

FOREWORD

Conferences, symposiums and workshops play a pivotal role in acquisition and dissemination of scientific knowledge. It provides a platform to the researchers, academicians and industrialists to join hand and formulate research strategies to resolve the engineering problems. The advancements in engineering materials lead to accelerated industrial production which strengthens the socio-economic standard of a progressive society.

The International Nathiagali Summer College on Physics and Contemporary was launched in Pakistan in 1976. A need was felt to keep pace with the rapid growth and identify promising areas of development relevant to our needs. To fulfill this need, it was decided to start a new series of conferences; International Bhurban Conference on Applied Sciences and Technology (IBCAST). The first conference was held on June 10-15, 2002 at a picturesque hill resort, Bhurban. The first four conferences were held at same location and then the venue shifted to the National Centre for Physics located at lush green city of Islamabad.

The 9th International Bhurban Conference on Applied Science and Technology proved to be a success; despite many difficulties. The participants derived great benefit from invited lectures, organized presentations and impromptu discussions. The success of the conference has encouraged us to continue the program; the focus will however change from year to year. Events such as IBCAST are difficult to organize and sustain, but from my experience I can say that IBCAST formation was evolutionary in its nature, factual in its form and continuous in its essence.

Dr. Arshad Munir
Scientific Secretary IBCAST

INTRODUCTION

The quest for improved materials for engineering industries is never ending. Design and market drivers include lower acquisition and operation cost, improved corrosion and fatigue resistance. Application of composite materials on commercial aircrafts and their extrapolation to the next-generation aircrafts has led to significant overall weight saving which transforms into enhanced range, payload and endurance. As advanced composite have superior physical and mechanical properties are eagerly being sought, optimization of their processing technique, design parameters failure modes and multifunctionality are also being sought. Thus the scope of activities on advanced materials focus on Design and Analysis of Composite Materials, Processing of Polymer Composite Materials, Failure Mechanics of Composite Materials, Shape Memory Polymer Nanostructured Materials and Specialty Coating, Alloys and Metals.

This conference attracted more than 200 scientists and engineers from national and international universities, scientific organizations and foreign universities. It was comprised of 06 technical sessions. There were 32 oral presentations and 09 poster presentations. Active participation of research scientists and engineers from Nanjing University, China, Laboratoire de Physique et Mecanique Textiles, France, Northwestern Polytechnical University, China, University of Leeds, UK and GIK Institute of Science and Technology, Pakistan made the conference interesting. A large number of scientists and engineers from R&D organizations, academics institutions and engineering industry participated in the conference.

The Journal of Advanced Materials for Applied Science and Technology is the compilation of selected peer reviewed research papers from the 9th International Bhurban Conference on Applied Science and Technology. I am personally thankful to Scientific Secretary for his continuous guidance, assistance and support. I am greatly thankful to the technical committee for putting up their best efforts in organizing the conference and reviewing the papers. I am also thankful to Trans. Tech. Publishers, Switzerland for accepting the papers of Advanced Materials track of IBCAST for publication.

Program Coordinator (Advanced Materials)
Dr Zaffar M. Khan

PATRON-IN-CHIEF

Muhammad Irfan Burney (HI SI)

SCIENTIFIC SECRETARY

Dr. Arshad Munir (SI)

PROGRAMME COORDINATOR (ADVANCED MATERIALS)

Dr. Zaffar M. Khan SI (M)

TECHNICAL COMMITTEES

Advanced Materials

International

Dr. Tasadduq Khan, Senior Adviser, The French Aerospace Lab. France.

Prof. Jang Kyo Kim, Hong Kong University of Science & Technology, Hong Kong.

Prof. Dr. Brian James Briscoe, Imperial College London U.K.

Prof. Yasuyuki Tezuka, Tokyo Institute of Technology, Tokyo, Japan.

Prof. Dan O Adams, Director, University of Utah, USA.

Prof. Christopher Leung, Hong Kong University of Science & Technology, Hong Kong.

Dr. Ihtesham ur Rehman, Queen May, University of London.

Prof. Chuanbao Cao, Beijing Institute of Technology, China.

Dr. Suong V. Hoa, Concordia University, Canada.

Prof. Mohammad Henini, University of Nottingham, UK.

Dr. Jihua Gou, University of Central Florida, USA.

Dr. Tanveer Ahsan, Henkel Corporation, USA.

Prof. Mathias Ulbricht, Universitat Duisburg – Essen, Germany.

Prof. Pascal Casari, University de Nantes, France.

National

Prof. Dr. Fazal Khalid, GIK Institute of Engineering Sciences and Technology, Topi, Pakistan
Prof. Dr. M. Mujahid, National University of Sciences and Technology, Islamabad, Pakistan
Prof. Dr. Mazhar Mehmood, Pakistan Institute of Engineering and Applied Sciences, Pakistan
Prof. Dr. Tajamal Hussain, National Center for Physics, QAU, Islamabad, Pakistan
Prof. Dr. Afzal Khan, International Islamic University, Islamabad, Pakistan
Prof. Dr. M. Mazhar, Institute of Space Technology, Pakistan
Prof. Dr. Tahir Jameel, Punjab University, Pakistan
Prof. Dr. Saqib Ali, Quaid-i-Azam University, Islamabad, Pakistan
Dr. Mubashar Ahmed, National Engineering & Scientific Commission, Pakistan
Dr. Zafar-uz-Zaman, National Engineering & Scientific Commission, Pakistan
Dr. Naveed Ahmed Siddiqui, National Engineering & Scientific Commission, Pakistan
Dr. Hammad Asghar, National Engineering & Scientific Commission, Pakistan
Dr. Zulfiqar H. Lodhi, National Engineering & Scientific Commission, Pakistan
Dr. Abdul Aziz Mazhar, Institute of Space Technology, Pakistan

TECHNICAL REVIEWERS

| S.No. | Name | Address |
|-------|---------------------------|--|
| 1 | Dr. Zaffar M Khan | National Engineering & Scientific Commission, Pakistan |
| 2 | Dr. Mubashar Ahmed | National Engineering & Scientific Commission, Pakistan |
| 3 | Dr. Zafar-uz-Zaman | National Engineering & Scientific Commission, Pakistan |
| 4 | Dr. Naveed Ahmed Siddiqui | National Engineering & Scientific Commission, Pakistan |
| 5 | Dr. Hammad Asghar | National Engineering & Scientific Commission, Pakistan |

COMPILED BY

| S.No. | Name | Address |
|-------|-----------------------|--|
| 1 | Dr. Zulfiqar H. Lodhi | National Engineering & Scientific Commission, Pakistan |