

**Quantum Computing Knowledge Workshop**  
**12 OCTOBER 2018**

Government of West Bengal is committed to make the State a leader in emerging technologies such as Artificial Intelligence, Fintech, Blockchain, Cyber Security, Embedded Technology and Electronics hardware manufacturing.

Quantum computing is the area of study focused on developing computer technology based on the principles of quantum theory, which explains the nature and behaviour of energy and matter on the quantum (atomic and subatomic) level. Development of a quantum computer, if practical, would mark a leap forward in computing capability far greater than that from the abacus to a modern day supercomputer, with performance gains in the billion-fold realm and beyond. The quantum computer, following the laws of quantum physics, would gain enormous processing power through the ability to be in multiple states, and to perform tasks using all possible permutations simultaneously.

A day-long knowledge sharing workshop on Quantum Computing was held at Biswa Bangla Convention Center, New Town, Kolkata to provide a platform for various stakeholders including senior Government Officers, subject matter experts, eminent researchers and leaders from academia and industries. The workshop was open for students, young and experienced professionals, academicians, entrepreneurs, and industry representatives to attend and benefit from. The event was organized by The Department of Information Technology & Electronics, Government of West Bengal, in collaboration with West Bengal Electronics Industry Development Corporation (WBEIDC) and NASSCOM. The overall project management support is provided by the Project Management Unit team from PricewaterhouseCoopers Pvt. Ltd, attached to the Department of IT & E, Government of West Bengal.

The department of IT&E has already organised 6 landmark events on Cyber Security, Blockchain, Artificial Intelligence, Embedded Technology, Internet of Things and Fintech in as many months starting from 16th of March 2018. This was the 7th such knowledge sharing workshop on emerging technologies.

At the beginning Shri Aninda Chatterjee, MD, WBEIDC welcomed the audience on behalf of The Department of Information Technology & Electronics and Webel and mentioned that this workshop is to share, enlighten, deliberate and define the future direction of the emerging technologies. This is the start of the journey in Bengal taking dominant position in emerging technologies. He welcomed the esteemed dignitaries of the inaugural session on the dais namely Professor Amlan Chakrabarti, Dean Faculty of Engineering and Technology and the Director of the A.K.Choudhury School of Information Technology, University of Calcutta, Shri Samar Jha, chairman, WBEIDC, Shri S. K. Bhattacharyya, IAS, Addl Secretary, DITE, Govt. of West Bengal, and Shri Manjit Nayak Joint Director Software Technology Parks of India (STPI) and requested Shri Debashis Sen, IAS, Addl Chief Secretary, Dept. of IT&E, Govt. of West Bengal, to deliver the welcome address.

In his welcome address Shri Debashis Sen, IAS, Addl. Chief Secretary, DIT&E referred that almost 500 conglomeration start-ups, industries, academicians all over the world are working in the field of Quantum Computing. The Department of IT & Electronics has been advocating that programming of all kinds, especially those related to AI and Robotics should be taught from school level. Already in ICSE schools, Java is taught at 8th and 9th standard and in China they teach Python and ARC from level 5. Very special languages such as True-Q, Q#, Corn, ARC are getting born and it is time to learn Quantum Computing as it is going to come commercially within a decade or so. He said, “we don’t want to fall behind this time”. Not only in terms of Quantum Computing, programming, or specialised things that are coming along with it, but also in the chip design framework and participate in the global design network.

He observed, “very interestingly we are trying to juxtaposition other emerging technologies against each other”. If Quantum Computing comes in that will be first under threat because cryptology and prime numbers can be very easily cracked by the super-efficient computer that is working on the quantum mechanism. Blockchain nobody can break, QC can break everything. The other things in similar juxtaposition is Cyber Security and Artificial Intelligence. Cyber security is trying to get more and more secured and Artificial Intelligence and Machine Learning is trying to get it across in a more efficient manner and all this will break when QC comes in. He concluded his welcome address with a request to

play a game named “Hello Quantum” by IBM which deals with concepts about the Qubit transposition and all that we talk about.

After the welcome address by Shri Debashis Sen, IAS, Shri Sushobhan Mukherjee, CEO Prime Infoserv and Chairman of Infosec Foundation announced 3rd International Conference which is going to be held for spreading cyber awareness across the globe, with a theme “Cyber Resilience and Agility in your Digital Future”.

Shri Aninda Chatterjee, MD, WBEIDC declared the formal inauguration of online helpline for IT Parks which will be available in website.

Shri S. K. Bhattacharyya, IAS, Addl Secretary, DITE, Govt. of West Bengal handed over a report on Strategy for Adaption of Artificial Intelligence in Bengal to Shri Debashis Sen, IAS, Addl. Chief Secretary, DITE for unveiling the same.

Bengalathon 2019 was launched on 27th of July 2018. More than 800 teams registered from different parts of India like Maharashtra, Jharkhand, West Bengal, Rajasthan, Haryana and Tamil Nadu. 117 teams submitted their ideas which were evaluated in the first round. 61 teams went to the second round and 19 teams are moving to the final round. The names were announced.

This was followed by lighting of the inaugural lamp by Shri Debashis Sen, IAS, Addl. Chief Secretary, DITE.

Dr. Amlan Chakrabarti, Professor of Information Technology in the A.K.Choudhury School of Information Technology at the University of Calcutta presented the book on “Centre of Competence on Quantum Computing” to Shri Debashis Sen, IAS, Addl. Chief Secretary, DITE.

Shri Sen informed about the decision of the Government to propose a Centre of Excellence on Quantum Computing to be set up with the IT Department of Kolkata University, School of IT which Dr. Chakrabarti is heading along with an absolutely amazing international team and the Govt. of West Bengal is happy to partner with them to create a Centre of Excellence on Quantum Computing in Kolkata.

In his key note address Dr. Amlan Chakrabarti explained that the need of quantum computing is not only minimising size of electronic circuits, but there is tremendous potential in quantum computing if the quantum mechanical phenomena can be exploited and the algorithms can be mapped to those particular phenomena and utilise those phenomena to have better execution time compared to the classical.

Shri Shesha S Raghunathan, Q Ambassadors & Leader IBM gave a special address on Quantum Computing and IBM Q. he said that Quantum Computing may provide a new path to solve some of the hardest or most memory intensive problems in business and science.

Shri Hirak Mukherjee, Oxford Business Alumni shared his views on “Quantum Computing in Business – The Future”. While explaining quantum computing mechanism he gave an example that to search an entire library of Congress which is in United States for a name in an unsorted database, classical computer is likely to take about a 100 years. Quantum computer takes half a second. It is likely that what is called big-data today may not be big anymore because the ability of quantum computing to crunch that amount of data is far more efficient than any computing system that anybody can think of today. With impacts of quantum computing better models for climate change and weather forecasting are being created, greater crunching is happening and more accurate results are coming in.

Shri Gokul Alex, Associate Director, PWC covered the topic “Quantum Key Distribution Protocols and Zero Knowledge Proof Systems”. Dr. Anindita Banerjee of Qu Nu Labs deliberated on “Quantum Security”.

The post-lunch session began with a very exciting quiz which is traditionally done by the technical quizmaster Shri Prodip Mukhopadhyay, CEO, WIL who has already earned a name for himself in making a very fantastic quiz mixed of wit and intellect. The winners were awarded each with a Medal, a Certificate and a Gift.

The next session was on Standards of Quantum Computing. Prof. Guruprasad Kar, Professor and Head, Indian Statistical Institute talked on the topic “Quantum Cryptography recreates what Quantum Computing destroys”. Prof. Anil Prabhakar, professor of IIT Madras covered the topic “Practical considerations for QKD links and networks”.

This was followed by a panel discussion on “Quantum Computing – Way Ahead”. The eminent panellists were Prof. Sonjoy Majumder (IIT Kharagpur), Prof Debasis Sarkar (Dept of Applied Mathematics, University of Calcutta), Prof Archan S. Majumdar (S.N.Bose National Centre for Basic Sciences), Prof. Somshubhro Bandyopadhyay (Bose Institute, Kolkata). The session was moderated by Prof. Sudeb Kumar Prasant Pal (IIT Kharagpur).

Shri Suvayu Ray, Project Director, PMU team from PricewaterhouseCoopers Pvt. Ltd summarized the take away of the workshop. The workshop concluded by Vote of thanks given by Shri Suvayu Ray.