CURRICULUM VITAE

Dr. Harshita Chawla
Ph.D. Chemistry
haarshita@gmail.com

A Passionate, self-driven, highly motivated, optimistic, and dedicated scholar in Chemistry, I am an optimistic and committed person with quick learning ability and excellent teaching skills and knowledge of educational technologies. Looking for the teaching position with demonstrated research expertise in semiconductor nanostructures for environmental remediation.

OBJECTIVE:

- To work in growth-oriented organization and to obtain a very challenging position that will utilize my expertise, education, and background, expand knowledge, and offer opportunities for personal and professional growth.

RESEARCH AREA OF INTEREST

- Nanomaterial synthesis
- Photocatalyst synthesis and characterization
- Photocatalytic and Thermal CO_2 Hydrogenation to fuels.
- Photo and Photo electrocatalytic Waste water treatment..
- Functionally modified photocatalysts
- Organometallic photocatalysts
- Modifications in photocatalyst synthesis
- Photocatalytic clean energy production
- Green synthesis
- Photocatalytic reactors development

RESEARCH:

Degree	Year	Title	Institute
Postdoctoral	January 2024-June 2025	Photocatalytic and Thermal CO_2 Hydrogenation using heterogenous catalysis	University of Szeged, Hungary
Ph.D.	July 2019 to April 2023	Development of Bismuth-based photocatalysts using sensitizers for wastewater treatment	Amity University, Noida. Co-guide at IIT Delhi, India

ACADEMIC QUALIFICATIONS

Degree	Year	Discipline	University/ Institute	Marks%/CGPA
M.Sc.	2019	Applied Chemistry	Amity University, Noida	7.02
B.Sc.	2017	Life Sciences	University of Delhi	81.11

Reviewer for various RSC (Advances)and Elsevier journals (JECE, MSB, ICC, JIEC).
h-index-8; i-10 index- 7
Current Research Details

My current research focuses on photocatalytic CO_2 hydrogenation and thermal reverse water-gas shift (RWGS) reactions, both of which play a crucial role in sustainable carbon utilization and green fuel production. The primary objective is to develop efficient catalyst systems that selectively convert CO_2 into value-added fuels and chemicals, addressing the global challenge of carbon neutrality.

In photocatalytic CO_2 hydrogenation, I investigate semiconductor-based photocatalysts capable of harvesting solar energy to drive CO_2 reduction with hydrogen. This involves designing highly active and stable photocatalysts, optimizing their electronic and structural properties, and enhancing light absorption, charge separation, and catalytic efficiency through heterojunction formation, co-catalyst deposition, and defect engineering.

In the thermal RWGS reaction, I focus on designing high-temperature catalysts that facilitate the selective conversion of CO_2 to CO, a key intermediate in syngas production. By employing advanced characterization techniques such as DRIFTS and TPD are used for analysing reaction mechanisms, catalyst stability, and structure-activity relationships.

This research contributes to the development of high-performance catalysts for carbon recycling, hydrogen utilization, and renewable energy applications, paving the way for efficient CO_2 conversion technologies in future sustainable energy systems.

Ph.D. Work Details

Awarded Ph.D. Degree on topic: **"Development of Bismuth-based photocatalysts using sensitizers for wastewater treatment"** at Amity University, Noida (11^{th} April 2023).

This work involves synthesis and in-depth photocatalytic investigation of pristine and modified bismuth-based nano-photocatalytic materials (bismuth oxyhalides and bismuth vanadate) and further implementation of those nanomaterials for multidisciplinary applicating of these nanocomposites to address environmental issues (waste-water treatment and water splitting applications). In this study, the catalysts were fabricated using various methods viz. green hydrolysis, grinding, and hydrothermal route. Different nanostructure that are achieved at high temperatures and long duration treatments (250-300°C), were achieved at low temperature (55-60°C) and within 2 hours; enhanced interfacial charge transfer was observed. The photocatalytic degradation study of various pollutants (dyes, organochlorine pesticides, Cr (VI) ions, phenol, bisphenol A, antibiotics etc.) were carried out using in house developed photocatalytic reactor. This study investigates the effect of various processing technique parameters, surface modifications of bismuth based photocatalysts as well as their stability after the degradation of various contaminants. In order to improve the interfacial charge transfer, and duration of the photogenerated charge carriers, we have implemented supramolecular-organic-semiconductor system of *C. longa* and Quercetin. Also, formation of oxygen vacancies was also studied using these phytochemicals. Further, the main challenge was to separate the catalyst from the slurry which was achieved by impregnating the fabricated catalyst onto *Luffa cylindrica*. The morphology of the modified nanoparticles and impregnated catalyst on the *L. cylindrica* were studies using FE-SEM, HR-TEM, SAED. Further, the improve surface area, better charge transfer, lower recombination rate of charge carriers and type of junction formed were studied using BET N_2 adsorption isotherm, photo-electrochemical (PEC) water splitting, photoluminescence (PL), diffuse reflectance spectroscopy (DRS) and Mott-Schottky analysis. Further, some preliminary studies on clean energy production (H_2 generation and CO_2 reduction) using these nano-catalysts were conducted that gave positive response.

Guide: Prof. Seema Garg, **Place:** Amity University (Department of Chemistry), Noida.
Co-guide: Prof. Pravin P. Ingole **Place:** Indian Institute of Technology, Delhi (Department of Chemistry).

M. Sc. Dissertation Topic

Detection of Latent Fingerprints after Water and Fire Treatment via Small Particle Reagent Technique

Supervisor:

Prof. G.S. Sodhi, S.G.T.B. Khalsa College, University of Delhi

AWARDS (National/ International)

1. DST SERB International Travel Grant Award for Conference Young Researchers on Heterogeneous Catalysis 2022 (YOURHETCAT 2022), organized by European Federation, Hungary (11^{th}-13^{th} July 2022).
2. Best oral Presenter Award in INCEEM 2021, held at Sharda University, Greater Noida (29^{th}-30^{th} July 2021).

List of Publications

Journal Articles

1. **Chawla, H.,** Chandra, A., Ingole, P. P., & Garg, S. (2021). Recent advancements in enhancement of photocatalytic activity using bismuth-based metal oxides Bi2MO6 (M= W, Mo, Cr) for environmental remediation and clean energy production. **Journal of Industrial and Engineering Chemistry, 95, 1-15. (I.F. 6.76, Q1).**
2. **Chawla, H.,** Garg, S., Upadhyay, S., Rohilla, J., Szamosvölgyi, Á., Sapi, A., ... & Chandra, A. (2022). Efficient charge separation and improved photocatalytic activity in Type-II & Type-III heterojunction based multiple interfaces in BiOCl0.5Br0.5-Q: DFT and Experimental Insight. ***Chemosphere*, *297*, 134122. (I.F. 8.943, Q1).**
3. **Chawla, H.,** Saha, M., Upadhyay, S., Rohilla, J., Ingole, P. P., Sapi, A., ... & Garg, S. (2021). Enhanced photocatalytic activity and easy recovery of visible light active $MoSe_2/BiVO_4$ heterojunction immobilized on Luffa cylindrica–experimental and DFT study. **Environmental Science: Nano, 8(10), 3028-3041. (I.F. 9.473, Q1).**
4. **Chawla, H.,** Shukla C., Upadhyay, S., Rohilla, J., Ingole, P. P., Sapi, A., ... & Garg, Visible LED-Light Driven Photocatalytic Degradation of Organochlorine Pesticides (2,4-D & 2,4-DP) by Curcuma longa mediated Bismuth Vanadate. **Journal of Cleaner Production, Volume 367, September 2022, 132923. (I.F. 11.072, Q1).**
5. **Chawla, H.,** Garg, S., Shukla, C. R., Upadhyay, S., Rohilla, J., Szamosvölgyi, Á., ... & Chandra, A. (2025). Efficient visible light driven photocatalysis using BiOBr/BiOI heterojunction modified by Quercetin and defect engineering via simple mechanical grinding: Experiments & first-principles analysis. **Materials Research Bulletin, 184, 113268. (I.F. 5.6, Q1).**
6. I. Arora, **H. Chawla**, A. Chandra, S. Sagadevan, S. Garg, Advances in the strategies for enhancing the photocatalytic activity of TiO_2: conversion from UV-light active to visible-light active photocatalyst, **Inorganic Chemistry Communications (2022) (I.F. 4.4, Q1)**.
7. Garg, S., **Chawla, H**. and Banerjee, S., 2023, February. Fabricating Plant Extract Mediated Silver Doped Bismuth Oxybromide (BiOBr-G-Ag) Photocatalyst for Wastewater Treatment. **Macromolecular Symposia (Q3)**.
8. Abdullah, M. M., **Harshita Chawla,** Hasan B. Albargi, Jari S. Algethami, Mohammad Zaki Ahmad, Amrish Chandra, and Seema Garg. "Bismuth-Based Nanophotocatalysts for Environmental Reintegration." ***Inorganic Chemistry Communications* (2023): 111016. (I.F. 4.4, Q1)**.
9. Arora, I., Garg, S., Shukla, B.K., **Chawla, H.,** Ingole, P.P., Kalra, P., Abdullah, M.M. and Chandra, A., 2024. Facile low temperature synthesis of bismuth molybdate stabilized ferricyanide and ferrocyanide nanocomposites for the degradation of organic pollutants. ***Inorganic Chemistry Communications*, *164*, p.112355(I.F. 4.4, Q1)**.
10. Arora, I., Garg, S., **Chawla, H.,** Sapi, A., Ingole, P. P., Hegde, G., ... & Chandra, A. (2024). Visible light active bismuth chromate/curcuma longa heterostructure for enhancing photocatalytic activity. ***Reaction Kinetics, Mechanisms and Catalysis*, 1-13(I.F. 1.7, Q3).**

11. Arora, I., Garg, S., **Chawla, H**., Sapi, A., Ingole, P. P., Sagadeven, S., ... & Chandra, A. (2025). Visible-light-active 'bismuth tungstate/curcuma longa'z-scheme heterostructured photocatalyst for the degradation of methyl orange and phenol. ***Reaction Kinetics, Mechanisms and Catalysis*, *138*(3), 1797-1811. (I.F. 1.7, Q3)**

Conference Proceedings:

1. Tyagi, H., **Chawla, H.,** Bhandari, H., & Garg, S. (2021). Recent-enhancements in visible-light photocatalytic degradation of organochlorines pesticides: A review. **Materials Today: Proceedings. (Q3).**

Book Chapters:

1. **Chawla, H.,** Garg, S., Ingole, P.P., Chandra, A. (2022). Immobilization of Photocatalytic Material on the Suitable Substrate. In: Garg, S., Chandra, A. (eds) Green Photocatalytic Semiconductors. Green Chemistry and Sustainable Technology. Springer, Cham. https://doi.org/10.1007/978-3-030-77371-7_15
2. **Chawla, H.,** Garg, S., & Ingole, P. P. (2022). Environmental applications of eco-friendly nano photocatalysts: toward green nanotechnology. In Innovation in Nano-Polysaccharides for Eco-sustainability (pp. 325-341). Elsevier. https://doi.org/10.1016/B978-0-12-823439-6.00016-7
3. Setia, R., **Chawla, H.,** & Garg, S. (2021). Enhancement in Degradation of Antibiotics Using Photocatalytic Semiconductors under Visible Light Irradiation: A Review. Nanomaterials for Water Treatment and Remediation, 69-92. DOI: 10.1201/9781003118749-2
4. Singh, S., **Chawla, H.,** Chandra, A., & Garg, S. (2021). Magnetic hybrid nanoparticles for drug delivery. In Magnetic Nanoparticle-Based Hybrid Materials (pp. 319-342). Woodhead Publishing. https://doi.org/10.1016/B978-0-12-823688-8.00034-X 313
5. Rawat, Priya, **Chawla, H.,** and Seema Garg. "Visible-Light Photocatalytic Degradation of Heavy Metal Ion Hexavalent Chromium [Cr (VI)]." ***Nanotechnology for Environmental Remediation* (2022)**: 121-138. https://doi.org/10.1002/9783527834143.ch8
6. Arora, I., Garg, S., **Chawla, H.,** Chandra, A., Sagadevan, S., & Abdullah, M. M. Functional Nanomaterials for Potential Applications. In ***Functional Nanomaterials for Sensors (pp. 17-37). CRC Press.*** https://doi.org/10.1201/9781003263852
7. Arora, Isha, **Harshita Chawla**, Amrish Chandra, Suresh Sagadevan, and Seema Garg. "Bismuth-Based Photocatalytic Material for Clean Energy Production and CO2 Reduction." In ***Photocatalysis for Environmental Remediation and Energy Production: Recent Advances and Applications***, pp. 363-394. Springer International Publishing, 2023. https://doi.org/10.1007/978-3-031-27707-8_15.
8. Uday, S., **Harshita Chawla**, Amrish Chandra, and Seema Garg. "Conducting Polymer Hybrid Nanocomposites-Based Photocatalytic Material for Energy Applications." ***In Photocatalysis for Environmental Remediation and Energy Production: Recent Advances and Applications***, pp. 417-438. Springer International Publishing, 2023. https://doi.org/10.1007/978-3-031-27707-8_17.
9. Mittal, S., Anand, A., **Chawla, H.,** & Garg, S. (2026). Solutions, Aqueous Solutions, Juices, and Syrups and Its Evaluation of Nutraceutical Formulation Contents. In *Handbook of Nutraceuticals: Science, Technology and Engineering* (pp. 43-81). Cham: **Springer Nature Switzerland**.
10. Arora, I., **Chawla, H.,** Chandra, A., Sagadevan, S. and Garg, S., 2023. Bismuth-Based Photocatalytic Material for Clean Energy Production and CO2 Reduction. In Photocatalysis for Environmental Remediation and Energy Production: Recent Advances and Applications (pp. 363-394). **Cham: Springer International Publishing.**

Patent Details:

1. **Indian patent on "**Ag doped-BiOXs (BiOBr/BiOI/BiOCl) nanocomposite impregnated 2-D cylindrical activated carbon block for photocatalytic applications., Application number: 202011008530.
2. **Indian patent on - "Curcuma Longa Sensitized BiVO4 Nanostructures for Removal of Recalcitrant Pollutants and Method Thereof". Application number: 202111018136.**
3. **Indian patent on** "A method for the synthesis of visible active bismuth oxyhalides (BiOCl, BiOBr, BiOI) composites". Application number: 202111049599.

4. **Indian patent on "**Fabricating Quercetin arbitrated efficient visible light driven bismuth oxybromide/bismuth oxyiodide [BiOBrpI1-p-Q] facilitated by defect Engineering via simple mechanical grinding". Application number: 202211032534.
5. **Indian patent on** "A method for preparing bismuth molybdate for photocatalytic degradation of amoxicillin and ampicillin." Application Number: 202311014159.

Conference Presentations:

1. Harshita Chawla, Andras Sapi, Visible light Photocatalytic CO2 Hydrogenation with Hierarchically Conjugated and Porous Polyacetylene Networks. **YOURHETCAT 2024, Hungary. [Oral Presentation].**
2. **Harshita Chawla**, Andras Sapi, Seema Garg, Rapid and Eco-Friendly Fabrication of Dendritic BiVO4 Mesocrystals using Curcumin for enhanced photocatalytic degradation of 2,4-D. **NANO-2024, Khalifa University,** Abu Dhabi [Oral Presentation].
3. **Harshita Chawla,** Jyoti Rohilla, Pravin P. Ingole, Seema Garg, *Curcuma longa* mediated Bismuth Vanadate nanoflowers for Photocatalytic Applications. **ICONECT 2023, IIT Delhi, [Poster Presentation].**
4. **Harshita Chawla,** Seema Garg, Andras Sapi, Pravin P. Ingole, Fabricating Quercetin (Q) Arbitrated Efficient Visible-Light-Driven BiOBr/BiOI [$BiOBr_pI_{1-p}$-Q] facilitated via Defect Engineering by Simple Mechanical Grinding: An Experimental and DFT Insight, **YOURHETCAT 2022, Hungary. [Oral Presentation].**
5. **Harshita Chawla,** Pravin P. Ingole, Seema Garg **'**Enhanced Photocatalytic Activity of Heterostructures For The Degradation Of Phenol Under Visible Light Irradiation' **27th CONIAPS. [Poster Presentation].**
6. **Harshita Chawla,** Pravin P. Ingole, Seema Garg, Designing Heterostructure Between Bismuth Vanadate and Molybdenum Diselenide for Enhanced Photocatalytic Activity and Further Immobilizing on Green Substrate for easy recovery, **INCEEM 2021. [Oral Presentation, Best Oral Presenter Award].**
7. **Harshita Chawla,** Mohit Yadav, Pravin P. Ingole, Seema Garg, Recent Advancements in Enhancement of Photocatalytic Activity using Bismuth Based Compounds for degradation of Organic pollutants in UV-Vis. Region, **ICRTMD 2019. [Poster presentation].**

RESEARCH PROFILES:

- **Scopus ID: AU-ID ("Chawla, Harshita" 57221462933)**
- **Research Gate: https://www.researchgate.net/profile/Harshita-Chawla-2**
- **Google Scholar: https://scholar.google.com/citations?user=l9j2GO0AAAAJ&hl=en**
- **ORCID: https://orcid.org/0000-0003-1114-9372**
- **Citation: 305; h-index:7; i-10 index: 7. (Ref. Scopus).**
- **Reviewer for various SCI Journals.**

TECHNICAL SKILLS:

- Hands on experience number of instruments including GC-MS, LC-MS, HPLC, Scanning Electron Microscopy, Ultrasonicator with temperature and light variation, Fourier transform infrared spectroscopy (FTIR), to prepare TEM samples, X-Ray diffraction spectroscopy, UV- Vis-NIR absorption spectroscopy, Diffuse Reflectance Spectroscopy (DRS), Photoelectrochemical potentiostat.
- I have mentored 6 B. Sc. students and 6 M. Sc. students for their project work at Amity University during my Ph.D. tenure.

Personal Dossier:

Name: Harshita Chawla
Gender: Female
Marital Status: Married
Community: GEN
E-mail: haarshita@gmail.com

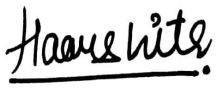
Contact: +91-9549796000
Date of Birth: 07 August 1994
Height- 5'2
Hometown: Hisar, Haryana
Languages Known: English, Hindi, Punjabi, and French**.**

References:

1. Dr. Andras Sapi
   Professor, Department of Applied and Environmental Chemistry
   University of Szeged, Hungary
   Tell: +36-62-343-795
   Cell: +36-30-325-0021
   Email: sapia@chem.u-szeged.hu
   Website: https://wizipisztoly.wixsite.com/nanocatalysis/contact-me
   Relation: Postdoctoral guide
2. Dr. Seema Garg
   Professor, Department of Chemistry,
   Amity Institute of Applied Sciences, Amity University Uttar Pradesh (India) 201313
   Cell: +919971117008
   Email: sgarg2@amity.edu
   Website: http://auup.amity.edu/faculty-detail.aspx?facultyID=7819
   Relation: Ph.D. Guide
3. Dr. Pravin P. Ingole
   Professor, Department of Chemistry,
   Indian Institute of technology, Delhi, India
   Tell: 011-26597547
   Cell: +919582994655
   Email: ppingole@chemistry.iitd.ac.in
   Website: https://chemistry.iitd.ac.in/faculty-profile/24
   Relation: Ph.D. Guide

Declaration:

I hereby declare that the above-mentioned information is correct up to my knowledge and I bear the responsibility for the correctness of the above-mentioned particulars.



Harshita Chawla