DR. BHAWNA UTTAM

Assistant Professor, Department of Chemistry, J.C. Bose University of Science and Technology YMCA, Faridabad, India. bhawnauttamchem@gmail.com, bhawnauttam@jcboseust.ac.in

EDUCATION

- **Ph.D. Chemistry (8.9)** March 2020
  Department of Chemistry
  Indian Institute of Technology Bombay, Mumbai, India
- **M.Sc. Chemistry (8.75)** June 2015
  Department of Chemistry
  Indian Institute of Technology Delhi, Delhi, India

RESEARCH EXPERIENCE

- **Postdoctoral Fellow (Advisor: Professor Sudipta Basu)** Dec. 2020-March 2021
  I worked on developing and synthesizing mitochondria-targeting organic molecules for photothermal therapy in cancer treatment. I synthesized multi-step organic molecules for the targeted research in Basu's lab at IIT Gandhinagar.
- **Ph.D. Chemistry (Supervisor: Professor C. P. Rao)** March 2020
  During my PhD thesis, I designed and developed the calix[4]arene molecules and their immobilization onto various nanoparticle surfaces (gold, silica, mesoporous silica, and Ceria) for applications in ion sensing, catalysis, and drug delivery. I have developed my skills in synthesizing multi-step multi-functional calixarene derivatives. I also worked on ion recognition in solution, solid surface, and biological cells, heterogeneous catalysis by organic molecule capped nanoparticles, and synthesis of supramolecular system as a drug delivery vehicle.

TEACHING EXPERIENCE

- **Assistant Professor Chemistry** April 2021-Present
  Department of Chemistry, J.C. Bose University of Science and Technology
  YMCA, Faridabad, India

COURSES ENGAGEMENT

1. **Chemistry of Supramolecules**
   Syllabus design, Teaching, Question paper structuring, Answer sheet evaluation
2. **Organic Spectroscopy (NMR, IR, UV-vis)**
   Teaching, Question paper structuring, Answer sheet evaluation
3. **Instrumental Methods of Analysis and Instrumentation Skills**
   Teaching, Question paper structuring, Answer sheet evaluation
4. **Green Chemistry**
   Teaching, Question paper structuring, Answer sheet evaluation

RESEARCH GRANTS

1. **SERB Power Grant 2023-2026** (ongoing): Development of Spiropyran Based Metal Complexes as Potent Drug Candidate for Effective Photodynamic and Photothermal Cancer Therapy.
2. **DST-Haryana Grant 2022-2025** (ongoing): Oxidative catalysis and synthesis of COVID-19 Drug candidate/precursors using iodine incorporated Metal organic frameworks (MOFs).

PUBLICATIONS

1. Rimi, R.; Kumar, R.; **Uttam, B.*** Porous Pd-loaded IRMOF-9 as Highly Efficient Recyclable Material towards the Reduction of Nitroaromatics in Aqueous Media. ChemPlusChem, 2024, e202400111.
2. Ingle, J.; **Uttam, B.**; Panigrahi, R.; Khatua, S.; Basu, S. Dog-bone shaped gold nanoparticle-mediated chemo-photothermal therapy impairs the powerhouse to trigger apoptosis in cancer cells. J. Mater. Chem. B, 2023,11, 9732-9741.
3. **Uttam, B.**; Polepalli, S.; Rao, C. P.* Synthetic strategies for the functionalization of upper or lower rim of supramolecular calix[4]arene platform. ARKIVOC 2022 (part vi), 254 – 279.
4. Rimi, R.; Kumar, P.; **Uttam, B.***; Kumar, R.* Highly Efficient Cauliflower-like Palladium-Loaded Porous MOF as a Robust Material for the Degradation of Organic Dyes. ACS Omega 8 (42), 38895-38904.

5. Rimi, R.; **Uttam, B.**; Zhdankin, V.V.; Kumar, R.* New Isoxazole-Substituted Aryl Iodides: Metal-Free Synthesis, Characterization and Catalytic Activity. European Journal of Organic Chemistry e202301191
6. Sangeeta, Kumar, A.; Fatima, A.; Shahid, M.; Verma, I.; Sharma, P.; Arora, H.; Javed, S.; Sharma, D.; **Uttam, B.**; Rajput, A. Synthesis, crystal structure, quantum computational, biological study, molecular docking and molecular dynamic simulations investigations on 2,2′-((1,4-phenylenebis(methylene)) bis(sulfanediyl))dianiline. Journal of Molecular Structure, 1319, Part 1,2025.
7. Narkhede, N.; **Uttam, B.**; Calixarene assisted Pd- Nanoparticles in organic transformations: Synthesis, Characterization and catalytic application in water for C-C coupling and for reduction of nitroaromatics and organic dyes. *ACS Omega* 2019*, 4*, 4908-4917.
8. Polepalli, S.; **Uttam, B.**; Rao, C. P.* Protein–inorganic nano hybrid sheets of Pd embedded BSA as a robust catalyst in water for oxidase mimic activity and C–C coupling reactions, and as a sustainable material for micromolar sensing of dopamine. Mater. Adv.*, 2020, **1**, 2074-2083*
9. **Uttam, B.**; Jahan, I.; Sen, S.; Rao, C. P.* Coumarin–Calix[4]arene Conjugate-Anchored SiO_2 Nanoparticles as an Ultrasensor Material for Fe^{3+} to Work in Water, in Serum, and in Biological Cells. ACS Omega 2020, 5, 21288−21299.
10. **Uttam, B.**; Sinha, S.; Majumdar, A.; Rao, C. P.* Selective Sensing and Removal of Mercury Ions by Encapsulating Dansyl Appended Calix [4] Conjugate in a Zeolitic Imidazolate Framework as an Organic–Inorganic Hybrid Nanomaterial. ACS Appl. Nano Mater. 2022, 5, 8, 11371−11380.
11. **Uttam, B.**; Kandi, R.; Hussain, M. A.; Rao, C. P.* Fluorescent lower rim 1, 3- Dibenzooxadiazole conjugate of calix[4]arene in selective sensing of fluoride in solution and in biological cells using confocal microscopy. *J. Org. Chem.* 2018, *83*, 11850–11859.
12. **Uttam, B.**; Hussain, M. A.; Joshi, S.; Rao, C. P.* Physicochemical and ion sensing properties of benzofurazan appended calix[4]arene in solution and on gold nanoparticles: Spectroscopy, Microscopy and DFT computations in support of the species of recognition. *ACS Omega* 2018*, 3,* 16989-16999.
13. Narkhede, N.; **Uttam, B.**; Kandi, R.; Rao, C. P.* Silica-Calix hybrid composite of allyl calix[4]arene covalently linked to MCM-41 nanoparticles for sustained release of Doxorubicin into cancer cells. *ACS Omega* 2018, *3*, 229-239.
14. Narkhede, N.; **Uttam, B.**; Rao, C. P.* Inorganic-organic covalent hybrid of polyoxometalate-calixarene: Synthesis, Characterization and enzyme mimetic activity. *Inorg. Chim. Acta* 2018, 483, 337–342.
15. **Uttam, B.**; Chawla, H. M.; Pant, N.; Shahid, M.* Proficient molecular receptor exhibiting "ON-OFF" excimer fluorescence with fluoride and mercury toxicants. *J. Photoch. Photobio. A.* 2017, *39*, 224-229.
16. Chawla, H. M.; Shahid, M., Arora, L. S.; **Uttam, B.** Synthesis and evaluation of a tri- armed molecular receptor for recognition of mercury and cyanide toxicants. *Supramolecular Chemistry* 2017, 29, 111-119.

DELIVERED KEYNOTES

▫ **ETSC SRM 2024**, India ▫ **3rd ACCI 2022**, India ▫ **15th ICC 2019**, France ▫ **ACS IITB 2019**, India ▫ **IHS IITB 2018**, India ▫ **MTIC-XVII 2017**, India

FELLOWSHIPS AWARDED

▫ **Junior Research Fellowship for PhD** (June 2015-June 2017) ▫ **Senior Research Fellowship for PhD** (July 2017-March 2020)

CERTIFICATION

▫ GATE Chemistry, **2015** ▫ GATE Chemistry, **2016** ▫ NET-JRF **2014** with AIR-78

RESEARCH GUIDANCE

PhD thesis completed: 1 (Co-supervised)
PhD thesis ongoing: 1 (Fully Supervised)
Master's thesis completed: 11
Master's thesis ongoing: 5