Research Clusters

KUKUM has decided to bypass the usual research evolution by forming interdisciplinary research in seven key areas, namely Microelectronic & Nanotechnology, Sensor Technology & Applications, Autonomous Systems & Machine Vision, Acoustic Applications, Embedded Computing, Power Electronic & Electrical Machine Design, and Sustainable Engineering. Each key area is called a 'cluster'.

1. Acoustics Applications

Acoustics is the science of sound and has 3 sub clusters, namely, the environmental group, the condition monitoring and machine diagnosis group and the speech group The acoustics group in KUKUM is formed to identify the real-world problems of acoustics and produce innovative solutions beneficial to the society; create awareness about the impact of noise and its remedial measures to the community.

2. Autonomous System and Machine Vision

This cluster is dedicated to the research and development of techniques and applications of computer, automation, robotics and machine vision. The focus areas of this cluster are subdivided to service robots, vision systems, artificial life and, modeling and control, which seek to improve quality of life.

3. Embedded Computing

An embedded computer is a component of a larger system which implement the system functionality. Embedded computers exist in automobiles, airplanes, home appliances, military vehicles & equipments, medical devices, robotic, mobile communication system etc. This cluster has 3 sub clusters which are; Embedded System, Communication Technology, and Artificial Intelligent & Networking. The Embedded Computing research cluster will involve in enhancing knowledge and creating technology in hardware & software design techniques through embedded system application development.

4. Microelectronic and Nanotechnology

Microelectronic is the branch of electronic concerned with or applied to the realisation of any microminiaturization technique to reduce the cost, size and weight of electronic parts, subassemblies and assemblies and to replace vacuum-tube circuits with solid compatible parts. Nanotechnology focuses on the nanoscale intersection of fields such as physics, biology, engineering, chemistry, computer science and etc. At present, this cluster is divided into four main groups as follows: IC Design, Simulation and Modeling, Semiconductor Processing and IC Packaging, Microelectronic Material and Failure Analysis, and MEMS and Product Development

5. Sensor Technology and Applications

This cluster is dedicated to the research and development of techniques and applications of sensors, sensing technology and applications. These include mimicking taste and smell, nano devices and systems,processes, nano particles' self assembly, environmental – wireless sensor networks, bio- and chemical sensors, MEMS,NEMS,RF sensors, nano biotechnology sensors, arrays, bio-molecular analysis.

6. Sustainable Engineering

Sustainability occurs when we maintain or improve the material and social conditions for human health and the environment. The university has developed strong expertise and facilities in seven research sub-clusters: metallurgy, construction materials, ceramic, polymer, plant and process design, electronic materials and materials chemistry.The research direction of this cluster is to develop processing technique or useful materials from a sustainability perspective including economic (eg-energy consumption), value added, environmental and social aspect. The main focus area is sustainable recycling materials.

7. Power Electronics and Electrical Machine Design

Power Electronics being both inter-disciplinary and multi-disciplinary plays a key role using modern technologies to produce 'competitive edge' energy efficient environmentally compliant products. The main objectives of this cluster are a) to identify real-world problems related to electrical machines and power electronics; and provide innovative solutions, b) to design, improve transformers, motors and generators for better performance and higher efficiency, c) to design and improve variable speed drives, power supplies, inverters and others, to be more reliable, robust and energy efficient.