

ChemBio Bulletin

(A bi-monthly e-magazine of the department of chemical and biological sciences)

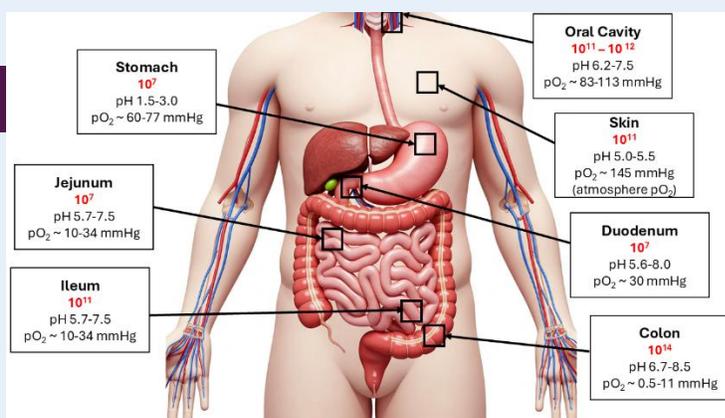
Combined Issue: Oct '24 – Jan '25

(Vol. 2, Issue 1, 2025, Publication Date: Feb 04, 2025)

FIRST FROM THE NITM SOHRA CHAPTER

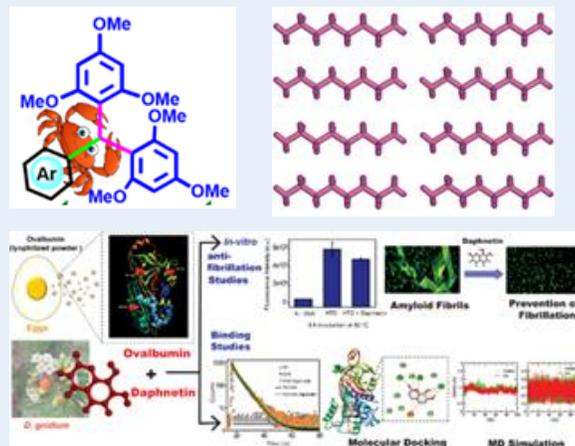
FEATURED ARTICLE:

Gut microbiome and its impact on human health



RESEARCH HIGHLIGHTS:

- Formation of Bis-indolyl-methanes from Symmetrical Triarylmethanes via Brønsted Acid Catalyzed C–C Bond Breaking Reaction
- Binding interaction of daphnetin with ovalbumin at molecular level
- Contrasting Mechanical Property and Surface Wettability of the Single Crystals of the Dimorphs of 4-n-Octyloxybenzoic Acid



Department of Chemical & Biological Sciences
National Institute of Technology Meghalaya
(An Institute of National Importance under MoE, Govt. of India)
Saitsohpen, Sohra, East Khasi Hills, Meghalaya, India, 793108

“If You Want to Have Good Ideas, You Must Have Many Ideas.” — Linus Pauling

Table of Contents

Contents	pages
1. About the institute	2
2. About the department	3
3. Message from the director	4
4. Message from the head of the department	5
5. Editor's note	6
6. Department details	7
7. Department news	8-9
8. Featured article	9-11
9. Research highlights	12-13
10. Recent publications	14
11. Achievements	14-15
12. Student contributions	15
13. Alumni corner	16
14. Career guidance	16-19
15. Picture gallery	20-21

Departmental magazine committee:

Editor: Dr. Harshit Joshi (Asst. Prof., Dept. of Chemical & Biological Sciences)

Editorial board members: Basudha Deb, Marry Hazarika and Satabdi Debroy (Ph.D. Scholars, Dept. of Chemical & Biological Sciences)

About the Institute



The National Institute of Technology (NIT) Meghalaya is one among the thirty-one NITs in India established under the NIT Act 2007 (Amended 2012) of the Parliament of India as Institutes of National Importance with full funding support from the Ministry of Education (Shiksha Mantralaya), Government of India. Ranked 68th in the NIRF 2024 rankings, NIT Meghalaya has been operational from its temporary campus in Shillong since 2012 and has made significant strides in becoming one of India's leading educational institutions.

The institute offers a diverse range of programs across nine academic departments, encompassing Engineering (Civil, Computer Science, Electrical, Electronics & Communication, Mechanical), Sciences (Physics, Chemistry, Mathematics), and Humanities & Social Sciences. Approximately 1000 students are enrolled in B.Tech., M.Tech., M.Sc., and Ph.D. programs, contributing to a vibrant learning community where faculty members are deeply involved in both teaching and cutting-edge research.

NIT Meghalaya's commitment to research is evident in its numerous publications, funded projects, and consultancy services. The institute has provided consultancy to prestigious organizations such as the Indian Air Force, Airport Authority of India, PWD, and CPWD, while fostering collaborations with industries like Vedanta Resources and Jindal Stainless Pvt. Ltd. It also maintains strong ties with research funding agencies such as DST-SERB and CSIR. Since 2018, the institute's international collaborations with institutions in countries like South Korea, France, Germany and Austria have further enhanced its global research footprint.

In addition to academic excellence, NIT Meghalaya hosts a wide range of events, including workshops, conferences, and faculty development programs, aimed at fostering innovation and skill development. The Centre for Career Development plays a pivotal role in student success, with 80% of eligible students securing placements in top-tier companies such as Microsoft, Bharat Petroleum, Power Grid Corporation, and Infosys.

NIT Meghalaya continues to strive for excellence by blending high-quality education with impactful research and industry collaboration, preparing its students to become future leaders and innovators.

About the Department



Established in 2012, the Department of Chemical and Biological Sciences at the National Institute of Technology Meghalaya offers a comprehensive education in chemistry and related fields. Currently, the department offers M.Sc. and Ph.D. degree programs, along with undergrad level courses for B.Tech. students in Chemical and Biological Sciences. The M.Sc. program commenced in 2015 with an initial intake of 13 students, while Ph.D. programs have been available since 2014 in various disciplines, including Organic Chemistry, Inorganic Chemistry, Biophysical Chemistry, Materials Chemistry, Gut Microbiology, and Computational Chemistry.

Our mission is to deliver high-quality education and conduct both fundamental and industry-oriented research. Faculty research interests span a wide range of core and interdisciplinary areas within chemical and biological sciences, including electrochemical sensors, carbon-based and composite materials for energy storage devices, electrocatalysts for oxygen reduction reactions, biophysical chemistry, nanomaterials, solid-state forms of pharmaceuticals, stimuli-responsive materials, crystal engineering, energy-converting smart materials, synthetic organic chemistry, gut microbiology, and computational chemistry.

Our department is equipped with advanced laboratory facilities, including a conductivity meter, pH meter, double beam UV-visible spectrophotometer with variable bandwidth and diffuse reflectance accessory, steady-state fluorescence spectrophotometer, Fourier transform infrared (FT-IR) spectrophotometer with ATR accessory, multichannel electrochemical analyzer including electrochemical impedance spectroscopy, differential scanning calorimeter, polarizing microscope with heating stage applications, and stereoscopic zoom microscope.

We are committed to fostering an environment conducive to innovative research and quality education in the fields of chemical and biological sciences.

Messages from the Director



It is with great pride and enthusiasm that I extend my warmest congratulations to the Department of Chemical & Biological Sciences on the publication of the fresh issue of its bi-monthly E-Magazine. This initiative truly reflects the vibrant academic and research culture upheld at NIT Meghalaya—centered on excellence, collaboration, and continuous innovation.

Our institute is committed to the holistic development of students, embracing core values such as academic integrity, excellence in teaching through student-centric pedagogy, and fostering interdisciplinary interaction through electives and projects. We also encourage creativity and innovation, skill development, and social responsibility. NIT Meghalaya's mission aligns with the goals of NEP-2020, offering skill-based multifaceted courses and implementing the Academic Bank of Credit for our students. A dynamic curriculum development process is underway, with updates already in effect for the different programs at the institute. Furthermore, NIT Meghalaya is in the process of shifting to its permanent campus at Sohra (Cherrapunji), which will be equipped with world-class infrastructure and research facilities. I am confident that this transition will provide an even stronger foundation for academic and research excellence.

The publication of this magazine comes at a pivotal time when science and education are rapidly evolving. It serves as an excellent platform to showcase the strides we are making in both teaching and research. The dedication and talent of our faculty, staff, and students are evident in the numerous achievements we celebrate today. Through this magazine, we can ensure that these accomplishments receive the recognition they deserve, not only within our institute but also in the broader academic and professional communities.

At NIT Meghalaya, we foster a culture where knowledge is shared, ideas are nurtured, and everyone—from students just beginning their academic journey to established researchers—can contribute meaningfully. This E-Magazine is a testament to that belief, providing a space where creativity, intellect, and innovation can flourish. In addition to highlighting key research, it will amplify the voices of our students and alumni, inspiring continued excellence.

Congratulations to the entire team behind this initiative. I look forward to seeing the positive impact it will have.

- Prof. Pinakeswar Mahanta

Messages from the Head of the Department



Greetings from the Department of Chemical and Biological Sciences!

It gives me great pleasure to present an overview of the Department of Chemical and Biological Sciences on the occasion of the publication of the fresh issue of ChemBio Bulletin. I would also like to extend warm greetings to all faculty members, staff, and students of the department.

The department was founded in 2012, and it currently offers M.Sc. degree in Chemistry and Ph.D. degree in broad areas of chemical sciences like physical chemistry, organic chemistry, biophysical chemistry, materials chemistry, gut microbiology, and theoretical chemistry.

The department currently has 5 regular faculty members, along with 27 Ph.D. students and 37 M.Sc. students. To date, a total of 94 M.Sc. students have graduated from our department, and 16 students have received their Ph.D. degrees.

In 2024, the department's name was changed from "Chemistry" to "Chemical and Biological Sciences" to enhance our interdisciplinary approach in teaching and research. In alignment with NEP 2020, we have recently revised the course syllabi for the undergraduate programs.

Our department is equipped with essential research facilities, including a double-beam UV-visible spectrophotometer, fluorescence spectrophotometer, Fourier transform infrared (FT-IR) spectrophotometer, electrochemical workstation, differential scanning calorimeter, stereoscopic zoom microscope, and contact angle measuring equipment. Additionally, our research scholars regularly utilize instrument facilities at the Central Instrumentation Facility (CIF) on the main campus in Sohra.

Our faculty members have secured a total of 14 sponsored research projects from various funding agencies such as DST, ANRF, CSIR, and BIRAC. The department also organizes conferences and workshops to showcase our research activities.

Finally, I would like to extend my sincere gratitude to all past and present faculty members, students, staff, and alumni for their unwavering support and valuable contributions to the department and the institute over the past few years. The department is committed to quality research and teaching and to the growth and development of our nation.

-Prof. Gitish Kishor Dutta

Editor's Note: NIT Meghalaya moves to Sohra!

It is with immense pride and excitement that I introduce this fresh issue of the Department of Chemical & Biological Sciences' bi-monthly e-magazine, *ChemBio Bulletin*. NIT Meghalaya is in the process of shifting to its permanent campus at Sohra (Cherrapunji).

The department has always been a hub of scientific discovery, collaborative research, and academic excellence. Through this magazine, we aim to bring to light the many efforts that often go unnoticed but contribute significantly to our academic and research ecosystem. Each edition will serve as a testament to the hard work and passion of everyone involved.

In this issue, you'll find an insightful message from our esteemed Director and Head of Department, reflecting on the future of science and education in our institution. Our faculty's latest research highlights and achievements are prominently showcased, alongside a corner dedicated to our alumni, whose professional journeys continue to inspire. Our students, the heart of the department, will find their voices amplified through contributions that showcase their creativity and intellect, whether through articles, event coverage, or career guidance.

In addition to this, we are thrilled to present a featured article on *Gut microbiome and its impact on human health*. The piece explores recent advances in microbiome research, highlighting its role in immunity, metabolism, and disease prevention.

This magazine is more than just a publication; it is a shared space for learning, celebrating success, and building a stronger, more connected community. It reflects the vibrant intellectual life we foster here at NIT Meghalaya. As we move forward, we hope this initiative will not only document our progress but also inspire future innovations.

I encourage you to engage with this magazine—whether by reading, contributing, or sharing your feedback. Together, we can make it a meaningful and lasting contribution to our department's legacy.

Here's to the beginning of a new chapter in our academic journey!

-Harshit Joshi

Department Details

- ❑ Number of faculties : 5
- ❑ Number of technical staff : 2
- ❑ Number of students enrolled in Ph.D. program : 27
- ❑ Number of students enrolled in M.Sc. program : 37
- ❑ Number of students enrolled in undergrad courses : 164

Our faculties:

Faculty

Research interest



Dr. Gitish Kishor Dutta

Carbon-based and composite materials for energy storage devices, fuel cell, electrocatalyst for oxygen reduction reactions and electrochemical sensors



Dr. Atanu Singha Roy

Biophysical chemistry, protein-ligand interaction studies, biomolecular spectroscopy, protein denaturation studies, DNA-ligand binding and DNA damaging experiments, protein modification and impact on ligand binding, protein-nano particle interaction, quantum dots and their biological applications.



Dr. Naba Kamal Nath

Crystal Engineering, Energy Converting Smart Materials, Solid State Forms of Pharmaceuticals



Dr. Harshit Joshi

Synthetic organic chemistry, methodology development and total synthesis of natural and non-natural compounds of biological interest



Dr. Rwivoo Baruah

Food microbiology, enzymology, and carbohydrate chemistry

Department News

New faculty joined: Dr. Rwivoo Baruah has recently joined the Department of Chemical and Biological Sciences at the National Institute of Technology Meghalaya as an Assistant Professor. He completed his Ph.D from the Dept. Biosciences and Bioengineering at IIT Guwahati under the supervision of Prof. Arun Goyal. His Ph.D. research was on food microbiology, enzymology and carbohydrate chemistry and were published in several international journals. During his Ph.D, Dr. Baruah received the CIMO (Centre for International Mobility) fellowship to Helsinki, Finland where he worked for six months at the VTT Research lab, Espoo Finland and the Department of Food and Environmental Sciences, University of Helsinki, Finland. After his Ph.D., he joined CSIR-Central Food Technological Research Institute (CFTRI), Mysore India with a fellowship through CSIR Research Associateship and worked on Bifidobacterial exopolysaccharides and developing probiotic fermented foods. Dr. Baruah received the Fulbright-Nehru Postdoctoral Fellowship in Aug 2022 to work with Dr. Stephen R Lindemann at the Diet-Microbiome Interactions Lab (D-MIL), Dept. Food Science at Purdue University, IN, USA where his research focus was on gaining a better understanding of the role of molecular weight in dietary fibre utilization by human gut microbiota. His research group at the Department of Chemical and Biological Sciences at NIT Meghalaya will be focusing on understanding the interactions of native and synthesized glycan with human gut bacteria

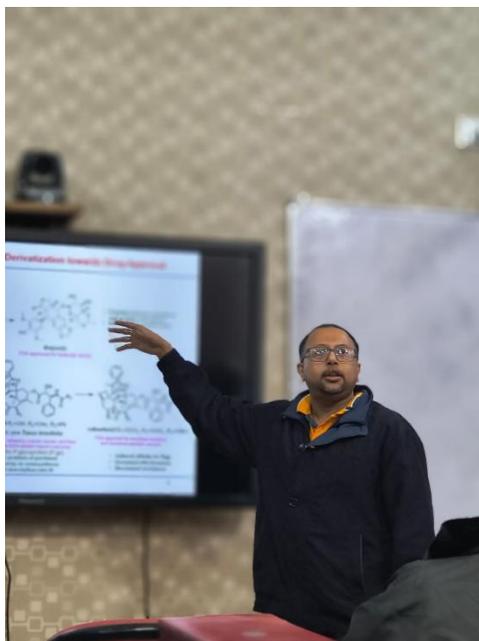
Departmental Activities



I. Rashmi Avinash Agarwal (Sr. Scientist), Department of Chemistry, IIT Jodhpur delivered an invited talk on “Coordination Polymers and its Applications” at the Department of Chemical and Biological Sciences, NIT Meghalaya on October 19, 2024.

(Prof. Gitish K. Dutta presenting a memento to Dr. Rashmi Avinash Agarwal as a token of appreciation for her excellent talk.)

II. Professor Debraj Mukherjee from Bose Institute, Kolkata delivered an invited talk on “Bridging bioactive natural products with drugs using a biotechnologist toolbox” at the Department of Chemical and Biological Sciences, NIT Meghalaya on December 5, 2024.



Prof. Debraj Mukherjee during Q&A session after his insightful talk (Left). Dr. Amit K. Paul presenting a memento to Prof. Debraj Mukherjee as a token of appreciation for his excellent talk (Right).

Featured Article

Gut microbiome and its impact on human health

*Dr. Rwivoo Baruah Assistant Professor
Department of Chemical & Biological Sciences
National Institute of Technology Meghalaya, India*

Introduction: The gut microbiome

The human microbiome is the collection of all the microbes, their genes and their products that colonise our body since birth. The human gut microbiome is the most extensively studied in recent times¹. Gut microbes reside in the human gut mucosa consisting of epithelial cells, lamina propria, and the muscularis mucosae amounting to approximately 10^{14} cells. The microbial load (number of microbes) varies with the environment within and outside the human body and are dependent on factors such as pH, partial pressure (pO_2) and redox potential² (Figure 1). Microbes start colonizing the human gut shortly after birth and comprise approximately of over 1000

species, most of which are unknown species and are anaerobic in nature and the distribution of microbial members varies with age¹.

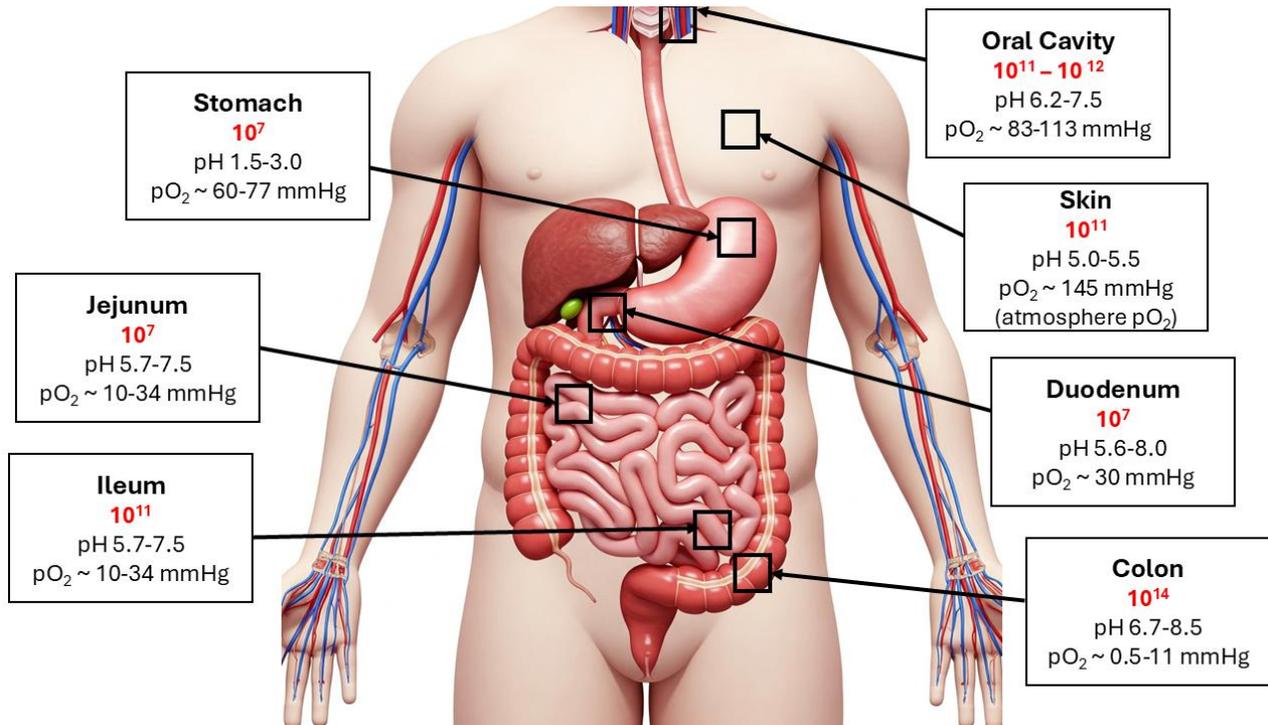


Figure 1: Total microbial load present and their physiological environment according to the different body sites.

The colonic microbiome is dominated by anaerobic bacteria, including thousands of species and millions of genes, distributed among the major bacterial phyla of Firmicutes (predominantly Ruminococcaceae and Lachnospiraceae), Bacteroidetes, Actinobacteria, Proteobacteria and Verrucomicrobia (*Akkermansia*)³. Human faeces is the starting point for the analysis of the human gut microbiome with predominantly consist of microbes in the lower GI tract such as the colon. DNA from the faecal matter is extracted and microbial members are identified through next generation sequencing (NGS) techniques like Illumina, Pacbio or Oxford Nanopore. 16S amplicon sequencing is the most common way for identifying gut microbes in each sample. Shotgun metagenomic can be utilized to study the probable functional aspects of the microbes through partial genome assembly of all gut microbes in each sample.

Gut microbiome associated diseases

The gut microbiome has been associated with several gastrointestinal (GI) disorders such as intestinal bowel diseases (IBDs), coeliac disease, irritable bowel syndrome (IBS), colorectal cancer (CRC), chronic liver diseases or pancreatic disorders. The primary cause of these disorders is the imbalance in the microbial ecology of the gut resulting in physiological symptoms in the host. Antibiotic treatment and surgery can lead to the increase in the population of pathogenic gut bacteria causing pseudomembranous colitis due to factors like i) toxin production by *Clostridium difficile* ii) sepsis of *Escherichia coli*, *Enterococcus faecalis* and *Enterococcus faecium*, and iii) intra-abdominal abscesses due to *Bacteroides fragilis*⁴.

Gut microbiome in promoting health

Most gut microbes and the host have a commensal relationship. They supply essential nutrients, health-promoting short chain fatty acids, synthesize vitamin K, aid in the digestion of cellulose, and promote angiogenesis and enteric nerve function. Bacteroidetes and Firmicutes are the main bacteria in the metabolism of undigested food remnants. They help to digest dietary fibre and polyphenols by a complex metabolic energy-harvesting mechanism, which is based on cross-feeding and co-metabolism. In return, commensal bacteria take advantage of the protective and nutrient-rich environment of the host. Some commensal bacteria can promote gut health resulting in improved barrier integrity, and prevent antigens and pathogens from entering the mucosal tissues⁵.

Human gut microbiome engineering

Human gut microbiome engineering is achieved through manipulating the composition and function of gut microbes to provide health benefit, treat diseases, or optimize physiological functions in the host. These can be achieved in various ways such as: i) Developing genome-scale models (GEMs) which are mathematical models which simulate microbial metabolism at the genome scale, ii) Designing synthetic microbial communities, iii) Using Fecal Microbiota Transplantation (FMT) by fundamentally reshaping the gut microbiota by introducing a diverse community of microorganisms from donor to recipient and iv) Dietary modulation by altering dietary components which can lead to shift in the composition, diversity, and metabolic activity of gut microbes⁶.

References:

1. Korpela, K., & de Vos, W. M. (2018). Early life colonization of the human gut: microbes matter everywhere. *Current opinion in microbiology*, 44, 70-78.
2. Sender, R., Fuchs, S., & Milo, R. (2016). Are we really vastly outnumbered? Revisiting the ratio of bacterial to host cells in humans. *Cell*, 164(3), 337-340.
3. De Vos, W. M., Tilg, H., Van Hul, M., & Cani, P. D. (2022). Gut microbiome and health: mechanistic insights. *Gut*, 71(5), 1020-1032.
4. Wilcox, M. H. (2003). Clostridium difficile infection and pseudomembranous colitis. *Best practice & research clinical gastroenterology*, 17(3), 475-493.
5. Zhang, Y. J., Li, S., Gan, R. Y., Zhou, T., Xu, D. P., & Li, H. B. (2015). Impacts of gut bacteria on human health and diseases. *International journal of molecular sciences*, 16(4), 7493-7519.
6. Corbin, K. D., Carnero, E. A., Dirks, B., Igudesman, D., Yi, F., Marcus, A., ... & Smith, S. R. (2023). Reprogramming the human gut microbiome reduces dietary energy harvest. *Research Square*, rs-3.

Research Highlights

Formation of Bis-indolymethanes from Symmetrical Triarylmethanes via Brønsted Acid Catalyzed C–C Bond Breaking Reaction

Nazir Uddin, Sudipta Roy, Sayantan Roy, Dipankar Paul, Geetanjali Basumatary, Gitish K. Dutta and Paresh Nath Chatterjee

We have developed a unique PTSA-catalyzed dual C–C bond-breaking reactions enabling the efficient cleavage of TMB-based symmetrical triarylmethanes (TRAMs) to form the desired bis-indolymethanes where an electron-rich and sterically bulky arene viz 1,3,5-trimethoxybenzene (TMB) acted as leaving group. We systematically optimized the reaction conditions by investigating the effects of various reaction parameters, including catalysts, solvents and temperatures. Our developed method exhibits broad substrate scope, tolerating various electron-withdrawing group (EWG) and electron donating group (EDG), thereby synthesizing a diverse range of bis-indolymethanes. Moreover, we achieved sequential bond cleavage using one equivalent of nucleophile, forming unsymmetrical triarylmethanes (TRAMs) as intermediate. This potential intermediate can be further converted to the final bis-indolymethanes with an additional equivalent of nucleophile under optimized reaction conditions. A proposed mechanism for the dual C–C bond-breaking reaction is presented, providing insight into the underlying transformation.

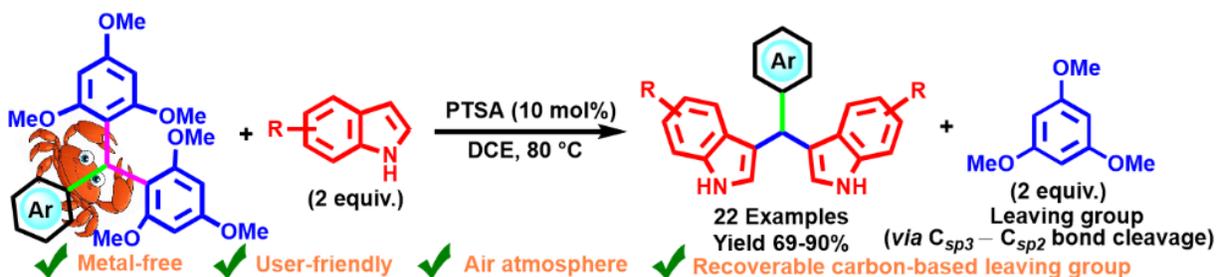


Figure 2: PTSA catalyzed dual C–C bond-breaking reactions in TMB-based symmetrical TRAMs

Binding interaction of daphnetin with ovalbumin at molecular level

Sadia Nudrat, Bilash Maity, Sana Quraishi, Kalpana Kumari, Madhurima Jana, Atanu Singha Roy

Ovalbumin (OVA), a prominent egg white protein, is widely utilized as a model for investigating small molecule-proteins interaction in drug discovery. Its versatility extends to research on immune responses, molecular interactions, protein folding, and drug delivery systems, contributing to the development of therapeutics for inflammation, oxidative stress, and immune-related diseases. This study investigates the interaction between OVA and the bioactive

compound daphnetin using a combination of multi-spectroscopic and computational techniques. Results from multi-spectroscopic and molecular docking studies confirmed the binding interaction between daphnetin and OVA. Additionally, we examine OVA's role in fibril formation and explore how daphnetin inhibits this process, offering insights into diseases associated with amyloid formation. These experimental findings are further supported by computational analysis, revealing daphnetin dynamics within the binding site of OVA.

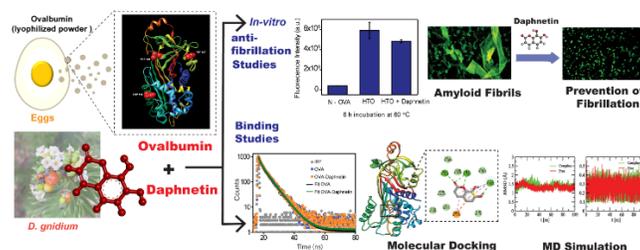


Figure 3: The figure illustrates the binding interaction of daphnetin with ovalbumin through molecular docking, MD simulations, and fluorescence studies, along with its anti-fibrillation effects in preventing amyloid fibril formation.

Contrasting Mechanical Property and Surface Wettability of the Single Crystals of the Dimorphs of 4-n-Octyloxybenzoic Acid

Silpi S. Borah and Naba K. Nath

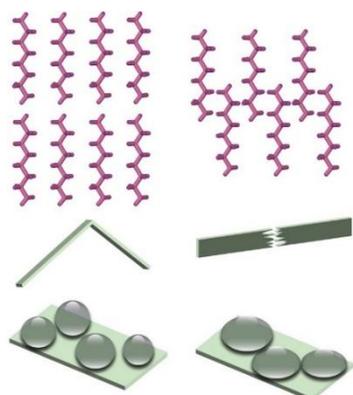


Figure 4: End to end packing of alkyl chain results in plastic deformability of single crystals whereas, interdigitated packing results in brittle single crystals in 4-n-Octyloxybenzoic Acid leading to variation of wettability of the single crystal surfaces.

4-n-acetyloxy benzoic acid is well known for its liquid crystalline characteristics and exists as at least two crystalline forms under normal conditions. We revisited this compound and unveiled distinct mechanical properties of the single crystals of the polymorphs, where one displays plastic deformability, whereas the other exhibits brittleness. The plasticity occurs from the end-to-end arrangement of *n*-octyl chains, generating plasticity that allows layers to slide past each other upon mechanical stress. On the other hand, the brittle polymorph features interdigitated *n*-octyl chains, which restrict movement and generate fractures under stress. Also, differences in the molecular packing affect the surface properties of the crystals. The alignment of the —COOH groups and alkyl chains leads to significant variations in wettability, with the major faces of the crystal of both the polymorphs showcasing distinct moisture affinity. This study highlights the crucial role of molecular packing and intermolecular interactions in determining the mechanical and surface properties of crystalline systems.

Recent Publications

1. Ria Deb, Jayshree Barman, Gitish K Dutta, Iron, cobalt embedded nitrogen-doped carbon derived from conjugated macrocyclic polymers as electrocatalysts for oxygen reduction reaction. *Electrochimica Acta* 2024, 508, 145256.
2. Ria Deb, Rimpi Gogoi, Gitish K. Dutta, Single-step process for creating nitrogen and oxygen-enriched carbon using organic polymers for supercapacitor applications. *Diamond and Related Materials* 2025, 151, 111811.
3. Harshit Joshi, Abhijit Manna, Someshwar Nagamalla, Annu Anna Thomas, Shyam Sathyamoorthi, A Catalytic, Enantioselective Sulfamate Tethered Aza-Michael Cyclization, *Org. Lett.* 2024, 26, 10708.
4. Appasaheb K Nirpal, Harshit Joshi, Steven P Kelley, Shyam Sathyamoorthi, Exploration of One-Pot, Tandem Sulfamoylation and aza-Michael Cyclization Reactions for the Syntheses of Oxathiazinane Dioxide Heterocycles, *J. Org. Chem.* 2024, 89, 16774.
5. Kakali Baruah, Ajit Kumar Singh, Sona Lyndem, Kalpana Kumari, Anupam Nath Jha, Atanu Singha Roy, Fundamental Understanding of Bio-Nano Interface of Lysozyme on Psidium guajava Polyphenol Coated Silver Nanoparticles: Mechanistic Insights into the Effect of Protein Corona on the Antibacterial Efficacy, *Langmuir*, 2025, 41, 4, 2899–2915.
6. Sanchia Mae Kharphanbuh, Kakali Baruah, Atanu Singha Roy, Arpita Nath, Protein misfolding by manganese (III) oxide nanoparticles generated by pulsed laser ablation in liquids, *Journal of Molecular Liquids*, 417, 2025, 126670.
7. Mitul Kalita, Mahabul Haque, Amarjyoti Mondal, Atanu Singha Roy, Bright Blue-Light emitting cobalt doped CuS quantum dots: Photophysical studies and selective sensing application of ferric ion, *Journal of Photochemistry and Photobiology A: Chemistry*, 116137 (2024).

Achievements

1. Yadav Manju Siyaram secured the Best Poster award in the poster competition at the Physical Chemistry Symposium- SoPhys, held at IIT Bombay from October 22 to 25, 2024.
2. Mitul Kalita from Dr. Atanu Singha Roy's research group secured the Best Poster award in the poster competition at the M2ChemSF 2024, held at NIT Hamirpur from November 21-22, 2024.
3. Basudha Deb secured the Best Poster award in the poster competition at the PCAMC 2024 held at IISER Kolkata from December 11-14, 2024.

4. Sana Quraishi secured the Best Poster award in the poster competition at the ICAMM 2024 held at JIS Institute of Advanced Studies and Research (JISIASR) Kolkata, India from December 18-19, 2024.

Student Contributions

1. Amarjyoti Mondal and Mitul Kalita from Dr. Atanu Singha Roy's research group, Yadav Manju Siyaram and Basudha Deb from Dr. Amit Kumar Paul's research group, Krishnendu Dey from Dr. Naba Kamal Nath's research group attended a Physical Chemistry Symposium- SoPhys at IIT Bombay during October 22-25, 2024.

2. Amarjyoti Mondal and Mitul Kalita from Dr. Atanu Singha Roy's research group participated in the M2ChemSF 2024 at NIT Hamirpur during November 21-22, 2024.

3. Sana Quraishi, Sadia Nudrat from Dr. Atanu Singha Roy's research group and Ria Deb, and Nazir Uddin from Prof. Gitish Kishore Dutta's research group attended a conference on Frontiers on Chemical Sciences during December 2-4, 2024, conducted by Department of Chemistry, IIT Guwahati.

4. Yadav Manju Siyaram and Basudha Deb from Amit Kumar Paul's research group attended a PCAMC conference at IISER, Kolkata during December 11-14, 2024. The major focus of the conference was on the latest developments in theoretical and computational aspects of this subject both in the chemistry and physics community.

5. Mitul Kalita attended the National Conference on Polymers and Advanced Functional Materials at IASST Guwahati during December 13-14, 2024.

6. Kakali Baruah, Sana Quraishi, Sadia Nudrat, Surendra Nath Barman from Dr. Atanu Singha Roy's research group participated in the ICAMM 2024 (1st International Conference on Advanced Materials and Manufacturing 2024) conducted by JIS Institute of Advanced Studies and Research (JISIASR) Kolkata, India during December 18-19, 2024.

7. Kakali Baruah delivered an oral presentation on "Interpretation of protein-corona formation of human serum albumin on curcumin fabricated gold and silver nanoparticles: Further investigation on anti-fibrillation, anti-bacterial efficacy, and cell cytotoxicity studies.

Alumni Corner



Hello, I am Aneesha S L. I am very excited and grateful for the opportunity to pursue my master's degree at NITM. The first thing that comes to my mind is the excellent professors and the beautiful location of Meghalaya-Shillong. Having experienced, supportive professors is crucial for a master's program. For all the juniors out there, this is the time to carefully consider and make decisions about your future studies or career. Fortunately, you are in the right place and will receive the perfect guidance and assistance for the next phase of your life. Regarding my experience at NITM, I am extremely delighted to have had such amazing professors during my master's program. They are so understanding to all the students, and we could discuss our difficulties and concerns with them. They share many of their experiences and achievements from research, and their words are powerful enough to motivate anyone to do anything, not just research, to be independent, self-sufficient, and satisfied with the work we do with complete dedication. I still follow one of my professor's (ASR) words "read at least 4 hours a day". Because the only way we can grow is by reading, and only when we experience reading will we understand the power of reading. I hope my juniors will have a good future, read as much as possible, whatever you like, anything that you need to achieve.

-Aneesha S L (NITM/M.Sc. 2021-2023), currently pursuing PhD in Hokkaido University, Japan

Career Guidance

Overcoming Procrastination: A Student's Guide to Productivity

*Dr. Harshit Joshi, Assistant Professor
Department of Chemical & Biological Sciences
National Institute of Technology Meghalaya, India*

Procrastination is the act of delaying or postponing tasks despite knowing their importance. It is a common challenge among students, often leading to decreased productivity and increased stress. Whether it's delaying assignments, putting off studying, or avoiding tasks altogether, procrastination can lead to stress, poor performance, and missed opportunities. Understanding its underlying causes and implementing effective strategies can significantly enhance a student's ability to manage time and tasks effectively.

Understanding Procrastination

Procrastination is rooted in various psychological factors, including:

Fear of failure – Many students delay tasks due to anxiety about not meeting expectations, which can lead to avoidance behavior.

Perfectionism – The desire for everything to be perfect can lead to delays in starting or completing work. It can paralyze students, causing them to postpone tasks entirely.

Lack of motivation – When tasks seem uninteresting or overwhelming, students may struggle to find the motivation to start.

Poor time management – Without a structured schedule, students may struggle to allocate time efficiently. Misjudging how long tasks will take can lead to delays in starting or completing assignments.

Distractions and lack of focus – Social media, entertainment, and social interactions can divert attention from important tasks.

Overwhelm – Large assignments or long study sessions may feel daunting, leading to avoidance.

By identifying the root cause, students can take proactive steps to manage their time effectively.

Effects of Procrastination

Procrastination doesn't just result in unfinished work. It can have serious consequences, including:

- Increased stress and anxiety
- Poor academic performance and missed deadlines
- Guilt and self-doubt, leading to lower confidence
- Lack of sleep due to last-minute cramming
- A cycle of chronic procrastination that affects future productivity

Effective Strategies to Beat Procrastination

1. Set Clear and Achievable Goals: Breaking large tasks into smaller, manageable steps makes them less overwhelming. Use SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals to stay on track. For example: Instead of "I will study for my chemistry exam," set "I will complete two chapters of chemistry revision by 6 PM." Instead of "I need to write my essay," set "I will complete the introduction and first paragraph by 3 PM."

2. Create a Structured Schedule: Using a planner, to-do list, or digital tools like Google Calendar, Todoist, or Notion can help organize tasks effectively. Allocate specific time slots for: studying, assignments, breaks, extracurricular activities, leisure and relaxation etc. A structured schedule reduces uncertainty and provides a clear plan of action.

3. Use the Pomodoro Technique: This time management method enhances focus and efficiency. It involves: Working for 25 minutes on a task then taking a 5-minute break. Repeating the cycle four times, then taking a longer break (15–30 minutes). This technique prevents burnout and improves concentration.

4. Identify and Eliminate Distractions: Distractions are a major cause of procrastination. To minimize them: Find a quiet, designated study area. Turn off social media notifications or use apps like Freedom, Cold Turkey, or StayFocusd. Use noise-canceling headphones or background music for better focus. Set boundaries with friends and family to minimize interruptions.

5. Develop a Reward System: Rewarding yourself for completing tasks can reinforce positive behavior. Rewards could include: Watching an episode of a favorite show after finishing an assignment. Taking a short walk or engaging in a hobby after completing study sessions. Or enjoying a favorite snack after meeting a goal.

6. Stay Accountable with a Study Partner: Sharing goals with a friend, mentor, or study group can help with motivation. Regular check-ins can: Encourage consistency, Provide motivation through teamwork, and Allow sharing of ideas and solutions

7. Manage Stress and Maintain Well-being: Procrastination often results from stress and mental fatigue. To maintain energy and focus:

Exercise regularly – Physical activity boosts cognitive function.

Eat a balanced diet – Nutritious food fuels brainpower.

Get adequate sleep – Rest improves concentration and memory.

Practice mindfulness and relaxation techniques – Meditation, yoga, and deep breathing help reduce anxiety.

8. Overcome Perfectionism: Perfectionism can lead to overthinking and delays. Instead of striving for perfection: Focus on progress over perfection, accept that mistakes are part of the learning process, set realistic expectations for assignments and exams.

9. Use Visualization Techniques: Mentally picturing yourself successfully completing a task can boost motivation. Visualize: Sitting down and starting your work with ease, feeling the satisfaction of completing the task or receiving positive results and feedback.

10. Track Your Progress: Keeping a log of completed tasks helps measure progress and build momentum. Use a journal, planner, or productivity app to: Record daily achievements, reflect on what worked well and what needs improvement and adjust strategies to optimize efficiency.

11. Seek Support When Needed: If procrastination becomes a persistent issue, seek guidance from: Teachers or professors for academic support, counselors or mentors for motivation and mental well-being. online resources like books, or workshops on productivity and time management may also help.

Summary

Overcoming procrastination is not an overnight process. requires a multifaceted approach that combines understanding its psychological roots with practical strategies. By implementing techniques such as time blocking, breaking down tasks, setting achievable goals, and creating a conducive study environment, students can enhance their productivity and academic success. Engaging in self-reflection and seeking support further solidifies these efforts, making it easier to develop lasting habits that combat procrastination effectively.

Start small, stay consistent, and celebrate progress—every step forward counts!



Picture Gallery



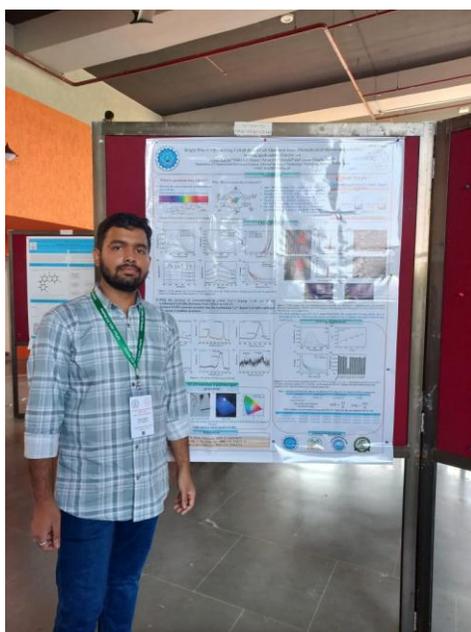
Amarjyoti Mondal from Dr. Atanu Singha Roy's research group presenting his work on "A chitosan- α -naphthaldehyde hydrogel film containing pineapple leaf fiber for wound dressing applications" in the M2ChemSF 2024, NIT Hamirpur on November 21-22, 2024.



Amarjyoti Mondal from Dr. Atanu Singha Roy's research group during poster presentation at Physical Chemistry Symposium- SoPhys, IIT Bombay on October 22-25, 2024.



Sadia Nudrat from Dr. Atanu Singha Roy's research group during poster presentation at ICAMM 2024: 1st International Conference on Advanced Materials and Manufacturing 2024, conducted by JIS Institute of Advanced Studies and Research (JISIASR) Kolkata, India on December 18-19, 2024.



Mitul Kalita from Dr. Atanu Singha Roy's research group during poster presentation at the M2ChemSF 2024, held on November 21-22, 2024, organized by the Department of Chemistry, NIT Hamirpur. He secured the Best Poster award in the poster competition.