

## Broad Area of Research

### Cutting-Edge Research in Nanotechnology

Design and engineering of methods/devices at molecular level that lead to compact and faster microprocessors with consumption of less energy. Smart and efficient products, efficient batteries and solar cells, targeted cure of many diseases like cancer are the few applications of this field. A discipline with all the ingredients to turn into the next industrial revolution.



## Computational Physics and Machine Learning

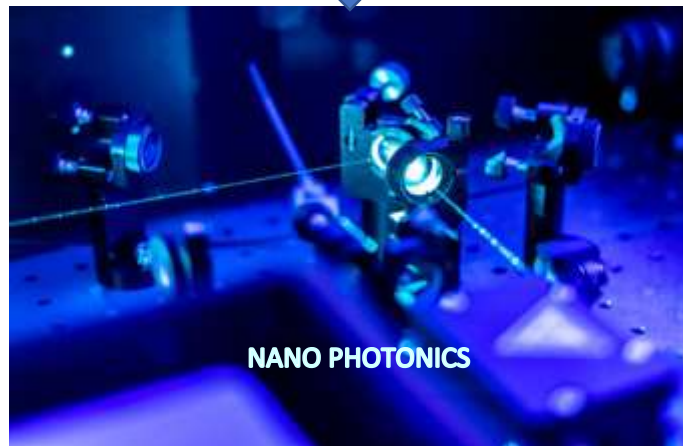
Many important recent advances in our understanding of the physical world have been driven by large-scale computational modeling and data analysis. For an example, the plasmonic deals with the interaction of coherent free electrons with radiation. It helps in confining light at subwavelength scale and useful for enhancing photochemistry, biosensing, energy harvesting etc.

Biomedical image segmentation and classification using machine learning methods; Application of metaheuristic algorithms in image processing.



## Advanced Research in Nano-Photonics and Nanoplasmonics

Photonics utilizes lasers, optics, imaging and more to impact every area of modern life, from communications and information processing to lighting, agriculture and medicine, manufacturing, transportation, aerospace and much more. Photonics is set to be the key technology for the 21st Century.



## **Novel Energy Storage Materials and Device Fabrication**

In the present age, for electric driven products based on large scale stationary energy storage devices, the new generation energy devices become good promising candidate due to their comparable low cost, environment friendliness, high efficiency, and relatable huge abundance. To meet the demand of clean energy which is increasing day by day with the increasing applications in the human life, new energy storage materials and devices like SIB's and Supercapacitors have to be developed.



**Na<sup>+</sup>-ion Rechargeable Battery**