



## COMSATS Lecture Series on Science Diplomacy

### BIOSURVEILLANCE: SCIENCE NEEDS FOR MICROBIAL FORENSICS

#### ABSTRACT

With global concerns about emerging infectious diseases, bioterrorism, and pandemics, there is unmet need for a real-time surveillance system and data generated would be useful for public health managers, researchers and policy makers. Infectious diseases are a major cause of human suffering in terms of both morbidity and mortality. Effective surveillance of infection has been reported to diminish the rate of morbidity and mortality and to prevent diseases it is important to understand the causative agents, risk factors and circumstances that lead to a specific disease. The genomic diversity of the microbial world is far greater than expected as reflected by a large degree of genetic variation within one species. Therefore, strain level differentiation of the microbes adds more complexities in their timely identification and hence response. In order to effectively address the possible natural outbreak event or suspected bio threat and its aftermath it will be a formidable task to rapidly identify risk associated pathogen/strain in quick time to reduce the damage through enhanced surveillance systems. Such real-time surveillance would alert public health care practitioners for early warning and hence early response by case finding and to ensure adequate access to treatment, thereby reducing morbidity and mortality.

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#### ABOUT THE SPEAKER

Dr. Habib Bokhari (Common-wealth scholar & Fellow) is currently serving as Professor of Microbiology in Department of Biosciences at Islamabad Campus. He was the first member who was hired, and was greatly instrumental in setting up the Department of Biosciences, in 2002-2003. He has played a pivotal role for the past 13 years in strengthening the Department in different roles; as Incharge, HOD, Chairman and faculty. His excellent academic and research speaks for itself.



He has a number of active, national and international collaborations with world's best Universities such as, National University of Singapore, London School of Hygiene & Tropical Medicine, RVIM The Netherlands, George Mason University, USA, University of Florida USA, UPENN, USA and Sanger Centre, Hinxton, UK. In the area of Microbial Genomics, he is the first researcher from Pakistan who has been able to complete the whole genome sequence of 100 *Vibrio cholera* isolates (100 Genome Project) from Pakistan in collaboration with Sanger centre, UK. The data helped identifying novel Cholera strains from Pakistan and will be used to develop rapid diagnostics for water testing as well tracking the key "epidemic strains" to its source and hence control of major epidemic or outbreak in particular during Floods. Moreover, the indigenous data will be used by Bioinformatics students in the country for their training and skill development and can also play a pivotal role in strengthening software development industry in Pakistan. He has also identified couple of novel fluorescent proteins which has the commercial value for the scientific community and based on this work preparation of "Educational Tool Kit" for students of Molecular Biology is under process. He was also nominated by the Institute for Best teacher Award (Year 2011). His work in field of infectious diseases such as whooping cough and Diarrhea are of significant importance and will serve the basis of their control in future in Pakistan. He is currently developing rapid strip test for detecting *Vibrio cholerae* and developing control strategies using its natural predators i.e. vibriophages. He is editor of various scientific journals and member of various national and international societies/forums. He has delivered invited talks at various national and international forums such as at training workshop, Department of Computer Sciences, Cambridge and also chaired sessions at various national and international forums such as "Informatics & Basic Science" at Microbial Forensics conference, Zagreb. His students won best poster awards on many occasions.

Since his joining to CIIT, he has not only designed and introduced a "brand new" degree program of "Bioinformatics" but was also key person in setting up and strengthening Department of Biosciences with its state of the art laboratories. During last 8 years or so about 1000 undergraduate and graduate students have completed their degrees from department and currently there are about 600 students enrolled. The strength of the departmental faculty rose to about 95, 85 of them are freshly graduated PhDs. He has supervised and co-supervised numerous undergraduate/BS thesis (40 projects) and post graduate thesis (35) including 4 PhDs and has published numerous papers (>50) in international impact factor journals with cumulative impact factor of more than 120. Dr. Bokhari was mainly responsible for preparing first "National Bioinformatics policy" document in 2004 submitted to HEC. He has developed several important international links and has opened up opportunities for staff and students to work in Foreign Universities of highest ranking in the world. He has been a affiliate faculty and visiting scientist in the US and UK. During his research career at COMSATS since 2003, he has won number of national and international research fundings including British Council and EU 2020 funding.