T The seminar covered the following four topics:

Examine contemporary control methods for laboratories conducting science

Control system development for Big Science facilities has evolved over the past ten years from a nascent scientific endeavor to an established engineering field, less frequently characterized by the "not-invented-here" attitude.

Therefore, if project managers want to prevent expensive issues down the road, they must make early decisions on the primary architecture and components and take into account all control system development factors.

In other words, the development of control systems is gradually moving away from being a scientific field and toward one of engineering.

Architect data acquisition pipelines for scientific laboratories

The science and skill of figuring out the elements or compounds that materials contain in terms of their composition can be summed up as analytical chemistry (Ewing, 1985). In order to help with this endeavor, the computer's role has developed across three stages: data processing, data collecting, and data communications. In analytical laboratories, computers were initially used for data processing, mostly for statistical analysis of data on distant mainframe computers. Computer technology had little immediate impact on the laboratory during this time. In the laboratory, manual examination of the initial raw data still involved measuring lengths or distances related to experimental conditions. The format of the raw data ranged from a pointer's movement on an analytical balance to a pen's vertical movement on a chart paper that was moving horizontally. The rapid advancement of computerized data acquisition in the laboratory started in the 1960s with the introduction of the minicomputer. A greater number of studies were thus made possible by the elimination of several manual manipulations made possible by the electronic capture of data. Due to these advances, it became necessary for data to be transferred electronically from specialized microcomputers to larger computer systems in order to facilitate more thorough data analysis, report preparation, and data storage.

Design and fabricate new, digital scientific devices

A fresh approach to design that uses ultrathin dielectrics to create 2-D electrical devices
In example, 2-D semiconductors may be used as channel materials for low-power transistors, which could be very beneficial. These materials are particularly attractive alternatives to silicon in the production of electronics because they exhibit extremely high mobility at extreme thicknesses. Despite their benefits, using these materials in transistors has been difficult so far. Due to the fact that 2-D semiconductors lack dangling bonds, it is famously difficult to install ultrathin high-gate dielectrics (i.e., materials having insulating or dielectric characteristics) on them using atomic layer deposition (ALD), frequently leading to discontinuous films.

Sidekick system architecture NASA and Microsoft collaborated on the Sidekick project to create a virtual assistant for astronauts to use with the Microsoft HoloLens augmented reality headset. Sidekick is now installed in the International Space Station as of December 2015.