TUMPA GORAI

Quarter No. H4-602, BITS Pilani - Hyderabad Campus, Telangana | +91-8597030935 | tumpagorai@gmail.com

SUMMARY OF QUALIFICATIONS

- Ph.D. in Organic and Supramolecular Chemistry; 10+ years of demonstrated experience in organic synthesis, functional supramolecular soft materials chemistry, and Lanthanide luminescence-based enzyme sensing.
- Independent, innovative, motivated, team-player with strong experimental, analytical, communication, and interpersonal skills.

PROFESSIONAL EXPERIENCE

Irish Research Council (IRC) Postdoctoral Fellow [Advisor: Prof. Thorfinnur Gunnlaugsson]

October 2019-April 2022 | School of Chemistry, Trinity College Dublin, Ireland. Project: Functional fluorescent/luminescent supramolecular assemblies and gels.

- Developed charge-transfer interaction induced hierarchical fluorescent supramolecular co-assembly/co-crystal as light-harvesting (FRET) scaffold.
- Developed luminescent lanthanide-based organic-inorganic supramolecular hybrid hierarchical assembly as multi-stimuli responsive material.
- Worked in four different collaborative projects involving teams across Ireland and UK.

Postdoctoral researcher [Advisor: Prof. Kimoon Kim]

November 2017-May 2019 | Institute for Basic Science, Pohang University of Science and Technology, South Korea. Project: Reactive oxygen species (ROS) induced protein aggregation study.

- Project design and starting materials selection, optimizing the condition for enzyme catalyzed reaction based α-synuclein aggregation
- The project was highly collaborative involving teams across different universities in South Korea.

Research associate [Advisor: Prof. Uday Maitra]

August 2016-September 2017 | Department of Organic Chemistry, Indian Institute of Science, Bangalore, India. Project: Developing Lanthanide luminescence based sensor for biologically important molecules.

- Developed a user-friendly technique for the detection of gallate-derived green tea polyphenols.

Graduate Research Fellow [Advisors: Prof. Uday Maitra]

August 2011-June 2017 | Department of Organic Chemistry, Indian Institute of Science, Bangalore, India. Thesis: Lanthanide based hydrogels in sensing, energy transfer and nanoparticle synthesis.

- Developed a hydrogel-based enzyme assay for β-galactosidase and alkaline phosphatase using pro-sensitizer doped Tb/Eu based hydrogels.
- Established a paper-based sensor as a portable and user-friendly technique for sensing enzymes.
- explored Lanthanide based hydrogel matrix as light harvesting medium for LRET study and synthesis of LnF_3 and $LnPO_4$ nanoparticles.
- Research outcome of 4 peer-reviewed publications, and 4 conference poster presentations.

Teaching Assistant

August-January 2013| IISc Bangalore, India

- Teaching Assistant for the undergraduate semester-3 course on Basic Organic Chemistry (theory).

EDUCATION

Ph.D. (Organic and Supramolecular Chemistry) | CGPA: 6.8/8.0 — 2011-2017
IISc, Bangalore, India

M.Sc. (Chemistry) | CGPA: 8.99/10.00 — 2009-2011
Department of Chemistry, Indian Institute of Technology, Kharagpur, India.

B.Sc. (Chemistry Hons.) | Percentage of Marks: 70.8% — 2006-2009
Bankura Christian College, Bankura, West Bengal., India

PROFESSIONAL SKILLS

- Synthesis of organic molecules, isolation of pure compounds and their characterization by NMR, mass, IR, HPLC and elemental analysis

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- Preparation of supramolecular soft materials, spectroscopic and microscopic characterizations, investigation of properties and applications
- Study of different enzyme assays using time-delayed Lanthanide luminescence
- Preparation of lipid vesicles and protein aggregation study under various experimental conditions
- hands-on experience in handling PerkinElmer Spectrum One FTIR spectrometer, Perkin Elmer Thermogravimetric analysis (TGA) instrument, Shimadzu class 10AT-VP HPLC, Biotage microwave instrument, UV-Vis spectrometer (Perkin-Elmer Lambda 35, and Shimadzu), spectrofluorometer (Perkin Elmer LS 50B, Varian Cary eclipse, Horiba fluorolog-3, Edinburgh FLS 980), Jasco J-815 circular dichroism (CD) spectrometer, Zetasizer Nano Z dynamic light scattering (DLS) instrument, AR-1000 Rheometer, and Carl Zeiss Ultra Scanning electron microscopy (SEM).
- Data analysis/visualization programs (Origin Lab, ChemDraw, Microsoft Office: Word, Excel, PowerPoint; ImageJ, Topspin, MestReNova, Leica microscopy software).

AWARDS & FELLOWSHIPS

- Irish Research Council Postdoctoral Fellowship, Government of Ireland, October 2019-September 2021.
- Work published in *ACS Sensors* (*ACS Sens.* 2016, *1*, 934) was highlighted in

1. IISc magazine “kernel” 2015-2016, (*https://iisc.ac.in/wp-content/uploads/2017/01/Kernel_2016.pdf*)
2. UK based magazine "The Pathologist" (*https://thepathologist.com/fileadmin/pdf/TP_0317_Issue.pdf#page=21*)

- all-India Rank-25 (CSIR) in NET December-2010
- all-India rank-31 in GATE-2011
- Merit-cum-Means (MCM) scholarship during M.Sc. degree (2009-2011) in IIT Kharagpur.

PERSONAL DETAILS

- Date of Birth: 28th October 1988
- Gender: Female
- Nationality: Indian
- Languages known: English, Hindi, Bengali

SELECTIVE PUBLICATIONS

11 publications in peer-reviewed scientific journals (Full list: https://scholar.google.com/citations?user=235eVcEAAAAJ&hl=en&oi=ao).

1. “Hierarchical supramolecular co-assembly formation employing multi-component light-harvesting charge transfer interactions giving rise to long-wavelength emitting luminescent microspheres” **Tumpa Gorai**,* June I Lovitt, Deivasigamani Umadevi, Gavin Mc Manus, and Thorfinnur Gunnlaugsson.* ***Chem. Sci.***, 2022, DOI:10.1039/d2sc02097a (*corresponding author)
2. “Contagious aggregation: Transmittable protein aggregation in cellular communities initiated by synthetic protocells”, Hong-Guen Lee, Jin Hae Kim, **Tumpa Gorai**, Young Ho Ko, Haw-Young Kwon, Wooseong Chung, Ilha Hwang, Sungsu Lim, Yun Kyung Kim, Kwanwoo Shin, Young-Tae Chang, Kimoon Kim, Kyeng Min Park, ***J. Am. Chem. Soc.,*** 2022, *144,* 5067.
3. “Luminescence resonance energy transfer in a multiple component, self-assembled supramolecular hydrogel”, **Tumpa Gorai** and Uday Maitra, ***Angew. Chem. Int. Ed.,*** 2017, *56*, 10730.
4. “Supramolecular Approach to Enzyme Sensing on Paper Discs Using Lanthanide Photoluminescence”, **Tumpa Gorai** and Uday Maitra, ***ACS Sens.***, 2016, *1*, 934.
5. “Eu/Tb luminescence for alkaline phosphatase and β-galactosidase assay in hydrogels and on paper devices”, Tumpa Gorai* and Uday Maitra,* ***J. Mater. Chem. B,*** 2018, 6, 2143. (*corresponding author)