



CALL FOR PAPERS

16th IBCAST – 2019

International Bhurban Conference on Applied Sciences & Technology

Technical Co-Sponsor



08 - 12 January, 2019

Despite enormous advances in communication technologies and invention of novel ways of social media, still the most effective way of sharing scientific and technological knowledge and experiences is through symposia and conferences. There has always been a need of keeping abreast with the fast-growing technologies as well as the identification of allied areas. This led to the idea of holding a series of conferences, addressing the contemporary research areas – what is known as the International Bhurban Conference on Applied Sciences and Technology (IBCAST). This effort was not only to promote the latest trends in the research and applications but also to make them accessible to those in need for industrial and economic growth of the country.

Starting from the year 2002, the IBCAST is being held consecutively for over a decade in the vicinity of Islamabad, the capital of Pakistan. Until the year 2005, four technological areas namely; Advanced Materials, Control Engineering, Computational Fluid Dynamics and Wireless Communication & Radar were covered. Later, five more research areas – Biomedical Sciences, Medical Sciences, Cyber Security & Assurance Technologies, Underwater Technologies and Aerostructures were included. So far, more than 11000 scientists and engineers have participated from Pakistani and foreign universities as well as scientific organizations with around 2600 research papers having been presented. The proceedings of the conference are published in IEEE Xplore® by IEEE and catalogued in renowned international journals on yearly basis. So far, 15 conferences have been successfully organized by the CESAT, Islamabad, which is a setup of Centres of Excellence in Science and Applied Technologies of the country with the research activities being inline with the conference theme.

To expand the horizon of this conference, IBCAST has formed associations with universities from China since 8th IBCAST, namely; Beihang University (BUAA), Beijing Institute of Technology (BIT), Nanjing University of Aeronautics and Astronautics (NUAA), Northwestern Polytechnical University (NPU), Shanghai Jiao Tong University (SJTU), Harbin Engineering University (HEU) and Wuhan Institute of Virology, CAS (WIV).

Apart from these universities, foreigners from other countries shall also participate and almost every year more than 40 foreign scholars/professionals/professors attend the conference.

IMPORTANT DATES

Abstract Submission:

30th June 2018

Abstract Acceptance:

15th July 2018

Paper Submission:

30th August 2018

Paper Acceptance:

15th October 2018

Participation Application:

1st November 2018

IBCAST SECTT.

Patron-in-Chief IBCAST

Dr. Nabeel Hayat Malik, HI, SI

Scientific Secretary IBCAST

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Dr. Sajid Raza Chaudhary, SI

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Coordinator IBCAST

Abdul Ahad Qureshi

Technical Coordinator IBCAST

Dr. Mohsin Raza

The 16th IBCAST will consist of the following nine activities:

1. Advanced Materials
2. Aerostructures
3. Biomedical Sciences
4. Control & Signal Processing
5. Cyber Security & Assurance Technologies
6. Fluid Dynamics
7. Medical Sciences
8. Underwater Technologies
9. Wireless Communication & Radar

REGISTRATION FEE

S. No.	Category	Registration Fee
01	Organizations & Professionals	Rs. 5000/-
02	Local Pakistani Paper Presenters & Students	Rs. 2000/-
03	Foreign Professors	US \$400/-
04	Foreign Students (including CESAT Scholars / Other Pakistani)	US \$300/-

* Accommodation at the venue shall only be provided to the paper presenters and invited speakers coming from outside Islamabad.

Note: Application Form is available at : www.ibcast.org.pk

ADVANCED MATERIALS

Development of new materials and their applications has always been the area of great interest for researchers; indicated by innumerable applications appearing in research journals every year. Advancement in characterization technologies has led to better understanding of material properties at nano-level, which has opened new horizons of applications of both metals and non-metals. Addition of nano-phase in polymers and polymer based composites, has resulted in entirely a new range of hybrid materials with much improved properties and functionalities. Similar advancements are also visible in other fields of Materials' Research. The Advanced Material Chapter of 16 IBCAST Conference will provide a forum for scientists and engineers to share their knowledge

and ideas about materials, their properties, behavior, and uses. The scope of the Advanced Materials Activity includes but not limited to following areas:

- Polymers and Polymer Composites
- Fiber Reinforced Composites (FRPs)
- Nanomaterials and Nanotechnology
- Advanced Alloys, Power Metallurgy and Metal Metal Composites (MMC)
- Coating & Surface Technology
- Energy Materials
- Piezoceramics & Piezocomposites Materials for Electromagnetic Radiation Protection
- Photonic, Optical and Semiconductor Materials

AEROSTRUCTURES

Today's aerostructures require stringent conflicting technical and certification as well as financial requirements compliance. There was a strong feeling among the IBCAST community to include a chapter aimed at providing a platform for sharing novel ideas and experience of the local and foreign research and industrial communities. This forum, named as Aerostructures, is now introduced that will encompass the numerous challenges faced during the design, development and testing phases of aerostructures. Invariably, these phases are completed with the help of efficient numerical tools, e.g. finite element method, boundary element method, smooth particle hydrodynamics, linked with high performance computing. The research areas that will be discussed in the forum include, but not limited to;

- Aircraft/Aerospace structural design and modeling approaches
- Static and dynamic aeroelasticity and flight loads
- Static & Dynamic stress analysis
- Vibration, acoustics and model analysis and testing
- Low and high velocity impact
- Fracture and damage tolerance
- Fatigue life assessment
- Sandwich structures, design, fabrication and failure analysis
- Structural Optimization
- Biomechanics
- Advanced manufacturing techniques
- Advanced testing techniques

BIOMEDICAL SCIENCES

Biomedical Sciences have been progressing with unprecedented growth, deepening of knowledge and proliferating methods of investigation. All the branches of Biology speak

the same language and use the same molecular tools. It is not surprising that the elements of these molecular biosciences can be combined at an advanced level of research. Keeping in view this concept, we create a great platform to researchers, scientists, academicians and industry experts to share experiences, discuss research findings and acquire the desired knowledge for practical exercise related to biological sciences to benefit society.

In upcoming conference we will address a range of critically important areas in relation to Bioscience and Biotechnology under the theme:

“Innovations in Bioscience and Biotechnology”

We incorporate Molecular Biology, Microbiology, Immunology, Biodiversity and Ecology, Forensic Science, Biosurveillance, Physiology, Cell Biology, Genetic Engineering, Molecular Pharming, Endocrinology, Hematology, Bioinformatics, Biotechnology, Animal Cell and Tissue Culture, Plant pathology/Entomology, Biological Control of insect pest and diseases, Toxicology, Virology, Mycology, Stem Cell Research, Nanotechnology, Applied Enzymology & Environmental Science related research.

CONTROL & SIGNAL PROCESSING

Control engineering is the science of manipulating engineering systems for optimal performance in real-operating environments. Control engineers are concerned with mathematical modeling, computer simulation, control design and its implementation. The field is, therefore, multi-disciplinary and covers a range of technologies. Control systems are seen at work in small and simple household appliances, large-scale industrial plants such as steel rolling mills and refineries, very sophisticated and complex systems such as aircraft, nuclear reactors and satellites. Control system technology has thus driven the engineers to operate their systems at the peak of their performance without compromising system stability or integrity. Furthermore, new developments in simulation techniques have helped in the application of innovative control algorithms. The advent of high performance microprocessors has significantly increases the capability of control systems. Efficient digital controllers have alleviated the need for expensive instrumentation and costly components, contributing towards low cost quality products with enhanced performance.

The importance of Signal Processing in the engineering domain cannot be over emphasized. With new generation computer technology and configurable integrated circuits, powerful algorithms can be implemented in real time and used in various contemporary fields such as telecommunication, image, video and audio processing, sonars, biomedicine, seismology and computer vision.

In this conference, research papers are sought on the latest developments in control and signal processing theory and technologies. Papers of interest include those that describe theory, analytical techniques, applications, and technological developments. Topics to be covered in this activity include, but not limited to:

Control

- System Modeling & Analysis
- Instrumentation and Data Acquisition
- Multi-sensor Data Fusion, Tracking and Control
- Autonomous Control and Unmanned Systems
- Guidance, Mission Control and Operations
- System Identification and Linearization
- Automotive Parameter Estimation and Control
- Control Theory, Analysis and Design
- Fault Diagnostics, Detection and Isolation
- Fault-Tolerant Control
- Simulation as an Engineering Design Tool
- Distributed Simulation Technologies
- Hardware in the Loop Simulation
- Launch and Orbital Systems and Simulation
- AI Simulation Techniques and Applications
- Monte Carlo Simulation Techniques
- Nonlinear Control for Aircraft Systems
- Flight Formation and Control
- Aero Engine Modeling and Control

Signal Processing

- Computer Vision & Graphics
- Statistical Methods and Learning Algorithms
- Pattern Recognition, Deep neural Networks, Bagging & Boosting Classifiers
- Remote Sensing
- Big Data and Image/Audio/Text/Analytics
- Image Recognition and tracking
- Multidimensional Signal Processing and Speech Recognition
- Medical Imaging
- Algorithmic Implementations on FPGA/ASIC/Embedded Systems
- DSP related RTOS Issues
- Sensor Networks
- Hyperspectral and Multispectral Imaging
- Robotic Perception
- 3D point cloud Sensing & Processing
- Video Processing and Compression

CYBER SECURITY & ASSURANCE TECHNOLOGIES

Digital information is revolutionizing all fields of technology with electronic infrastructure serving as the communication backbone. With the development in this technological area, the dependence of economy and other public and private affairs on internet and digital infrastructure is on the rise. This reliance demands reliability and security of cyber space and information flow. Today, attacks from cyber space, show a direct threat to banking institutions, energy, infrastructure, state agencies and even social affairs. In the online world, it is important to be familiar with the sophistication of cyber security threats-including targeting phishing scams, denial of service attacks, malwares, data theft, social network attacks and other related attacks. Thousands of infected web

pages are being exposed every day and hundreds of millions of records have been breached. With information flowing seamlessly through boundaries of countries and systems connected to networks around the globe, there is a growing need to protect our national assets and information by accentuating on national cyber security. *There is a need to focus on the problems of design and analysis of security, privacy, and data protection algorithms in various emerging IT systems and concepts such as Internet of Things, Edge Computing, Fog Computing, Software Defined Networks, Blockchain, Cryptocurrency, etc.* Aim of this track is to bring together researchers working on different aspects of cyber security, for advancing in this particular body of knowledge.

Computer software require specialized quality assurance and testing techniques like formal verification to confirm absence of bugs. Formal verification exposes the boundary conditions and worst case scenarios which are not possible using merely computer simulations. This part of the activity also invites new researches in the fields like Software Quality, Automata, logic, and Formal Verification, etc.

Topics of interest include, but are not limited to:-

- Cyber Threats and Defence
- Network Security
- Computer/System Security
- Vulnerability Assessment
- Cryptography/Cryptanalysis
- Forensics Investigation
- Data availability, protection and Key Management Systems
- Privacy, trust metrics, and risk management
- Malware Analysis
- HW Trojans Detection and Prevention
- Anonymity and Identity Management
- Software Quality Assurance
- Formal Methods and Theory of Automata

MEDICAL SCIENCES

The aim of the 15th International Bhurban Conference on Applied Sciences and Technology (IBCAST), Medical Sciences activity, is to accumulate and exchange innovative ideas, latest knowledge and unique experiences for the benefits of Clinicians, Researchers, Healthcare professionals and Medical students.

This conference provides 4 days of comprehensive lectures and extensive hands-on workshop in Endometriosis. We do hope that active involvement of most prominent speakers and delegates (International & national) and their innovative ideas will create an existing atmosphere for recent innovations in Medical Sciences and Technology.

Endometriosis is an often painful disorder in which tissue that normally lines the inside of the uterus, the endometrium, grows outside the uterus. Endometriosis most commonly involves ovaries, fallopian tubes and the tissue lining the pelvis. Rarely, endometrial tissue may spread beyond pelvic organs.

Endometriosis can cause pain, sometimes severe, especially during period. Fertility problems also may develop. Fortunately, effective treatments are available.

Asia hosts 60% of the world population and presumably has more women with endometriosis than all the remaining continents combined.

The treatment options involve both surgical intervention and non-surgical modalities. Minimally Invasive surgical options are an emerging trend these days. This option not only optimizes the cosmetic outcome but also carries the additional benefit of limiting the number of days of hospital stay as well as results in faster recovery.

Foreign Experts with outstanding international repute and expertise shall hopefully join us in this conference. Their experience shall not only help us be updated with the latest management protocols but would also result in further improvement of our surgical skills.

FLUID DYNAMICS

Fluid dynamics (FD) activity encompasses principally all the spheres related with the applied fluid dynamics. The main theme is to encourage all the relevant novel ideas and research work carried out numerically and through experiments. The application areas include flows inspired from nature and flow analysis around various crafted aerodynamic objects. It also covers the flow analysis carried out in automotive, civil, defense and process industries etc.

Information about the physics of the flow can be obtained from measurements in experimental test facilities or from flow visualization studies. However, there are some limitations and a full picture of flow fields is often hard to obtain from experimental studies. Computational fluid dynamics (CFD) is one core research front in fluid dynamics. It is a technique to model and analyze fluid flow using a computer simulation. CFD techniques can be applied to solve industrial flow problems especially in complex flow situations of aerodynamics and hydrodynamics.

The IBCAST will provide an opportunity to the local and foreign researchers to benefit from mutual exchange of ideas, discuss their queries and problems with the experts and to explore the new avenues in active research fronts.

The broader scope of the present IBCAST, FD – 2019, session is to cover the following areas:

- Gas Dynamics
- Aerodynamics
- Hydrodynamics
- Industrial and Environmental Fluid Dynamics
- Fluid Structure interactions

- Turbulence Modeling
- Experimental Fluid Dynamics
- Multiphase flows
- Reactive flows
- Heat Transfer

UNDERWATER TECHNOLOGIES

Ocean is alive with noise and approximately 71% of the earth surface is covered by the ocean. The advancement and research in underwater technologies has direct impact on human endeavor to explore the nature. The field of underwater technologies spans over a wide range which includes ocean vehicles, underwater communications, sonar systems, oceanography and has ever increasing role in defense applications. Research areas like marine life preservation, seafloor geological resources and marine pollution hazards etc are of significant importance for Pakistan which has more than 1000kms of coastline and an exclusive economic zone spread over an area of more than 2,35,000 km².

The Underwater Technologies chapter of IBCAST provides opportunities for spread of information, exchange of knowledge and novel ideas among the practitioners of various fields of underwater technologies.

The Underwater Technologies chapter of the 16th IBCAST - 2019 invites contributions in:

Underwater Communication

- Acoustic telemetry and communication
- Channel Physics and Ocean dynamics
- Radio Frequency Communications
- Optical Communications
- Network Models
- Adaptive/Smart modems
- Modem Architecture and Software Defined Modems
- Embedded System

Sonar Signal/Image Processing and Sensors

- Array Signal Processing and Array Design
- Detection, Classification and Localization
- High Resolution Spectral Analysis
- Synthetic Aperture Sonar (Active and Passive)
- Sonar Imaging and Displays

- Transducer Arrays & Materials
- Suspension System for Sonar Buoys
- Sonobuoy Dynamics and Control
- Sonar Test and Calibration

Ocean Vehicles

- Vehicle Design
- Vehicle Navigation and Positioning
- Unmanned Underwater Vehicles (UUVs)
- Remotely Operated Vehicles (ROVs)
- Naval Architecture
- Underwater Fittings and Installations

Marine Environment and Oceanography

- Marine Surveys
- Marine Renewable Energy
- Marine Pollution
- Marine Geology and Mineral Resources
- Hydrography and Seafloor mapping
- Mineral Resources

WIRELESS COMMUNICATION & RADAR

Microwave Engineering and Electromagnetics are key technology areas. Many of the modern day electronic gadgets and devices owe their existence to some derivative of electromagnetics and microwave engineering. Radio sets & radio broadcasting, televisions & real time video transmission through satellites, speed monitoring radars to space borne imaging radars, sophisticated avionics to what has become a necessity of contemporary times, cellular communications all stem from advancement in microwave engineering.

Historically, it was the advancement in radar development during Second World War that substantiated the potential of microwave engineering. As the products evolved through the corridors of time, technologies associated with this sphere of engineering became pivotal in imparting cutting edge to number of military and civilian equipment.

The Wireless Communications and Radar Activity of IBCAST offers a broad coverage of topics related to RF and microwave technology making it a premier event in this area for scientific and educational community in Pakistan. Our endeavor is to promote research in this key technology area and bring academia and industry closer to bridge this technology gap.

This track also has a unique feature of microwave technology coverage related to civil and military radar. Topics related to technologies up to systems and applications are covered such as waveform generation; radar signal processing; antenna systems; radar imaging and object classification etc.

In recent past electro medical devices has also been benefited by wireless technology and radar principles therefore, this topic has been included in the scope of WCR activity since 2013.

Another salient feature of this year's activity is a special session on "**Phased Array Radars & Characterization**".

High quality papers reporting on novel solutions on the following topics are encouraged:

Radar Topics

- Synthetic Aperture Radars, ISAR
- MIMO Radars
- Ultra Wide Band Radar, GPR
- Radar Performance Modeling / Measurement
- Bistatic / Multi-static Radars
- Analog / Digital Beam Forming
- Near Field & Far Field Antenna Characterization
- Radar Signal Processing
- Phased Array Radar Calibration
- Multifunctional Phased Array Radar
- Space Time Adaptive Processing (STAP)
- Radar DSP Hardware
- RF / Microwave Circuit Design, RFICs & MMICs
- Reconfigurable Front-ends
- Active / Passive Device Modeling
- Computational Electromagnetics
- Radio Imaging including mm-wave and THz
- Imaging systems
- RCS Reduction / Stealth Design

Wireless Communication Topics

- Software defined Radios
- Satellite & Space Communication
- Emerging Wireless Mobile Applications
- Network Centric Warfare
- Electromagnetic Scattering, Channel / Interference Modeling
- Adhoc Networks
- Wireless Technologies in Electro Medical Devices
- Metamaterials, FSSs and Electromagnetic Bandgap Structures
- Communication Systems Simulation
- integrated Transceivers
- Wireless Power Transfer and Energy Harvesting
- Smart Antennas
- MIMO Systems
- Antenna Systems: Theory, Modeling and Measurement



16th IBCAST – 2019

International Bhurban Conference on Applied Sciences & Technology

08th – 12th January, 2019

Application for Participation

PLEASE USE BLOCK LETTERS OR TYPE

*First Name: _____ *Last Name: _____
*Nationality: _____ *CNIC / Passport No. _____
*Affiliation & Position: _____ DoB _____
Postal Address: _____

Phone: _____ Fax: _____
*Email _____ *Mobile: _____
*Residential Address: _____

Education (Highest Degree):

<u>Institution Attended</u>	<u>Period (years)</u>	<u>Degree Obtained</u>
_____	_____ to _____	_____

Current field of interest: _____

Number of publications during last five years: _____

16th IBCAST Activities of Interest: (Please indicate one activity only)

- | | |
|--|---|
| <input type="checkbox"/> Advanced Materials | <input type="checkbox"/> Fluid Dynamics |
| <input type="checkbox"/> Aerostructures | <input type="checkbox"/> Medical Sciences |
| <input type="checkbox"/> Biomedical Sciences | <input type="checkbox"/> Underwater Technologies |
| <input type="checkbox"/> Control & Signal Processing | <input type="checkbox"/> Wireless Communication & Radar |
| <input type="checkbox"/> Cyber Security and Assurance Technologies | |

Venue: National Centre for Physics, Quaid-e-Azam University, Islamabad

Organized by: Centres of Excellence in Science and Applied Technologies (CESAT) Islamabad, Pakistan

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Scientific Secretary (IBCAST)

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Note: Fields with (*) are mandatory.

Last Date of Application for Participation is **01 November, 2018**.