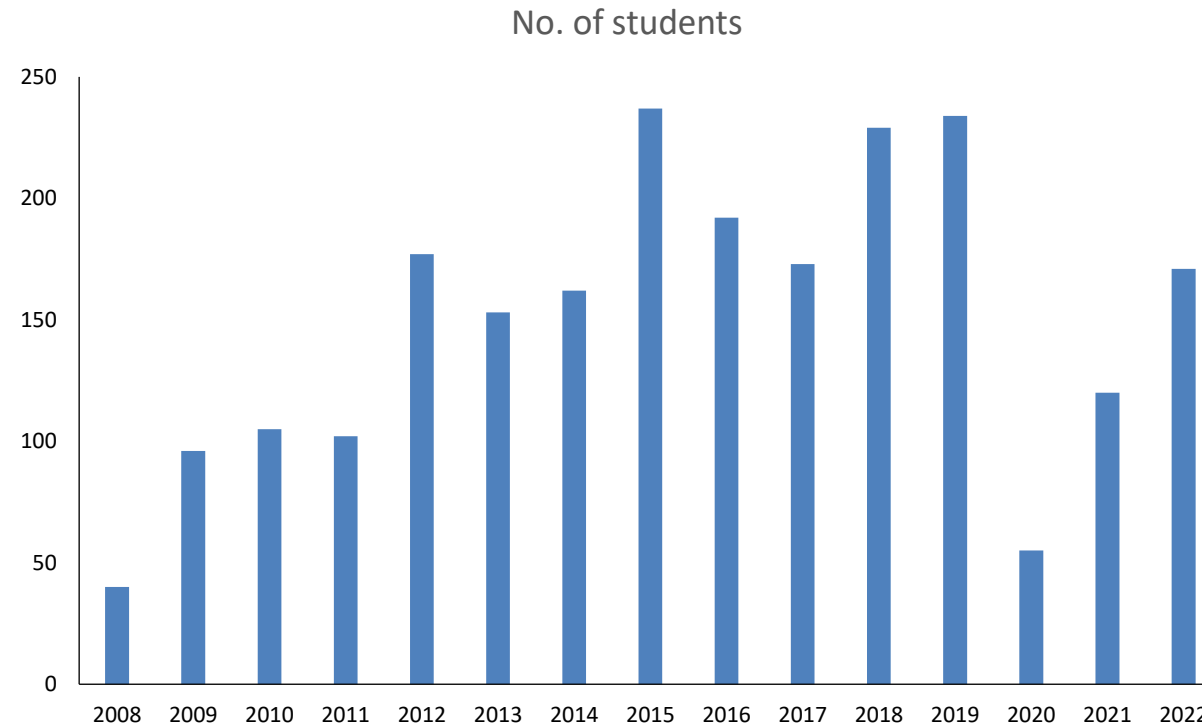
Access to Scientific Instrument Program- samples have been processed for NMR/ Mass analyses-HEC/ PCSIR Instrumentation

Access Program

PUBLIC OUTREACH PROGRAMS

Summer Internship Program

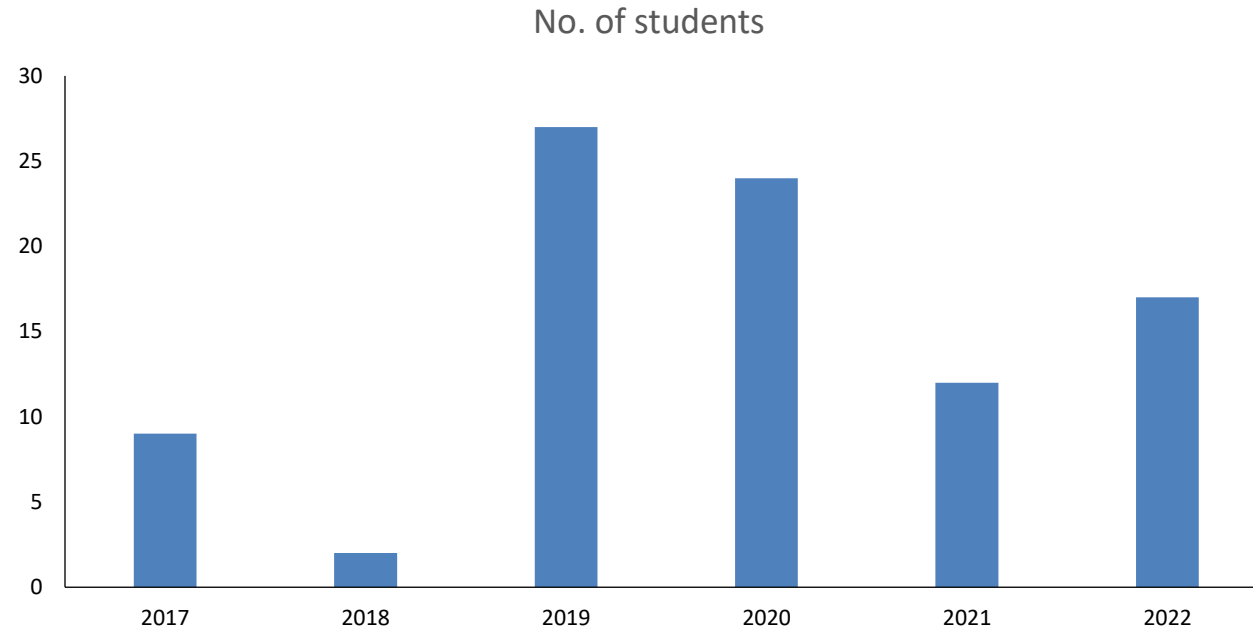
Year	No. of students
2008	40
2009	96
2010	105
2011	102
2012	1077
2013	153
2014	162
2015	237
2016	192
2017	173
2018	229
2019	234
2020	55
2021	120
2022	171
Total	2,246



PUBLIC OUTREACH PROGRAMS

Winter Internship Program for Medical Graduate

Year	No. of students
2017	9
2018	2
2019	27
2020	24
2021	12
2022	17
Total	91



TRAINING OF INTERNATIONAL SCHOLARS

CAPACITY BUILDING OF YOUNG SCHOLARS IN SCIENCE AND TECHNOLOGY

- ❖ Over 1100 scholars from developed and developing world have obtained advanced research trainings in chemical and biochemical sciences at the International Center for Chemical and Biological Sciences (ICCBS), University of Karachi.
- ❖ Students includes from Germany, France, Turkey, USA, Cameroon, Nigeria, Kazakhstan, Sudan, Sri Lanka, Bangladesh, Nepal, Malaysia, Iran, China, Iraq, Cuba, Jordan, Palestine, Saudi Arabia, etc.

Joint NAM S&T Centre-ICCBS Karachi (Pakistan) Fellowship
www.namstct.org

TWAS Fellowship Program
<http://www.iccs.edu/twas.php>

COMSTECH Visiting Scientists Program
<http://www.comstech.org/Programs>

Others (UNESCO, IFS, ISESCO, COMSATS, IDB, etc)

**THE 8th INTERNATIONAL SYMPOSIUM-
CUM-TRAINING COURSE ON MOLECULAR
MEDICINE AND DRUG RESEARCH
(MMDR-8)
(NOVEMBER, 27-30, 2023)**

8th International Symposium-cum-Training Course on Molecular Medicine and Drug Research (MMDR-8)

- ❑ The 8th International Symposium-cum-Training Course on Molecular Medicine and Drug Research (MMDR-8) was held during November 27 - 30, 2023, at the Dr. Panjwani Center for Molecular Medicine and Drug Research (PCMD), International Center for Chemical and Biological Sciences (ICCBS), University of Karachi, Karachi, Pakistan.
- ❑ The first symposium of the series was held in January 2007.
- ❑ Chief Guest: Dr. Saad Khallid Niaz, Minister of Health, Social Welfare & Public Health
- ❑ Honorable Chief Guest: Prof. Dr. Khalid Mahmood Iraqi, Vice Chancellor, University of Karachi
- ❑ Other dignitaries who spoke during the ceremony included Prof. Dr. Atta-ur-Rahman, Patron in Chief, ICCBS, Prof. Farzana Shaheen, Director, ICCBS, Prof. Dr. M. Iqbal Choudhary, Director General, COMSTECH and UNESCO Chair holder, Ms. Nadira Panjwani, Managing Trustee, Dr. Panjwani Memorial Trust, and Mr. Aziz Latif Jamal, Chairman, Hussein Ebrahim Jamal Foundation. Prof. Dr. Asmat Salim, Coordinator, MMDR-8.

Glimpses 8th International Symposium-cum-Training Course on Molecular Medicine and Drug Research (MMDR-8)



SCIENTIFIC PROGRAM

- ❑ The scientific program of the symposium included plenary and invited lectures by eminent scientists and session, and poster presentations by young scholars.
- ❑ Over 600 scientists, including 70 researchers from 32 countries, participated in this international event.
- ❑ Plenary lectures dedicated to the memories of Prof. Salimuzzaman Siddiqui, Prof. Zafar H. Zaidi, Prof. Viqar Uddin Ahmad, Prof. M. Anwar Waqar, and Prof. Sheikh Arshad Saeed were presented by Prof. Dr. Atta-ur-Rahman, Prof. Dr. Rafat A. Siddiqui, Prof. Dr. M. Iqbal Choudhary, Prof. Dr. Ikram Burney, and Prof. Dr. Nessar Ahmed, respectively.
- ❑ During the four-day event, 14 plenary (40 min), 45 invited (30 min), and 25 session (20 min) lectures were presented.
- ❑



Poster Sessions

- ❑ Poster sessions were conducted on November 27, 28, and 29, 2023.
- ❑ A total of 167 posters were presented. To encourage young scholars, certificates and cash prizes were given to two poster winners of each day.
- ❑ The poster winners were Ms. Aimen Inamullah, Ms. Aisha Raza, Ms. Maha Shahid, Ms. Rida-e-Maria Qazi, Ms. Sukaina Arshad, and Mr. Waqar Ahmed.
- ❑ These presenters briefly presented their work during the concluding ceremony on November 30, 2023.



Gala Dinner, 8th International Symposium-cum-Training Course on Molecular Medicine and Drug Research (MMDR-8)



Collaboration with COMSATS Member Countries

- **Bi-national Workshop with Institutions in COMSATS member countries.**
- **Post-graduate and Post Doctoral fellowship(5)**
- **Technician level training programs**
- **Joint research projects in the field of drug discovery from nature**

**STATE-OF-THE-ART
INSTRUMENTATION
FACILITIES AT THE ICCBS**

LARGEST NMR PARK IN THE REGION



13 Superconducting Nuclear Magnetic Resonance- Largest Facility in Afro Asian Region

National X-Ray Diffraction Facility at the ICCBS



**Bruker D8 ADVANCE
Fitted with Cu as source with
LYNXEYE-2 detector
(Powder XRD)**



**Bruker SMART APEX D8 Venture
having Cu as source with CMOS 100
photon detector
(Single Crystal XRD)**

LARGEST MASS SPECTROMETRY FACILITIES



MALDI-TOF (Ultra-flex-III)



Bruker Amazon (HPLC Ion Trap)



MASS SPECTROMETER (ELECTRON BOMBARDMENT SYSTEM)



NEW IMAGING FACILITY



Scanning Electron Microscope

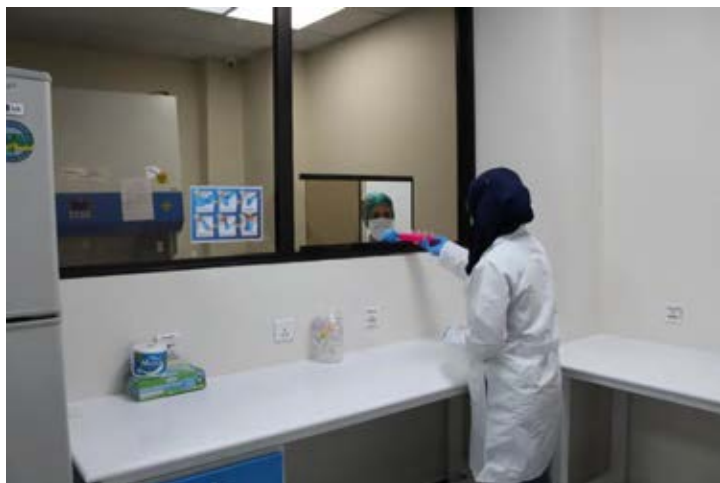


**Nikon TE 2000 inverted
Microscope**



Nikon NI-E Microscope

BSL-II and BSL-III Facilities



NEW IMAGING FACILITY



**Semi automated cryo
microtome**



**Nikon SMZ-800
Stereomicroscope**



**Nikon 90i
Microscope**



Nikon NI-E Microscope

CELL PHYSIOLOGY LABORATORY



PATCH CLAMP



MOLECULAR AND GENOME BIOLOGY LAB



MiSeq Sequencer



Solid State Genome Sequencer



NextSeq Sequencer



ABI – 7500 Real time PCR



ABI – Verity Thermal Cycler



Hitachi – 3500 Genome Analyzer

Facilities at National Facility for Laboratory Animal Research (NFLAR)



Cage washer



Steam Sterilizer



IVIS In-vivo imaging system



Ventilated cages(IVS)

Facilities at L.E.J. Nanotechnology Center



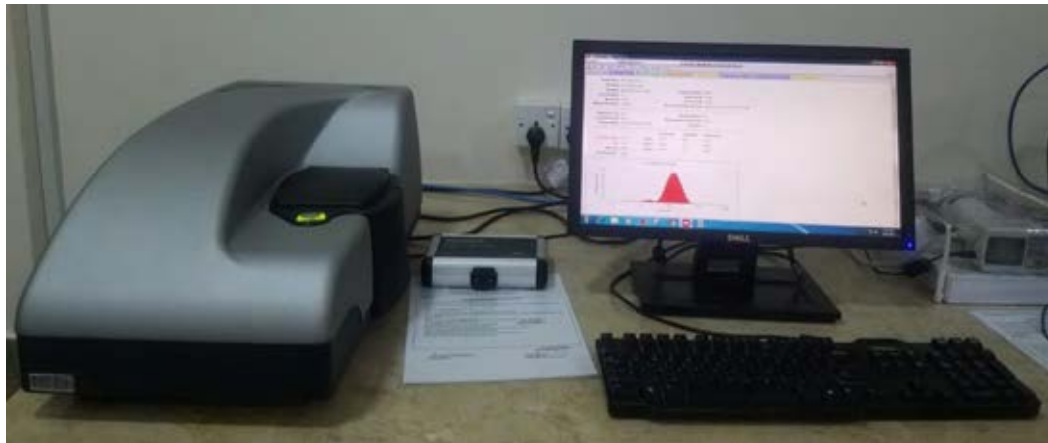
DSC/TGA



Electrospinning Machine



Optical tensiometer



Nanozetasizer



AFM

Facilities at L.E.J. Nanotechnology Center



Microfluidizer



Microplate Reader



Pilot Freeze Dryer



Muffle Furnace



Ultra microbalance

COMPUTATIONAL RESEARCH FACILITY





NITROGEN LIQUIFICATION PLANTS



HELIUM LIQUIFICATION PLANT



PILOT PLANT

ICCBS - LIBRARIES



STUDENT FACILITATION PROGRAMS

CHILDREN DAY CARE CENTERS- WOMEN SUPPORT PROGRAMS



RECREATIONAL FACILITIES



FREE TRANSPORTATION FOR STUDENTS AND STAFF



ACCOMODATION AND CAMPUS LIFE

ICCBS INTERNATIONAL SCHOLAR' LODGES



ICCBS - *IN BRIEF*

- ❖ Demonstrate the possibility to build world-class science institutions in Pakistan.
- ❖ Serving nation in various ways.
- ❖ Role model for others to follow.
- ❖ An institution with global vision.





ICCBS GROUP PHOTOGRAPH

Thank You