Science & Engineering Research Board (SERB) sponsored High-End Workshop on Techniques and Applications of Hyperspectral Data Analytics was inaugurated at Birla Institute of Technology, Mesra today, 25th July 2022 at 10:30 AM. The workshop was organized by the Centre for Quantitative Economics and Data Science, Birla Institute of Technology, Mesra. The event organizer Dr Manish Kumar Pandey has emphasized that the skilled resources coming out of this workshop would fill the gap of the researchers lacking in Space Science, especially in Hyperspectral Data Analytics in India. The objective of the workshop was to gather researchers from various areas, namely Agriculture, Forestry, Oceans, Geology, Environment, Defence, Climate Change, and Medical Science along with Computer Science, Data Science to understand the existing challenges of Hyperspectral Sensing. How Hyperspectral Data Analytics would provide the solutions to the respective challenges in these areas would also be explored. Students from IITs, NITs, and Central Universities took part in this workshop from locations across India. The sessions were delivered by renowned experts from IITs, NITs, Central Universities and Institutes of National importance. A total of 33 applications were received across India out of which 25 students were shortlisted through a committee. The confirmed participants were from IIT ROORKEE, NIT Raipur, BIT Mesra, Central University of Punjab, Shiv Nadar University, Institute of Environment & Sustainable Development, BHU, Banasthali Vidyapith, Aligarh Muslim University, Dr Ram Manohar Lohiya Awadh University, Sardar Vallabhbhai Patel University of Agriculture and Technology, to name a few. The sessions were conducted covering the following objectives:-

1. To provide the background knowledge of Hyperspectral Sensing, understanding of the basic principles of Hyperspectral Imaging, and its use in various areas.
2. Data collection from Hyperspectral Sensors or Unmanned Aerial Vehicles (UAV) and their processing.
3. Building the concepts of Hyperspectral Data Analytics from Descriptive, Predictive, Prescriptive, and Preventive Analytics points of view.
4. To provide Hands-on experience in Hyperspectral Image Processing.
5. Skill-building from a Data Science perspective and exploring the benefits of Artificial Intelligence in Hyperspectral Data Analytics for efficient decision-making.
6. Building the technological expertise of the participants in Agriculture, Forestry, Environment, Defense, Climate Change as well as in Medical Science in a case study manner.

As part of the workshop, **Dr Lokesh K Sinha, Ex-Director, Defence Geoinformatics Research Establishment** delivered a session on 28th July 2022 entitled "**Remote Sensing for Defence Applications with special emphasis on Hyperspectral Imaging**". The importance of hyperspectral data analytics in terrain engineering was discussed. The focus was made on the technological advancements that would be game-changers in the current era. The session covered a vast range of applications, ranging from Agricultural monitoring to terrain intelligence using the Data Science approach. The importance of building spectral libraries for hyperspectral data analytics in terrain mapping using data science was discussed. **Dr Rabi Narayan Sahoo, Principal Scientist, Indian Agricultural Research Institute**, also delivered a session on 29th July 2022 entitled "**Imaging Spectroscopy for Smart Agriculture**". The importance of hyperspectral data analytics to enhance Agri productivity to achieve a Self-reliant India has been discussed in detail. The importance of digital soil mapping is explained in the best manner. The importance of collaboration between data science and soil engineering has been explored. A multidimensional aspect of soil, water and future vision for air using hyperspectral data analytics was discussed.

Dr V. S. Rathore, Department of Remote Sensing, BIT Mesra delivered a session on "**Basics of Hyperspectral Remote Sensing**". Dr Mili Ghosh Nee Lala (BIT Mesra) delivered a session on "**Basic concepts of Hyperspectral Imaging and its use in various areas**". Dr Amit Kumar, Central University of Jharkhand delivered a session on "**Forest Monitoring using Hyperspectral Remote sensing**". Dr Dileep K. Singh (Department of Physics, BIT Mesra) delivered a session on the **concepts of spectroscopy and curve fitting for nanomaterials**. Dr Manish K. Pandey, CQEDS (BIT Mesra) delivered a session on "**Building the concept of Hyperspectral Data Analytics**". Dr K. V. Satish (IESD,

BHU) delivered a session on **Remote sensing and GIS applications in forestry, ecology and conservation.** Mr Vikas Dugesar (IESD, BHU) **demonstrated the spectroradiometer** and helped the participants in understanding the data collection and basic preprocessing of the spectra. He also demonstrated the basics of UAVs, Multispectral and IR sensors and Demonstrated to the participants the UAV flights, data capturing and processing. Dr Prem Chandra Pandey, Assistant Professor, School of Natural Sciences (SNS), Shiv Nadar University delivered a session on "**Introduction to HYPERSPECTRAL IMAGING: concepts and advancement**". Dr Manika Gupta, Assistant Professor, Department of Geology, Delhi University delivered a session on "**Hyperspectral Image Analysis in R**". Dr Jit Mukherjee, Assistant Professor, Department of Computer Science and Engineering, Birla Institute of Technology, Mesra delivered a session on "**Introduction and Application of Land Surface Temperature using Multi/Hyperspectral Images**".

One of the most awaited sessions was delivered by Dr Prashant K. Srivastava, Assistant Professor, Institute of Environment and Sustainable Development, Banaras Hindu University. He explained Hyperspectral Data Processing through various examples and discussed the perspectives of **Hyperspectral Data Analytics.** The journey from Multispectral to Hyperspectral was discussed and the future with Ultraspectral was explored. He also covered descriptive analytics and the importance of visualization for different materials during the session. Dr Manish K Pandey, Assistant Professor, Centre for Quantitative Economics and Data Science, Birla Institute of Technology, Mesra delivered a session on "**Data mining: Concepts and Techniques**". Prachi Singh (IESD, BHU) delivered a hands-on session on "**Hyperspectral data analysis using ENVI**" utilizing AVIRIS and Hyperion data respectively. Mr Mrinal Pathak, Department of Architecture and Planning, BIT Mesra delivered a session on "**communication sciences and the secret of success**". He spoke about the ancient Indian system of understanding life and a balance between the mental, physical, and psycho spectrum of life. Dr Parthsarthi Mukhopadhyay, Senior Scientist from the Indian Institute of Tropical Meteorology, Pune delivered a session on "**Recent developments and new approaches in NWP forecast in India and future pathways using Hyperspectral Remote Sensing**". He discussed the importance of nowcasting in India and how hyperspectral data could be a boon for building an efficient model. Dr Himanshu Govil, Assistant Professor from NIT, Raipur delivered a session on "**Hyperspectral remote sensing application in mineral identification and mapping covering cover all the hyperspectral data**". A detailed approach to mineral identification using Hyperspectral data was explored.

All good things must come to an end, but this won't be an end but a small break. With these words in mind, the valedictory of the Science & Engineering Research Board (SERB) sponsored, High-End Workshop on Techniques and Applications of Hyperspectral Data Analytics through Accelerate Vigyan scheme was held at Birla Institute of Technology, Mesra on 7th August 2022. The Centre for Quantitative Economics and Data Science, Birla Institute of Technology, Mesra has organized this workshop. A total of 25 sessions were conducted by 18 resources during the workshop. In the valedictory, Vice-chancellor Prof. Indranil Manna emphasized the need of learning from multiple perspectives. He also highlighted the importance of the data-centric approach to tackling 21st-century issues. The vice-chancellor and Event Organizer thanked Science & Engineering Research Board (SERB) for sponsoring this workshop through Accelerate Vigyan Scheme. Dean of Faculty Affairs and Head of the centre, Dr Kunal Mukhopadhyay has offered a vote of thanks.