

## PhD Open Seminar

**Speaker**-Kaushik Pal (Thesis supervisor: Dr. Apurba L. Koner) **Roll No**-1220206

**Date**-8<sup>th</sup> September 2017

**Time**-12.00 noon

**Venue**-AB II-401

**Title:** Single and two-photon active fluorescent and fluorogenic probe for formulation, cancer detection, bioconjugation, measuring polarity inside cellular organelle and removal of stress

### Abstract

Biological system is myriad of heterogeneity and complexity in terms of chemical and physical composition. Highly regulated processes are maintaining the proper function from small cellular organelles to the large system level. Malfunction within the system either taken care of by internal machinery or administration of drug.<sup>1</sup> Fluorescence spectroscopy and microscopy are extensively being used to understand the fundamental processes in the biological system and in the clinical field.<sup>2</sup> Tailoring of the fluorescent materials according to their practical utility *via.* aids of supramolecular interaction, synthetic modification, and solvent effects has been reported in the literature.<sup>3</sup> The versatile nature of fluorescence is being used in the field of opto-electronic devices, sensing of micro-environmental properties, sensing of important chemical species, dynamics and evolution of bio-molecules *etc.*<sup>4</sup>

During my doctoral research, I developed single and multi-photon active fluorescent probes for fluorescence microscopy. Mainly, I have explored the functionality in terms of chemical reaction, organelle and receptor protein specificity and micro-environment sensitivity *via.* design and synthesis of single and multi-photon active fluorescent probe which are water-soluble, bright, small, easy to functionalize bio-conjugation tool, environment sensitive, and multi-color. The exploration extended to drug formulation,<sup>5a-b</sup> food-additive formulation,<sup>5c</sup> deciphering micro-environment inside cellular organelle mitochondria<sup>6a</sup> and endoplasmic reticulum,<sup>6b</sup> bio-conjugation,<sup>6a</sup> removing stress from endoplasmic reticulum<sup>7</sup> and detection of cancer *via.* receptor (biotin<sup>8a</sup> and folate<sup>8b-d</sup>) mediated endocytosis process.

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