

Summer Workshop

(Over online Zoom platform)

on

Recent Advances in Spectroscopy, Catalysis and Synthesis

Department of Chemistry

IIT Kanpur



June 14 – July 02, 2021

The primary aim of this workshop is to expose students to challenging areas of chemical research. It intends to connect students to the cutting-edge techniques and methodologies used in advanced research. This workshop would provide a platform to engage 4th Year BS, BS-MS and 2-year MSc students in the Department who have missed summer internships and related programs and those who are yet to return to campus due to pandemic. The theme for this year is "Recent Advances in Spectroscopy, Catalysis and Synthesis", covering a wide range of subjects involving both fundamental aspects and applications.

Who can register: 4th Year BS, BS-MS and 2-year MSc students of Department of Chemistry, IIT Kanpur (However, all are welcome to attend)

Registration process: Registration link will be provided by email (chmug@lists.iitk.ac.in)

Registration fee: Nil

Last date to register: **June 06, 2021**

Tentative topics to be covered

Week 1: Theme – Spectroscopy

June 14, Mon: Gas phase spectroscopy

June 15, Tues: Materials and spectroscopy

June 16, Wed: Spectroscopy at interfaces

June 17, Thu: Single molecule spectroscopy

June 18, Fri: Spectroscopy in characterization

Week 2: Theme – Catalysis

June 21, Mon: Main group elements in catalysis

June 22, Tue: Ligand design in catalysis

June 23, Wed: Sustainable processes and products

June 24, Thu: Photocatalysis at surfaces

June 25, Fri: Enzyme catalysis

Week 3: Theme – Synthesis

June 28, Mon: Strategy in synthesis

June 29, Tue: Bioinspired materials

June 30, Wed: Synthetic methodologies

July 01, Thu: Design and synthesis of vaccine

July 02, Fri: Stimuli-responsive materials

Each day there will be two lectures; 3:00 – 4:30 PM
and 5:00 to 6:30 PM.

Contact

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Summer Workshop 2021: Recent Advances in Spectroscopy, Catalysis and Synthesis

<https://zoom.us/j/91826849166?pwd=aEZUb3diZHZjamYrTkRZcWwrZ29tUT09>

Meeting ID: 918 2684 9166

Passcode: EW58vd

Program Schedule

June 14, Monday 2:45 PM: Introductory remarks by HoD and Coordinator

Week 1: Theme – Spectroscopy

Day 1 (June 14, Monday): Gas phase spectroscopy

- 1.A. (3:00 – 4:30 PM) “Good” vibrations: importance of anharmonicity and Fermi resonances – Prof. K. Srihari
1.B. (5:00 – 6:30 PM) Spectroscopic studies of step-wise solvation and dissociation of HCl molecule – Prof. D. Mani

Day 2 (June 15, Tuesday): Materials and spectroscopy

- 2.A. (3:00 – 4:30 PM) Photonic Crystal Lasers – Prof. M. Ranganathan
2.B. (5:00 – 6:30 PM) Photoelectron spectroscopic investigations of perovskite materials – Prof. D.L.V.K. Prasad

Day 3 (June 16, Wednesday): Spectroscopy at interfaces

- 3.A. (3:00 – 4:30 PM) Water evaporation from free surfaces of aqueous solutions – Prof. A. Chandra
3.B. (5:00 – 6:30 PM) Understanding the electronic properties of molecular materials at solid-solid interface – Prof. T.G. Gopakumar

Day 4 (June 17, Thursday): Single molecule spectroscopy

- 4.A. (3:00 – 4:30 PM) 1D & 2D fluorescence correlation spectroscopy – Prof. P. Sen
4.B. (5:00 – 6:30 PM) Approaching spatial and temporal control at nanoscale with femtosecond pulses – Prof. D. Goswami

Day 5 (June 18, Friday): Spectroscopy in characterization

- 5.A. (3:00 – 4:30 PM) Characterization of organic compounds by special NMR experiments – Prof. M.K. Ghorai
5.B. (5:00 – 6:30 PM) NMR and EPR Spectroscopy of Paramagnetic Molecules – Prof. S.P. Rath

Week 2: Theme – Catalysis

Day 6 (June 21, Monday): Main group elements in catalysis

- 6.A. (3:00 – 4:30 PM) The concept of frustrated Lewis pair and its utility in catalysis – Prof. V. Chandrasekhar
6.B. (5:00 – 6:30 PM) Low-coordinate main-group compounds for small molecule activation and catalysis – Prof. V. Chandrasekhar

Day 7 (June 22, Tuesday): Ligand design in catalysis

- 7.A. (3:00 – 4:30 PM) In search of catalysts to meet the challenges of sustainable processes and products – Prof. J.K. Bera
7.B. (5:00 – 6:30 PM) Hydrogen, Hydride, Hydrogensae: Bioinspired Ligands and Catalysts for Hydrogen Production – Prof. R. Angamuthu

Day 8 (June 23, Wednesday): Sustainable processes and products

- 8.A. (3:00 – 4:30 PM) New Generation Threefold C-C Couplings using Triarylbiismuth Reagents under Palladium Catalysis – Prof. M.L.N. Rao

- 8.B. (5:00 – 6:30 PM) Sustainable Catalysis: challenges, impacts and opportunities – Prof. B. Sundararaju

Day 9 (June 24, Thursday): Photocatalysis at surfaces

- 9.A. (3:00 – 4:30 PM) Plasmonic Nanomaterials: Fundamentals and Application in Photocatalysis – Prof. V.G. Rao
9.B. (5:00 – 6:30 PM) Challenges in Plasmon Driven Reduction of CO₂ to Chemical Fuels – Prof. V.G. Rao

Day 10 (June 25, Friday): Enzyme catalysis

- 10.A. (3:00 – 4:30 PM) Metallohydrolases: Role of Metal Ions in the Hydrolytic cleavage of an RNA-model Phosphodiester – Prof. R.N. Mukherjee
10.B. (5:00 – 6:30 PM) Green approaches to organic synthesis using enzymatic catalysis – Prof. R. Gurunath

Week 3: Theme – Synthesis

Day 11 (June 28, Monday): Strategy in synthesis

- 11.A. (3:00 – 4:30 PM) Strategy in Asymmetric Synthesis – Prof. V.K. Singh
11.B. (5:00 – 6:30 PM) Total Synthesis of Natural Products through Novel Synthetic Strategies – Prof. D.H. Dethe

Day 12 (June 29, Tuesday): Bioinspired materials

- 12.A. (3:00 – 4:30 PM) Bioinspired Assemblies for Biomedical Applications 1 – Prof. S. Verma
12.B. (5:00 – 6:30 PM) Bioinspired Assemblies for Biomedical Applications 2 – Prof. S. Verma

Day 13 (June 30, Wednesday): Synthetic methodologies

- 13.A. (3:00 – 4:30 PM) Total Synthesis: Changing Targets Vs Changing Methods – Prof. R. Ramapanicker
13.B. (5:00 – 6:30 PM) Unveiling New Frontiers of Chemical Space and Efficient Synthetic Design – Prof. A. Singh

Day 14 (July 01, Thursday): Design and synthesis of vaccine

- 14.A. (3:00 – 4:30 PM) Physical Virology: Structure and Function of Viruses – Prof. N. Parveen
14.B. (5:00 – 6:30 PM) Engineering Traditional & New Generation of Vaccines – Prof. N. Parveen

Day 15 (July 02, Friday): Stimuli-responsive materials

- 15.A. (3:00 – 4:30 PM) Stimuli-Responsive Materials: Concepts, Development and Applications – Prof. J.N. Moorthy
15.B. (5:00 – 6:30 PM) Design Strategy for Stimuli-Responsive Optical Materials – Prof. A.K. Patra

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