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**103th HU-ACE seminar**  
**\*\*th Mechanical System Seminar**  
**182nd TAOYAKA Program Seminar**

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Date and time: Monday, Jun. 20, 2022 4<sup>th</sup> period (14:35-16:05)

Place: Engineering A3-131

Lecturer: Prof. Sanket Goel (MEMS, Microfluidics and Nanoelectronics (MMNE) Lab, Department of Electrical and Electronics Engineering, Birla Institute of Technology and Science (BITS) Pilani, Hyderabad Campus, Hyderabad, India)

**Turnkey Laser Ablation Method to Produce Graphene and  
Related Materials: Application to realize Smart Miniaturized Devices**

With the advent of cyber-physical system-based automation and intelligence, the development of smart wearable devices has dramatically enhanced. Evidently, this has led to the thrust to realize standalone and sufficiently-self-powered miniaturized devices for a variety of sensing and monitoring applications. To this end, a range of aspects needs to be carefully and synergistically optimized. These include choice of material, micro-reservoir to suitable place the analytes, integrable electrodes, detection mechanism, microprocessor/microcontroller architecture, signal-processing, software etc. In this context, MMNE Lab is working towards developing novel flexible devices having micro-reservoir, both in flow-through and stationary phase, integrated with graphanized zones created by simple benchtop laser. Various substrates, like different kinds of cloths, papers and polymers, have been harnessed to developed laser-ablated graphene regions alongwith micro-reservoir to aptly place various analytes to be sensed/monitored. Likewise, similar substrates have been utilized for energy harvesting by fuel-cell or solar routes, and supercapacitor-based energy storage. Overall, realization of a prototype is envisioned by integrating various sub-systems, including sensory, energy harvesting, energy storage and IoT sub-systems, on a single mini-platform. During the presentation, our work towards developing such prototypes will be showcased, and current and future commercialization potential will be projected.

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