AMITY UNIVERSITY

A RESEARCH & INNOVATION DRIVEN UNIVERSITY

ANNUAL REPORT

2024

Amity Science, Technology & Innovation Foundation

(ASTIF)

&

Amity Directorate of Science & Innovation

(ADSI, AUUP)

A Journey towards
Research Excellence

Message from Founder President

"I live and breathe innovation, dream of groundbreaking discoveries, and strive to cultivate an outcome-driven research ecosystem that propels us toward ever-rising benchmarks of success."

It gives me immense joy and pride to reflect on our achievements and progress of Amity Universe during the past year 2024. The **Annual Report of Amity University** stands as a testament to our unwavering commitment to **excellence, innovation, collaboration, and the relentless pursuit of knowledge**. **Amity Science, Technology & Innovation Foundation (ASTIF)** and **Amity Directorate of Science & Innovation (ADSI)** were created with a steadfast commitment to **foster a research-driven ecosystem** that champions an **outcome-oriented approach** to innovation across our university landscape. As we present the **Annual Report** 2024 prepared by ASTIF & ADSI, we take pride in our remarkable milestones—each a result of the dedication, ingenuity, and perseverance of our **faculty, researchers, and students**. The pages of this report reaffirm that **research and innovation remain the driving forces** behind our pursuit of academic and scientific excellence.

It is truly inspiring when **distinguished personalities and thought leaders** from India and around the world commend Amity for **setting new benchmarks in education**. Amity is now recognized and respected not only in **India but globally**, enhancing the perception of **Indian education on the world stage**. These accolades reinforce my pride in our **Vice-Chancellors, Heads of Institutions, Heads of Departments, faculty, staff, Ph.D. scholars, and students** across all campuses. Their **tireless efforts and shared vision** continue to elevate Amity as a **global brand**, positioning it among the **world's leading educational institutions**.

Looking ahead, I envision the **establishment of 100 faculty-led startups** within the next two years, aligning with India's **national missions** in **space technology, green hydrogen, defense, cybersecurity, healthcare, and sustainable development**. Amity will support **ISRO's space initiatives, develop clean energy solutions, advanced AI-driven security, and drive innovations in biotechnology and smart infrastructure**. Through **cutting-edge research, entrepreneurship, and industry collaborations**, we are committed to **strengthening India's self-reliance and global competitiveness**, contributing to the vision of **Viksit Bharat @ 2047**.

Through **innovation, entrepreneurship, and collaborative research**, Amity is dedicated to shaping a **self-reliant, technology-driven, and globally competitive India**, in line with the vision of **Viksit Bharat @ 2047**.

Warm regards,

Dr. Ashok K. Chauhan
Founder President
Ritnand Balved Education Foundation (RBEF)
Amity Global Education and Research Establishments

Preface

It is with immense pride and pleasure that I present the **Annual Report 2024** of Amity University, a compendium of our collective achievements, endeavours, and milestones in research and innovation. This report stands as a testament to the unwavering commitment and relentless pursuit of excellence by our vibrant and dynamic community.

I extend my heartfelt gratitude to our Hon'ble Founder President, Dr. Ashok K. Chauhan, Chairperson, Dr. (Mrs.) Amita Chauhan, Dr. Atul Chauhan, President of RBEF, Dr. Aseem Chauhan, Additional President of RBEF, and all the trustees for their guidance and incessant support in our endeavours.

Established in 2008, **Amity Science, Technology, and Innovation Foundation (ASTIF)** has played a pivotal role in fostering a culture of research and innovation. In 2024, our faculty secured **110 new projects** worth ₹30.17 crore, bringing the total to **314 ongoing projects** valued at ₹133.93 crore. A total of **74 projects** worth ₹34.80 crore were successfully completed. Our research output has been exceptional, with **8,155 publications**, of which **6,201** are indexed in Scopus. Additionally, **487 publications** have an impact factor ranging from **6.0 to 168.9** and the h-Index is growing fast reaching 170. Additionally, Amity successfully conducted **400+ consultancy projects and training programs**, generating a revenue of ₹17.88 crore in revenue.

Amity continues to lead in **intellectual property**, with **2,339 patents filed** and **414 granted** as of December 2024. In 2024 alone, we filed **229 patents and 421 copyrights**, earning prestigious awards such as the **Best Patent Portfolio Award (CII Industrial IP Awards 2024)** and **Best University for Strong IP Ecosystem (ASSOCHAM IP Excellence Awards 2024)**. Several key **technology transfers** were executed, including **Rootonic**, **Herbal Blue Colour** and **HNB9** an endophyte interaction method.

My sincere appreciation also goes to all Vice-Chancellors, Pro Vice-Chancellors, and senior functionaries for their exemplary leadership in steering their respective campuses toward fulfilling the mission and vision of our Hon'ble Founder President. I extend my heartfelt appreciation to every member of the Amity community for their dedication, contributions, passion, and commitment to maximizing outcomes from our science and technology endeavours. I would like to place my record of appreciation to ASTIF/ADSI Team especially Dr. Sneha Nair & Mr. Devendra Kumar who has worked meticulously to bring out the report in its present form. As we celebrate the successes of the past year, let us also look ahead with determination and ambition. For 2025, **ASTIF has set ambitious targets**, which includes **9,930 publications, 192 sanctioned projects, 411 filed patents, 31 technology commercialization's, ₹18.30 crore in consultancy revenue, 701 extension activities, and 1,595 Ph.D. admissions.**

The journey of research and innovation is continuous, and I am confident that, together, we will reach new heights and contribute meaningfully to the global knowledge landscape. May the spirit of inquiry and innovation continue to guide us in realizing the vision of our Hon'ble Founder President positioning Amity among the top institutions in India for Science, Technology, and Innovation.

Dr. W. Selvamurthy
President, ASTIF & Director General, ADSI

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PREAMBLE

At the heart of Amity Education Group's unwavering commitment to **academic excellence and knowledge advancement** lies a deep-seated vision to establish Amity as a **global leader in research and innovation**. To realize this mission, the **Amity Science, Technology & Innovation Foundation (ASTIF)** was established in **2008**, followed by the **Amity Directorate of Science & Innovation (ADSI) in 2014**, under the visionary leadership of **Hon'ble Founder President, Dr. Ashok K. Chauhan**. These institutions were conceived with a forward-thinking approach to **drive high-impact research, foster interdisciplinary collaborations, and translate scientific discoveries into real-world applications**.

ASTIF, the cornerstone of Amity's research ecosystem, was founded with a singular purpose: to **facilitate, promote, support, and augment an outcome-driven research culture** across diverse disciplines within Amity Universities and institutions. By providing strategic guidance, research funding, and state-of-the-art infrastructure, ASTIF has empowered **faculty members, scientists, researchers, and students** to push the boundaries of knowledge and make groundbreaking contributions to science and technology.

The **synergy between ASTIF and ADSI** has been instrumental in propelling Amity towards its goal of becoming a **"Topmost Research & Innovation Driven organization"**. These entities have **created an ecosystem that nurtures curiosity, fosters scientific inquiry, and encourages translational research**—bridging the gap between academia, industry, and society. They have also played a crucial role in **securing research grants, fostering global collaborations, and contributing to India's national missions** in areas such as **space technology, green hydrogen, defence, cybersecurity, healthcare, and sustainable development**.

Over the years, ASTIF has not only **enhanced Amity's academic reputation** but has also **positioned it as a hub of intellectual ingenuity on the global stage**. The commitment to **transformative research and innovation** is reflected in the **cutting-edge patents, high-impact publications, and technology-driven solutions** emerging from Amity's institutions.

This **Annual Research & Innovation Report 2024** is a testament to the **remarkable achievements, breakthroughs, and transformative ideas** that continue to define Amity's journey. As we move forward, Amity remains steadfast in its mission to **push the frontiers of knowledge, contribute to national and global progress, and inspire future generations to lead the world with innovation and excellence**.

Founder President
Ritnand Balved Education Foundation
Amity Global Education and Research Establishments
& Chairman, ASTIF

Dr. W. Selvamurthy
President, ASTIF & Director General, ADSI

Prof. (Dr.) Ajit Varma
Vice President, ASTIF

Prof. (Dr.) B.C. Das
Vice President, ASTIF

Prof. (Dr.) S.L Kothari
Vice President, ASTIF

Prof. (Dr.) V.K. Jain
Vice President, ASTIF

Lt. Gen. S.K. Gadeock
Vice President, ASTIF

Prof. M.S. Prasad
Vice President, ASTIF

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In order to achieve the objectives set for ASTIF & ADSI the following Human Resources have been provided.

HUMAN RESOURCES

Dr. Gopal Bhushan
Dy. Director General,
ADSI

Mr. S. N. Singh
OSD to President, ASTIF &
Director, ADSI

Dr. Goodwill Khokhar
Dy. Director
ASTIF

Dr. Sneha Nair
Asst. Director
ASTIF

Dr. Vaibhav S. Bhugra,
Asst. Director & Strategic
Attache to President, ASTIF

Dr. Suchandra Banerjee,
Senior Scientific Officer
ASTIF

Mr. Benny Thomas
Assistant Manager
ASTIF

Mr. Sanjai K.V.
Sr. Executive Secretary
ADSI

Mr. Devendra Kumar
Research Officer
ADSI

SUPPORT STAFF

Mr. Shailendra Tiwari

Mr. Vinod Kumar Chauhan

Mr. Gaurav Kumar

Mr. Hira Lal Kumar

IPR Team

Dr. Smita Sahu
Director, Amity IPR Cell

Mr. Harish
Deputy Manager

Mr. Sonu Raghvan
Assistant Manager

Dr. Abhishek Nandy
Senior Patent Associate

Mr. Dushyant Singh
Patent Associate

Mr. Pawan
Support Staff

DITT Team

Dr. Meenakshi Kanojia
Addl. Director

Ms. Nishi N Narang
Senior Manager (Projects)

Dr. Shashank Singh
Assistant Manager

Dr. Rashi Bhardwaj
Assistant Manager

CHARTER OF ASTIF

Amity Science, Technology & Innovation Foundation (ASTIF): The various charter and activities of ASTIF are:

1. Develop appropriate research ecosystem for promotion of cutting-edge research in emerging fields of national and international importance.
2. Set targets for Projects, Patents, Publications, Technology Transfer, Consultancy, Extension, Ph.D. programme and enable the Amity group to achieve them.
3. IPR Protection: Filing of Patents and ensuring their grant through coordination and follow-up with the office of the Controller General of Patents. In addition, Copyrights are also registered.
4. Encourage Development of technologies and products leading to Commercialization through Transfer of Technology to the Industry.
5. Organize lectures/ oration from eminent scientists from India and abroad.
6. Conduct workshops and training programmes for writing quality Project proposals, Publications, IPR augmentation.
7. Offer financial support for selective scientific projects and offer fellowships to meritorious research scholars.
8. To identify and nurture scientific talents through research cluster formation, interaction meetings and providing synergy.
9. Dissemination of scientific achievements, research excellence and innovations to promote visibility of Amity Group through media.
10. Developing research policies/ concept notes relating to areas connected with promotion of quality research and innovation.
11. Development and updation of ASTIF Website and formulation S & T Brochures, promotional Film highlighting research accomplishments.
12. Conducting review meetings of all Amity Universities/Institutions in India & abroad to assess the Health and Performance management of the Organization.
13. Providing assistance to all AU Campuses addressing specific issues, if any, related to HR, Projects, Certifications like NGO Darpan registration etc.

CHARTER OF ADSI

Amity Directorate of Science & Innovation (ADSI) has also been established in 2014 to address all issues related to research and innovation at AUUP-Noida, Greater Noida, Lucknow & Dubai. The main charters of this Directorate are:

1. To facilitate and catalyse research activities in AUUP and its constituent campuses.
2. Set quantitative and qualitative targets in terms of research, publication & patents etc.
3. Periodic review and monitoring research endeavours including those of Ph.D. scholars.
4. Review and augment research facilities in the S&T Institutes as per the emerging needs.
5. Motivate faculty members to attain their best in terms of competence, commitment, and self-motivation.
6. Promote transdisciplinary research with the participation of various relevant research Institutes.
7. Administrative & Financial Management of Funded Projects of AUUP.
8. Accreditation and rankings related activities of AUUP pertaining to Research, innovation, and extension activities.
9. To resolve any administrative or HR issues and address the grievance of Faculty and Scientists as and when referred to the Directorate.
10. Support Amity Institute of Defence Technology (AIDT) for defence technology programme including industries/schools and DRDO/ISRO interaction/special invites/talks and arranging internship.
11. Preparation of reports/notes/concept papers on emerging areas of interest to Amity.
12. Support to Amity Institute of Defence & Strategic Studies (AIDSS) as and when consulted.
13. Support ASTIF in all its endeavours including review meetings, hosting of guests and coordination of their visit to Amity/workshop/conferences/guest lectures.
14. Any other activity as and when assigned by the apex management.

GLIMPSE OF ACHIEVEMENTS 2024

1. **Funded Projects: Driving Innovation and Excellence**

- Secured **110 new research projects** in 2024, with a total funding of **₹30.17 Crores**.
- **314 ongoing projects** worth **₹133.93 Crores** during 2024 across Amity Universe.
- **74 projects** having a sanction amount of **₹34.80 Crores** were successfully completed in 2024
- **400 consultancy projects and training programs** generating a revenue of approximately **₹17.88 Crores** were undertaken.

2. **Pioneering Research and Publications**

- **8,155 publications** in 2024, with **6,201 indexed in Scopus** and the rest in Web of Science, MEDLINE/PubMed, UGC-CARE, etc.
- **487 publications** have an impact factor ranging from **6.0 - 168.9**.
- **396 case studies** were published in 2024
- Amity's **h-index of 169**, with a total of **360,261 citations** eludes to its research impact.
- **19,864 research contributions aligned to the UN Sustainable Development Goals (SDGs)**.

3. **Intellectual Property: Powering Innovation**

- **2,339 patents filed** till December 31, 2024, with **414 patents granted**.
- In 2024, **229 patents were filed**, and **137 were granted**
- **421 copyrights** were filed, with **209 officially registered/approved** in 2024.

4. **Technology Transfer: Bridging Research and Industry**

- **ROOTONIC** transferred to **M/s INERA Cropscience Pvt. Ltd.**
- **Herbal Blue Color** licensed to **M/s Radha Kishan Bishan Dass Rang Rasayan Pvt. Ltd.**
- **A novel method for tripartite interaction between endophyte Talaromyces Albobiverticillius HNB9**, transferred to **M/s Myodelphia Biotech Research Company**.

5. **Prestigious Awards and Global Recognitions**

- **Best Patent Portfolio – 10th CII Industrial Intellectual Property (IP) Awards 2024**.
- **Best University for Strong IP Ecosystem – ASSOCHAM 4th IP Excellence Awards 2024 Global Conclave**.
- **Excellence in Globalisation of Education Award – FICCI Higher Education Excellence Awards 2024**.
- **Champion Award 2024 by SIDM (Society of Indian Defence Manufacturers)** for **Technology/Product Innovation addressing Defence Capability Gaps**.
- **Institution of Happiness – 2024** recognition by **QS I-Gauge** awarded to Amity University Madhya Pradesh.
- **46 Amity faculty members** were featured among the **Top 2% of Global Researchers**, as recognized by **Stanford University, USA**.

6. **Strengthening Research Ecosystem and Collaborations**

- **100+ Research Centers and Centres of Excellence** in emerging fields.
- **22 prestigious fellows**, including Ramalingaswami Re-entry Fellows, Ramanujan Fellows, and Wellcome Trust Fellows, are currently contributing to Amity's research landscape.
- **23 Honorary Doctorates and 36 Honorary Professorships** were conferred by Amity in 2024.
- Amity hosted **over 1,000 global webinars and lectures**, alongside **200+ Conferences, Seminars, Workshops, and Faculty Development Programs (FDPs)**.
- Strengthening its global footprint, Amity signed **157 strategic MoUs** in 2024, comprising **116 National** and **41 International** collaborations, fostering knowledge exchange and innovation.

7. **Advancing Space Research:** Amity University's **APEMS** payload successfully cultivated *Spinacia oleracea* (spinach) callus tissue in microgravity aboard **ISRO's PSLV-C60** mission, marking a first for an Indian university.The experiment demonstrated growth patterns comparable to Earth-based controls, offering insights into plant adaptation to space environments.This breakthrough supports future space-based agriculture and India's vision for the **Bharatiya Antariksh Station (BAS)**.

Chapter - 1 FUNDED PROJECTS

1.1 Research Excellence and Commitment

Research is fundamental to advancing knowledge, fostering innovation, and driving societal progress. Amity University is dedicated to nurturing a dynamic research ecosystem, promoting interdisciplinary collaboration, and addressing global challenges through cutting-edge research.

1.2 Strengthening the Research Ecosystem

To enhance research productivity and funding acquisition, Amity University has established dedicated organizations focused on:

- **Identifying funding opportunities**
- **Connecting faculty with relevant funding sources**
- **Assisting in the development of high-quality research proposals**
- **Overseeing technical implementation post-sanction**

The **Amity Foundation for Science Technology & Innovation Alliances (AFSTIA) and the Amity Center for Developmental Cooperation and Alliances (ACDCA)**play a crucial role in circulating funding schemes, facilitating faculty participation, and monitoring project progress to ensure timely execution and impactful outcomes.

In 2024, these initiatives facilitated the submission of 877 research proposals to various funding agencies.

1.3 Administrative and Financial Oversight

The Amity Directorate of Science & Innovation (ADSI) manages the administrative and financial aspects of research projects, ensuring smooth execution and compliance with funding requirements.

1.4 Research Funding and Impact

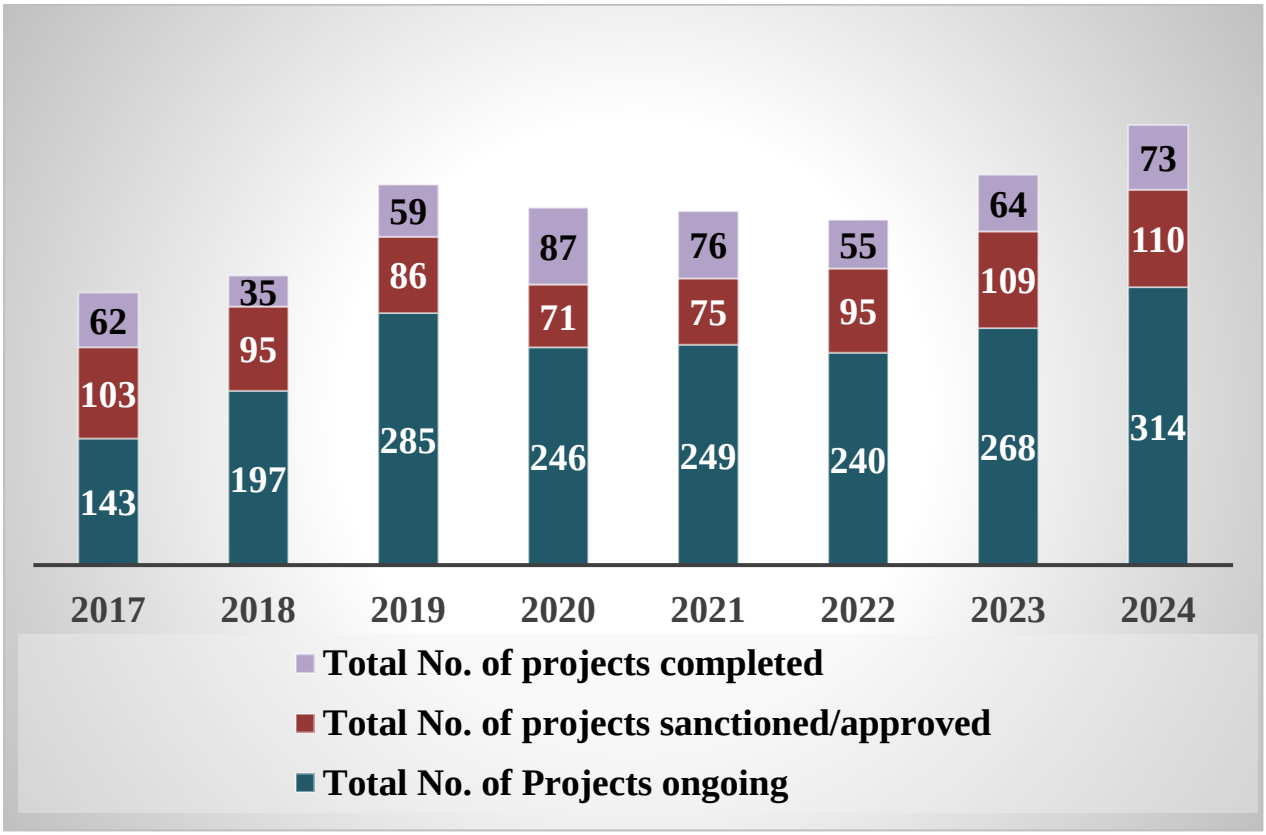
Financial support plays a crucial role in enabling impactful research that addresses critical societal and scientific challenges. The annual research funding secured reflects Amity University's commitment and dedication

towards quality research and in turn achieving academic excellence as well as contributing meaningfully across diverse disciplines.

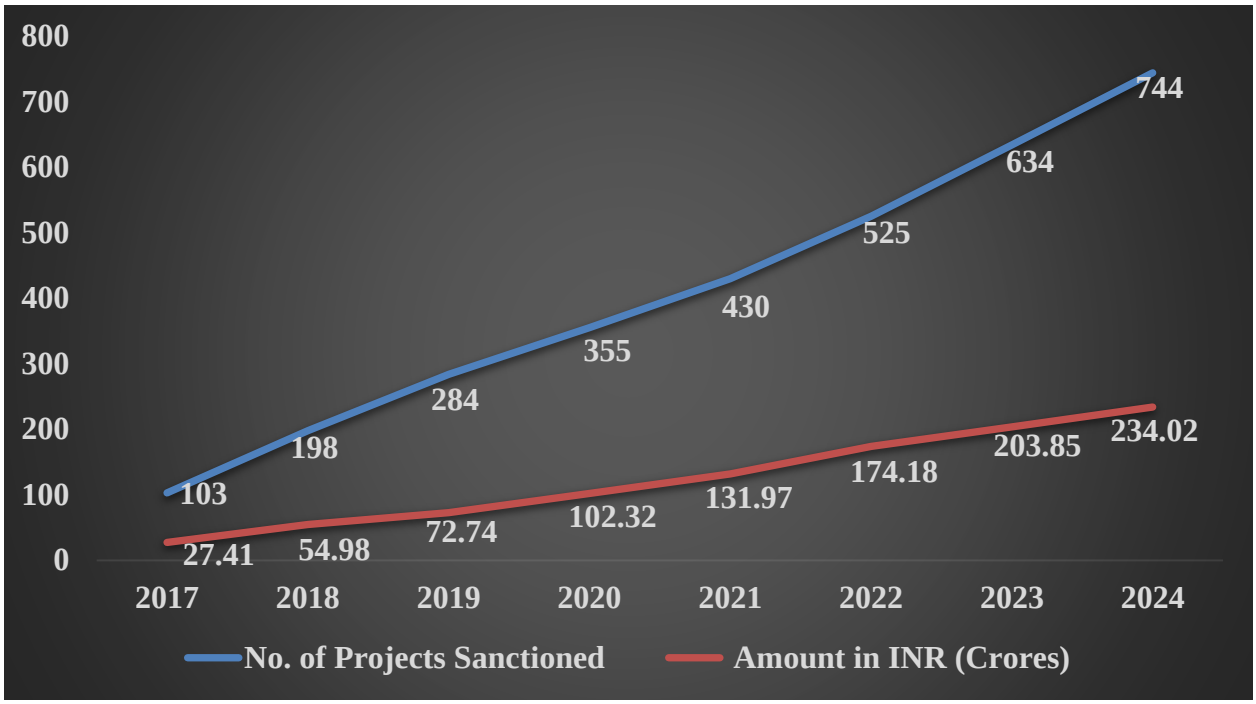
1.5 PROJECTS SANCTIONED IN 2024

A total of **110 projects** were sanctioned in **2024**, with a cumulative funding of **₹30.17 Crores**, sourced from diverse channels. **Government grants accounted for 91%** of the funding, secured from national and international agencies supporting projects aligned with global and national priorities. The remaining **9% came from industry partnerships and philanthropic foundations**, fostering knowledge exchange, technology transfer, and academic-industry collaboration.

1.6 The summary of sanctioned, ongoing, and completed research projects funded by National & International funding agencies as well as industries during the year 2024 is as given below:



1.7 The funds received from various agencies for undertaking research projects is depicted below:-

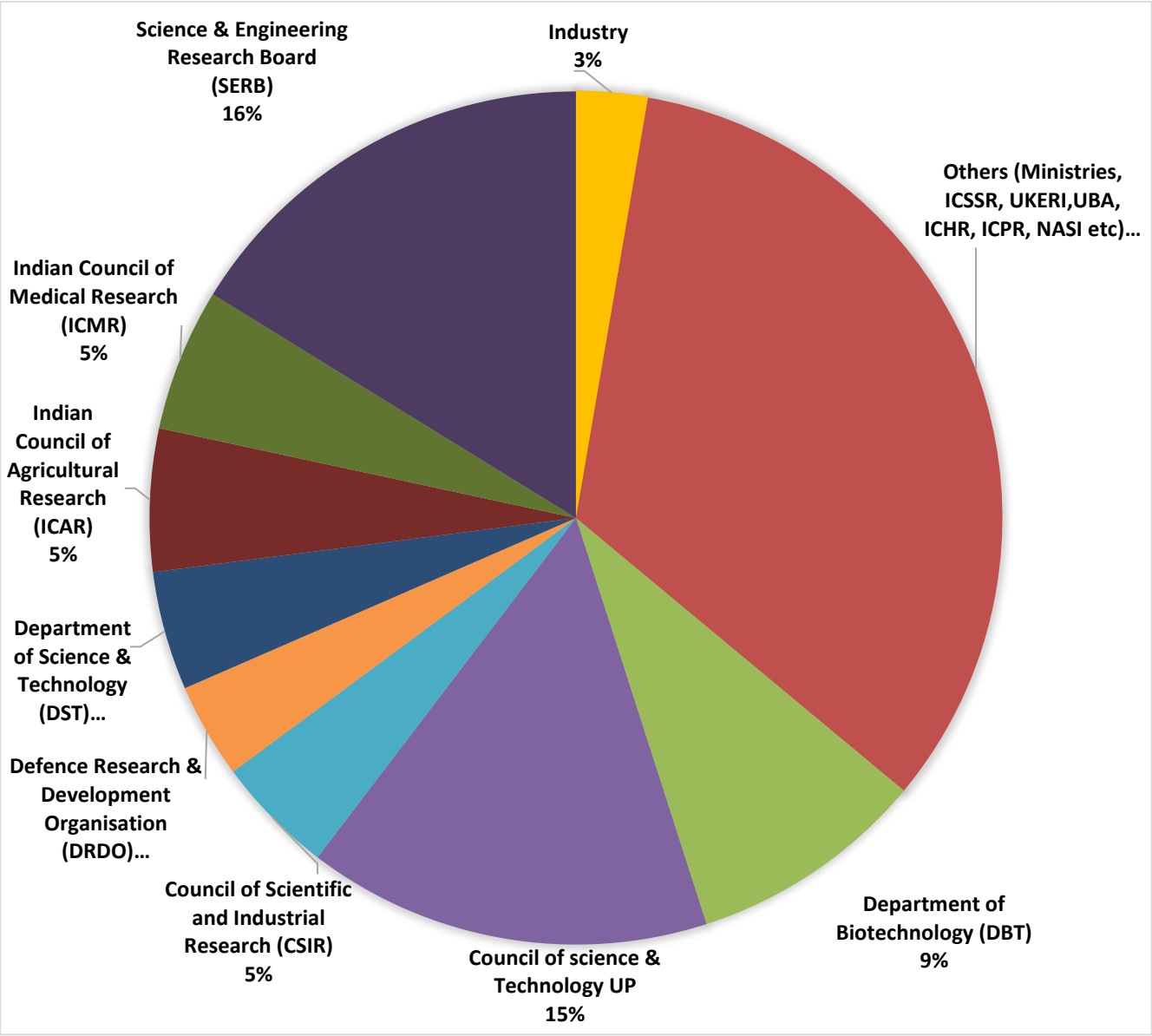


1.8 A total of 314 projects with a sanction amount of ₹ 133.93 Crores are undertaken by our brilliant faculty members and researchers across Amity Universe. We have successfully completed 74 projects with a sanction amount of ₹ 34.80 Crore in the year 2024.

1.9 University wise details of projects in 2024 (Funded projects):

Name of Campus	Sanctioned Projects	Ongoing Projects	Completed Projects
AUUP, Noida	69	181	53
AUR, Jaipur	4	9	2
AUMP, Gwalior	2	8	-
AUUP, Lucknow	8	17	4
AUH, Manesar	9	49	7
AUUP, Greater Noida	1	1	-
AUM, Mumbai	4	11	3
AUJ, Ranchi	4	7	1
AUWB, Kolkata	3	16	1
AUC, Raipur	0	3	-
AUB, Patna	1	2	-
AUP, Mohali	4	9	3
AUK, Bengaluru	1	1	-
TOTAL	**110**	**314**	**74**

1.10 Funding agency wise projects sanctioned in 2024:



GRAPHICAL REPRESENTATION OF THE FUNDS RECEIVED FROM VARIOUS FUNDING AGENCIES

1.11 GLIMPSE OF HIGH VALUE RESEARCH PROJECTS SANCTIONED IN 2024

University: Amity University Uttar Pradesh, Noida **Title of the Project:** FIST Programme **Sponsoring Agency:** Department of Science & Technology (DST) **Duration:** 5 years **Sanctioned Amount (In Rs.):** - 2,35,00,000	 **Dr Monalisa Mukherjee** **Director, Amity Institute of Click Chemistry Research and Studies**
University: Amity University Maharashtra, Mumbai **Title of the Project:** Advancing Healthcare through Predictive Analytics: A Machine Learning approach **Sponsoring Agency:** UK-India Education and Research Initiatives (UKERI) **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 1,20,00,000	 **Dr. Garima Shulka** **Associate Professor** **Amity School of Engineering and Technology**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Renewable approach to artificial photosynthesis, and other nature-inspired reactions **Sponsoring Agency:** DST- Science & Engineering Research Board (SERB) **Duration:** 5 years **Sanctioned Amount (In Rs.):** - 1,19,00,000	 **Dr Uttam Gupta** **Ramanujan Fellow** **Amity Institute of Advanced Research & Studies (Materials & Devices)**
University: Amity University West Bengal, Kolkata **Title of the Project:** Development of Biomarker signature for early detection of gastric cancer **Sponsoring Agency:** Department of Biotechnology (DBT) **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 83,16,000	 **Dr. Souvik Ghatak** **Associate Professor and Ramalingaswami Fellow,** **Amity Institute of Biotechnology**
University: Amity University Maharashtra, Mumbai **Title of the Project:** Bioengineering metal-binding proteins for bioremediation, resource recovery and environmental monitoring **Sponsoring Agency:** Department of Biotechnology (DBT) **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 83,16,000	 **Dr. Bhuvana Kamath Shanbhag** **Associate Professor and Ramalingaswami Fellow,** **Amity Institute of Biotechnology**

University: Amity University Uttar Pradesh, Noida **Title of the Project:** Long distance regressive signaling during neurodevelopment and degeneration in Alzheimer's disease **Sponsoring Agency:** Department of Biotechnology (DBT) **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 83,16,000	 **Dr. Amrita Pathak** **Associate Professor and Ramalingaswami Fellow** **Amity Institute of Neuropsychology & Neurosciences**
University: Amity University Haryana, Manesar **Title of the Project:** Identification of Sphingolipid and Eicosanoid-based Signatures as potential Diagnostic, Prognostic, and Therapeutic Targets for Inflammatory Bowel Disease Subtypes **Sponsoring Agency:** Indian Council of Medical Research (ICMR) **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 79,51,081	 **Dr. Ujjaini Dasgupta** **Professor** **Amity Institute of Integrative Sciences and Health**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Identifying novel transcriptional inhibitors for therapeutic targeting of M. tuberculosis SigE **Sponsoring Agency:** Indian Council of Medical Research (ICMR) **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 78,39,549	 **Dr. Kajal Kanchan** **Professor and Ramalingaswami Fellow** **Amity Institute of Molecular Medicine and Stem Cell Research**
University: Amity University Haryana, Manesar **Title of the Project:** Establishing Center for Korean Studies **Sponsoring Agency:** Academy of Korean Studies **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 73,02,564	 **Dr. Santosh Kumar Gupta** **Associate Professor** **Faculty of Arts**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Development of Infra-Red (IR) detector using a heterojunction of graphene with SiNWs on Si chip for Night Vision Devices **Sponsoring Agency:** Defence Research & Development Organisation (DRDO) **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 59,05,744	 **Dr. Avshish Kumar** **Assistant Professor** **Amity Institute of Advanced Research Studies (Materials & Devices)**

University: Amity University Haryana, Manesar **Title of the Project:** Sugar transporters are new determinants of drug resistance in Candida auris **Sponsoring Agency:** Department of Biotechnology (DBT) **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 57,63,760	 **Prof. (Dr) Rajendra Prasad** **Dean** **Faculty of Science Engineering and Technology, Director AIB, AIISH**  **Dr. Amresh Prakash** **AP-III, Faculty of Science Engineering and Technology**  **Dr. Atanu Banerjee** **AP-II, Faculty of Science Engineering and Technology**
University: Amity University Bihar, Patna **Title of the Project:** Systematic Investigation of Spectroscopic Factors Using Single Nucleon Transfer Reactions **Sponsoring Agency:** DST- Science & Engineering Research Board (SERB) **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 52,99,800	 **Dr. Vishal Srivastava** **Assistant Professor** **Amity School of Engineering and Technology**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Investigating the role of p53 amyloid in the tumor associated macrophage polarization and tumor microenvironment of colorectal carcinoma **Sponsoring Agency:** DST- Science & Engineering Research Board (SERB) **Duration:** 3 years **Sanctioned Amount (In Rs.):** - 49,71,560	 **Dr Shinjinee Dasgupta** **Associate Professor and DBT /Wellcome Trust India Alliance Early Career Fellow** **Amity Institute of Molecular Medicine and Stem Cell Research**
University: Amity University West Bengal, Kolkata **Title of the Project:** Small RNA sequencing approach to find out miRNA-based predictive biomarkers in Gastric Cancer patients treated with adjuvant and palliative chemotherapy **Sponsoring Agency:** Department of Biotechnology (DBT) **Duration: 3** years **Sanctioned Amount (In Rs.):** - 51,99,000	 **Dr. Payel Chakraborty** **Amity Institute of Biotechnology**

University: Amity University Uttar Pradesh, Noida **Title of the Project:** Valorization of seaweeds as a potential blue crop from the perspectives of nutritional and bioactive compounds with emphasis on A & N Islands coastal habitats **Sponsoring Agency:** Ministry Of Earth Sciences **Duration: 3** years **Sanctioned Amount (In Rs.): -** 49,29,120	 **Dr Tanu Jindal** **Director, Amity Institute Environmental Toxicology, Safety and Management**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Synthesis of Halogenated and Chalcogenated Porphyrins for Catalysis Reaction: Role of Halogen Bond (XB) and Chalcogen Bond (CB) Interactions **Sponsoring Agency:** DST Science- Engineering Research Board (SERB) **Duration: 3** years **Sanctioned Amount (In Rs.): -** 48,44,224	 **Dr Ranjan Patra** **Associate Professor & DST-Inspire Faculty** **Amity Institute of Click Chemistry Research and Studies**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Biogenic Carbon Quantum Dots: A Neoteric Trident in Stem Cell Biology **Sponsoring Agency:** DST Science- Engineering Research Board (SERB) **Duration: 3** years **Sanctioned Amount (In Rs.): -** 48,32,696	 **Dr Monalisa Mukherjee** **Director, Amity Institute of Click Chemistry Research and Studies**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Design and Development of Pumped Two-Phase Cooling Device for Thermal Management of High Heat Generating System **Sponsoring Agency:** Defence Research & Development Organisation (DRDO) **Duration: 2** years **Sanctioned Amount (In Rs.): -** 48,06,336	 **Prof. (Dr.) Basant Singh Sikarwar** **HOD-ME** **Amity School of Engineering & Technology**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Development of Urinary MicroRNA-based biomarker panel for improved prognosis and surveillance in Bladder Cancer Patients **Sponsoring Agency:** Indian Council of Medical Research (ICMR) **Duration: 3** years **Sanctioned Amount (In Rs.): -** 47,16,780	 **Ms. Malika Ranjan** **Women Scientist** **Amity Institute of Molecular Medicine & Stem Cell Research**

University: Amity University Uttar Pradesh, Noida **Title of the Project:** Establishing efficacy of selected homoeopathic medicines against breast cancer using in vitro and in vivo mice model **Sponsoring Agency:** SBL Private Limited **Duration: 3** years **Sanctioned Amount (In Rs.): -** 46,23,350	 **Dr Nilanjana Basu** **Associate Professor,** **Amity Institute of Indian System of Medicine**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Understanding the role of Aurora A Kinase in Gallbladder cancer progression and maintenance of cancer stem-like cells : Implication in early diagnosis and chemo -resistance **Sponsoring Agency:** Indian Council of Medical Research (ICMR) **Duration: 3** years **Sanctioned Amount (In Rs.): -** 45,43,258	 **Dr Shikha Srivastava** **Women Scientist** **Amity Institute of Molecular Medicine & Stem Cell Research**
University: Amity University Haryana, Manesar **Title of the Project:** Transformation of peanut and chickpea pollens using magnetic Nano-particle DNA conjugates: A method for developing transgenics bypassing tissue culture **Sponsoring Agency:** DST Science- Engineering Research Board (SERB) **Duration: 3** years **Sanctioned Amount (In Rs.): -** 44,01,513	 **Dr. Sumistha Das** **Assistant Professor-II** **Faculty of Science Engineering and Technology**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Development of IR sensor for fire detection and suppression system **Sponsoring Agency:** Defence Research & Development Organisation (DRDO) **Duration: 2** years **Sanctioned Amount (In Rs.): -** 43,19,128	 **Dr Anoop Kumar Shukla** **Associate Professor** **Amity Institute of Applied Sciences**
University: Amity University Uttar Pradesh, Noida **Title of the Project:** Flexible Nanofiber with Atomically Dispersed Metal Sites for Advanced ApplicationsScience **Sponsoring Agency:** DST Science- Engineering Research Board (SERB) **Duration:** 3 years **Sanctioned Amount (In Rs.): -** 42,39,664	 **Dr Saikat Dutta** **Professor, Amity Institute of Click Chemistry Research and Studies**

University: Amity University Uttar Pradesh, Lucknow **Title of the Project:** To study the immune stimulant effect of mitochondria-targeting nutrients of some marine micro-algae from coastal to open ocean on type II diabetic animals **Sponsoring Agency:** Ministry Of Earth Sciences **Duration: 2** years **Sanctioned Amount (In Rs.): -** 40,13,495	  **Dr. Lucy Mohapatra, Associate Professor, Amity Institute of Pharmacy** **Dr. Chitralekha Nag Dasgupta, AP-I, Research Cell**

Successful completion of the TDF_DRDO (DRDO, Ministry of Defence, Govt. of India) project, 'AI based Identification of Person using Physiological parameters: Divya Drishti,' led by Dr. Shivani Verma.

Chapter - 2 PUBLICATIONS

2.1 Publication serves as a reflection of knowledge generation through research and its dissemination for societal benefit. It lies at the heart of scientific endeavours, with researchers and scientists dedicated to producing and publishing their work in reputable, peer-reviewed journals indexed in Scopus and the Web of Science.

2.2 At Amity, the goal has been to enhance both the quality and quantity of publications by strengthening research, thereby contributing to the advancement of the nation's standing in the global academic community.

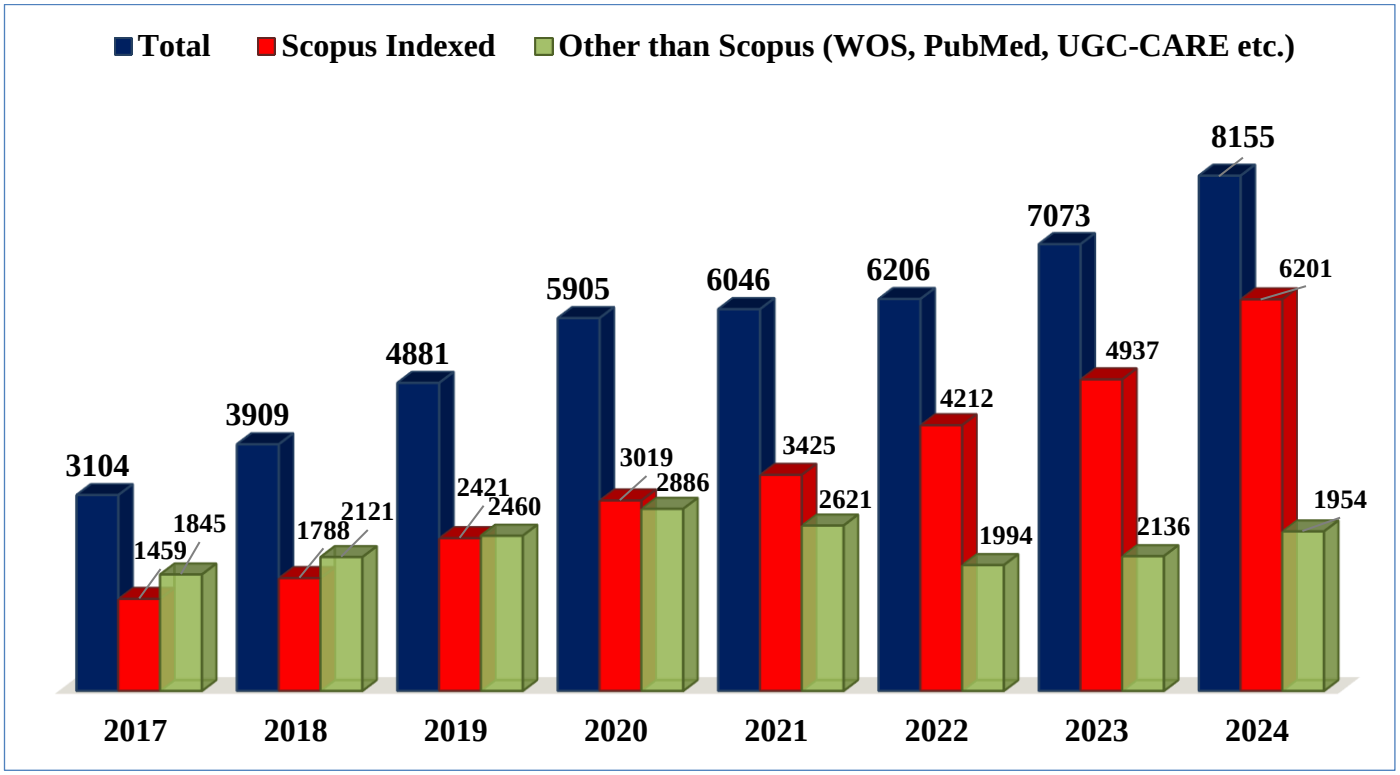
2.3 In 2024, from January to December, a total of **8,155** publications were recorded showing an increase of 15% over the past year, with **6,201** indexed in Scopus. The remaining publications are indexed in various platforms, including Web of Science, MEDLINE/PubMed, UGC-CARE, EBSCO etc and more. Out of these, **487** publications have an impact factor ranging from **6.0** to **168.9**.

2.4 Building on Amity's 30+ years of excellence in education, the faculty at Amity plays a pivotal role in all areas of Management Research, Consulting, and MDPs. This strong emphasis on research has led to the development of over 4500 case studies including **396 case studies published in 2024** across various domains, including Strategy, Marketing, Economics, Finance, and more. The University has published.

2.5 The data provided offers an overview of the growth pattern in the publication domain, summarizing the number of research papers, books, book chapters, and conference proceedings over the years.

Year	2017	2018	2019	2020	2021	2022	2023	2024
Total	3104	3909	4881	5905	6046	6206	7073	8155
Scopus Indexed	1459	1788	2421	3019	3425	4212	4937	6201
Other than Scopus (WOS, PubMed, UGC-CARE etc.)	1845	2121	2460	2886	2621	1994	2136	1954

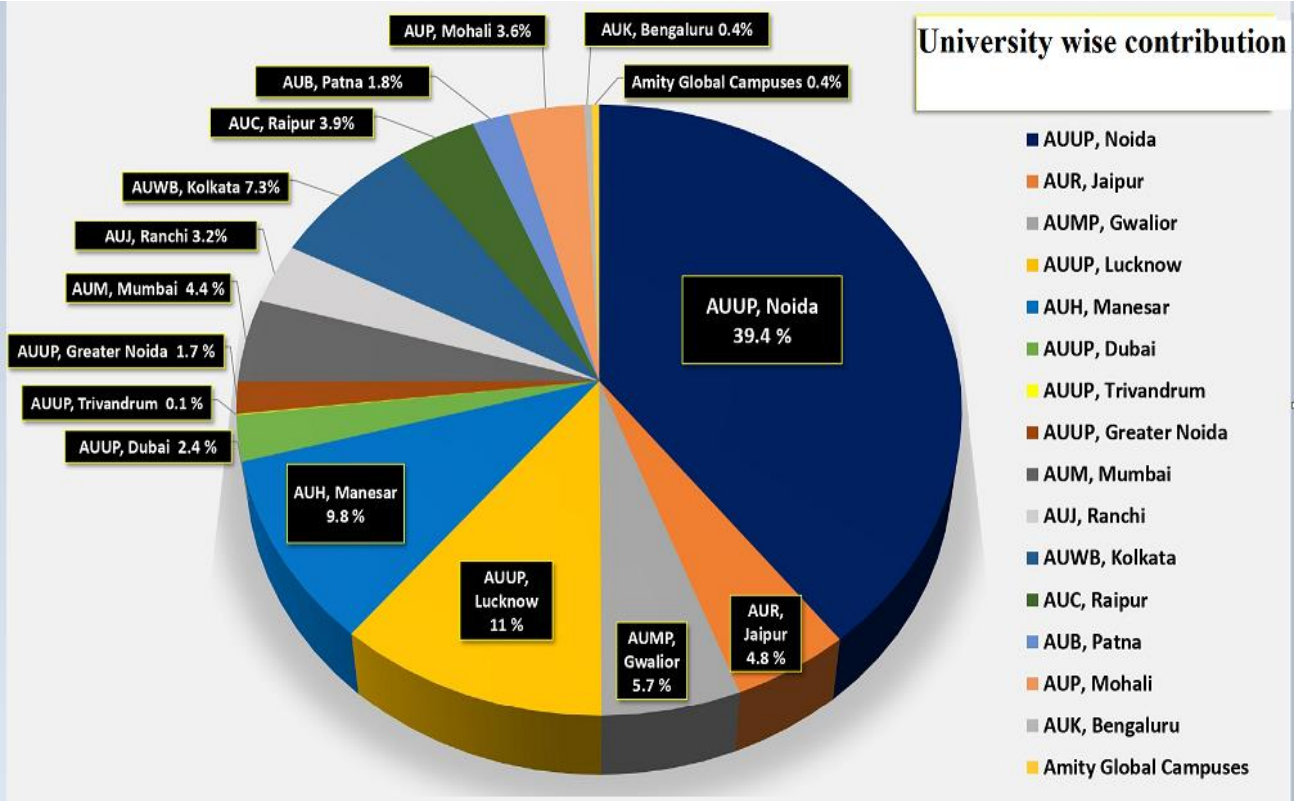
GRAPHICAL REPRESENTATION OF YEAR-WISE GROWTH IN PUBLICATIONS



2.6 The University wise contribution for the year 2024 is summarized below:

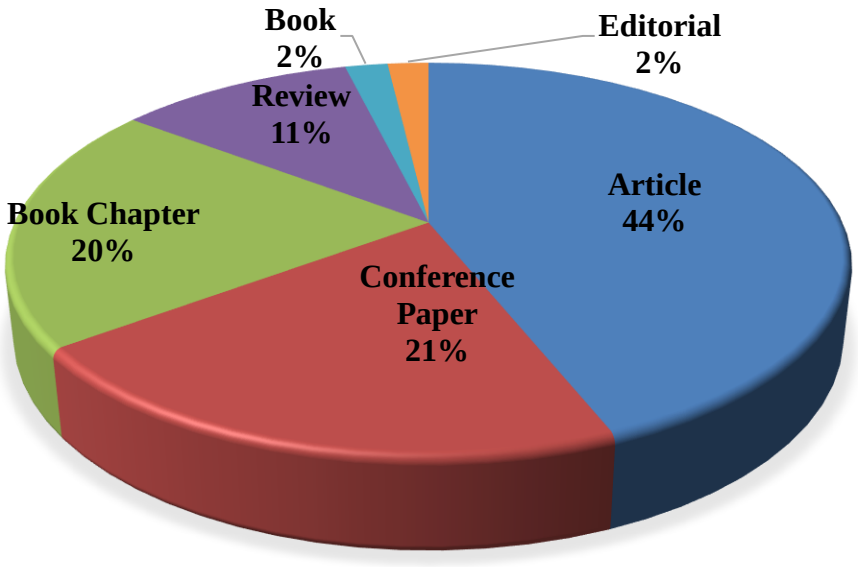
S. No	Name of Campus	Publications	Scopus	Other than Scopus (WOS, PubMed, UGC-CARE etc.)
1	AUUP, Noida	3217	3041	176
2	AUR, Jaipur	391	327	64
3	AUMP, Gwalior	462	344	118
4	AUUP, Lucknow	901	441	460
5	AUH, Manesar	803	580	223
6	AUUP, Dubai	197	196	1
7	AUUP, Trivandrum	4	3	1
8	AUUP, Greater Noida	139	122	17
9	AUM, Mumbai	359	212	147
10	AUJ, Ranchi	262	154	108
11	AUWB, Kolkata	595	335	260
12	AUC, Raipur	317	88	229
13	AUB, Patna	149	37	112
14	AUP, Mohali	298	264	34
15	AUK, Bengaluru	31	29	2
16	Amity Global Campuses (AUT)	30	28	2
Total		8155	6201	1954

Representation of Contribution towards Publications from each University

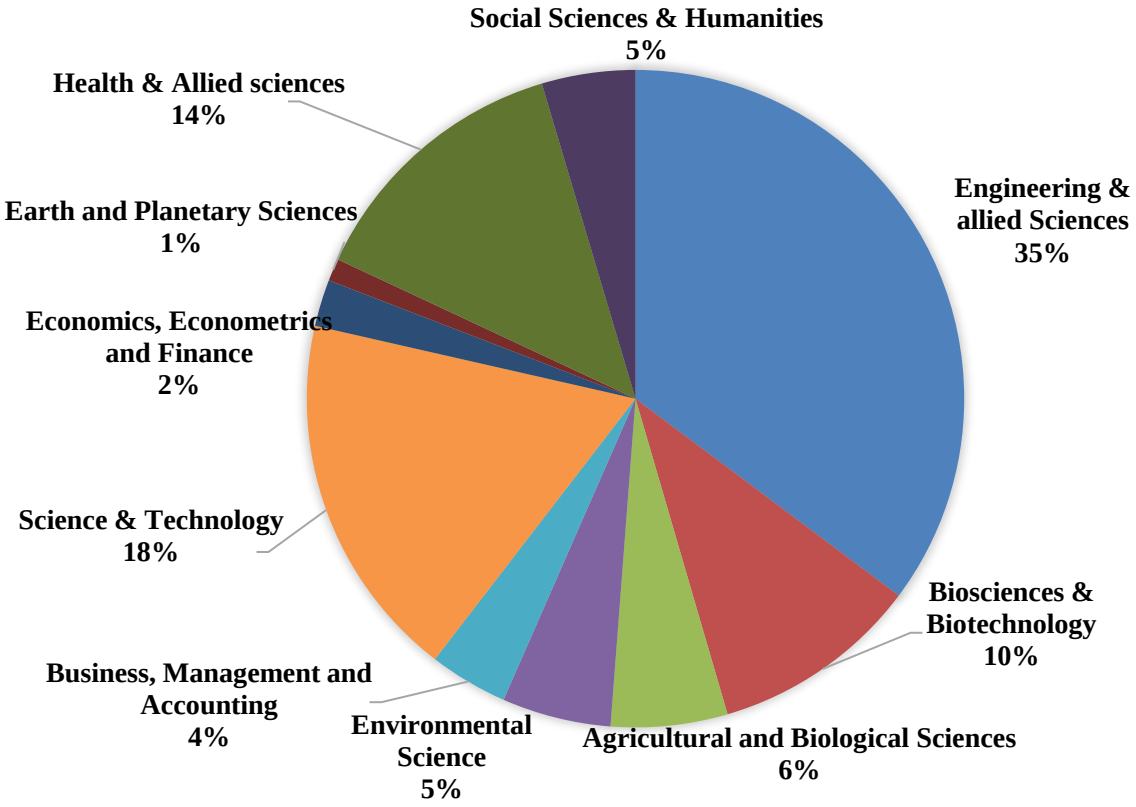


Analysis of Scopus indexed Publications for the year 2024

- **The percentage of the publications document wise such as Articles, Conference papers etc. is given below:**

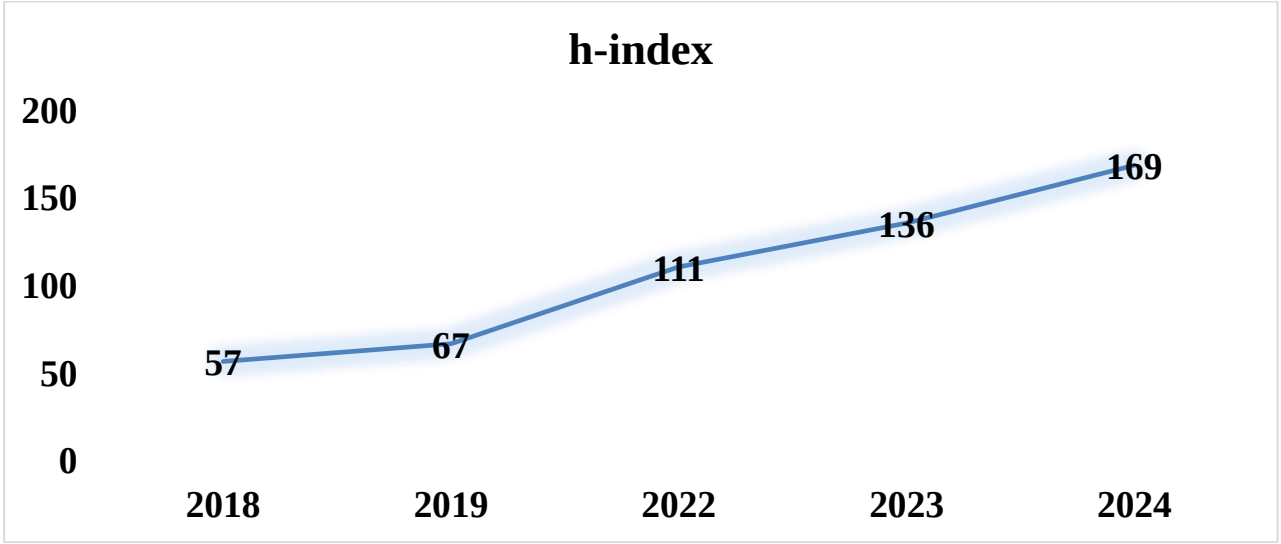


- **The percentage of publications based on their subject is as given below:**



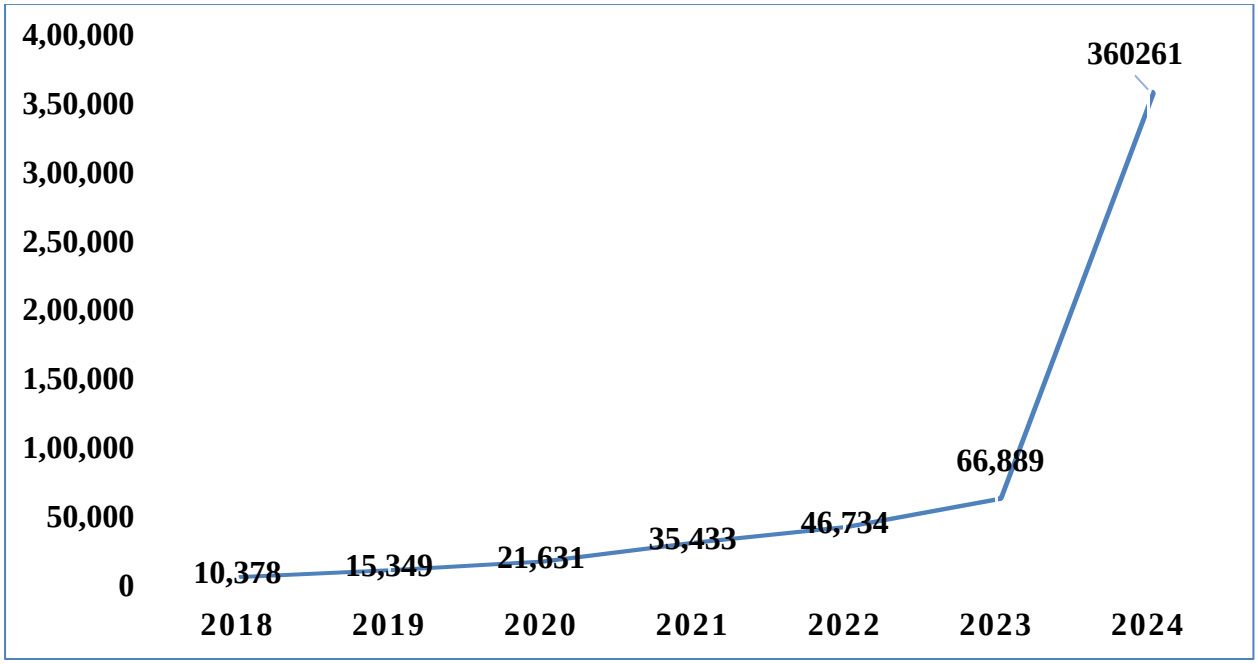
- **h-index of Amity University for the last 7 years:**

Year	2018	2019	2020	2021	2022	2023	2024
h-index	57	67	78	98	111	136	169

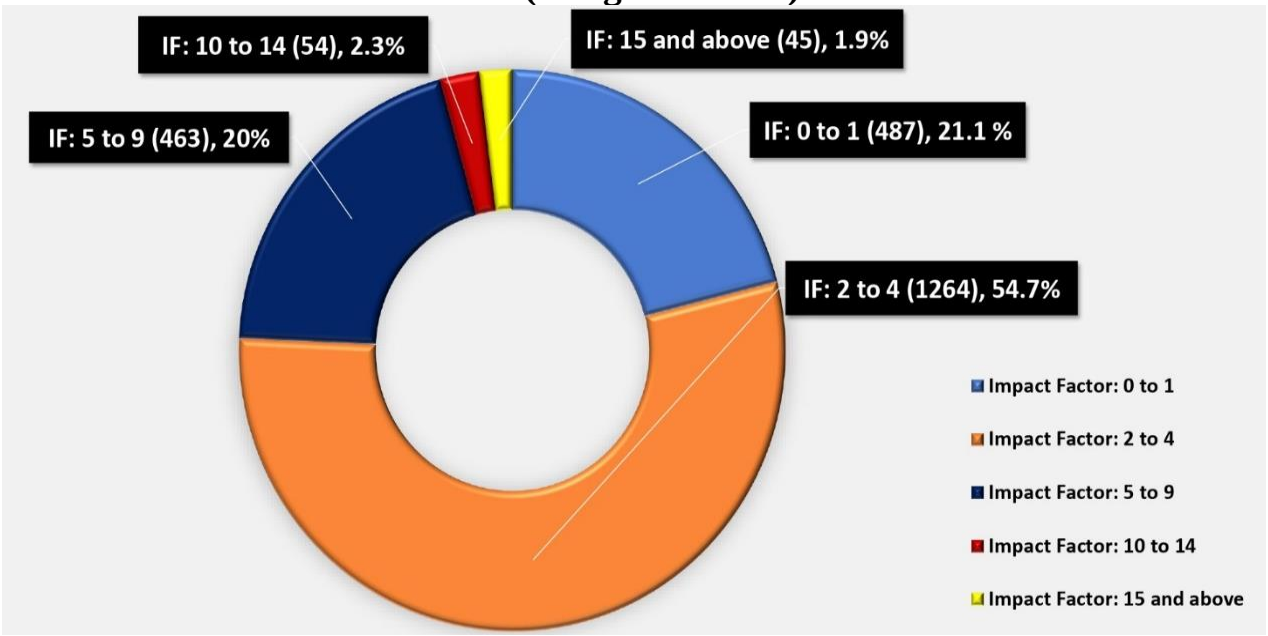


- **The citations of research publications by Amity faculty members/researchers as per Scopus for the last 7 years are depicted below:-**

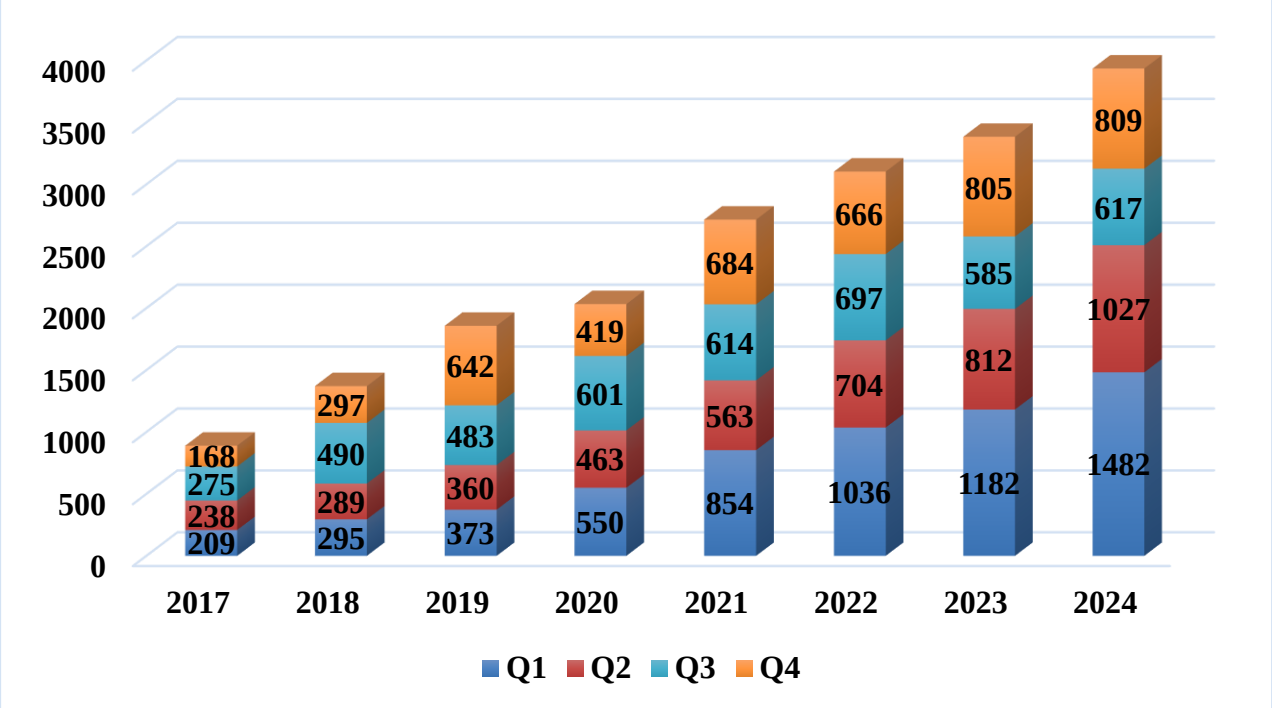
Year	2018	2019	2020	2021	2022	2023	2024
Citations	10,378	15,349	21,631	35,433	46,734	66,889	360261



- **Qualitative Research Publications based on Impact Factor (Range: -0-168.9)**



- **Share of publications per Journal quartile by Cite score percentile**



- **Collaborative Publications**

✓ Amity University has established strong research collaborations with leading national and international institutions, resulting in high-impact publications across diverse disciplines. Domestically, Amity has partnered with premier institutions such as the **Indian Institutes of Technology (IITs), All India Institute of Medical Sciences (AIIMS), Banaras Hindu University (BHU), Delhi Technological University (DTU), Jawaharlal Nehru University (JNU), and the Indian Council of Agricultural Research (ICAR)**, among others.

✓ On the global front, Amity has engaged in collaborative research with top-ranked institutions including **Johns Hopkins University (USA), Imperial College London (UK), the National University of Singapore (NUS), the University of Melbourne (Australia), and King Saud University (Saudi Arabia)**. These partnerships have led to groundbreaking contributions in **Biotechnology, Nanotechnology, Artificial Intelligence, Defence Technology, Sustainable energy, and Healthcare Innovations**, published in reputed high-impact journals indexed in **Scopus, Web of Science, and PubMed** etc.

✓ Such collaborations reinforce Amity's commitment to advancing knowledge, fostering innovation, and driving impactful research that addresses global challenges.

- **Amity's Contributions to UN Sustainable Development Goals (SDGs) through Research:**

  Amity University actively aligns its research output with the **United Nations Sustainable Development Goals (UN-SDGs)** to drive meaningful global impact. The university has contributed **19,864 publications** across various SDGs, reflecting its commitment to sustainable and inclusive development.

SDG		No. of Documents
Goal 1	No poverty	136
Goal 2	Zero hunger	855
Goal 3	Good health and well-being	4572
Goal 4	Quality education	308
Goal 5	Gender equality	182
Goal 6	Clean water and sanitation	913
Goal 7	Affordable and clean energy	1787
Goal 8	Decent work and economic growth	1064
Goal 9	Industry, innovation and infrastructure	1950
Goal 10	Reduced inequalities	270
Goal 11	Sustainable cities and communities	809
Goal 12	Responsible consumption and production	1106
Goal 13	Climate action	648
Goal 14	Life below water	193
Goal 15	Life on land	593
Goal 16	Peace, justice and strong institutions	254
Goal 17	Partnership for the goals	3195

- **The Top 2% of Global Researchers from Amity Universe in the list compiled by Stanford University, USA for 2024**

URL: https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/7

A GLIMPSE OF STAR AUTHORS (BASED ON IMPACT FACTOR 15 – 168.9)

S.N.	Publication	Photograph (Author/s)
1	**Title of Paper:** Global fertility in 204 countries and territories, 1950–2021, with forecasts to 2100: a comprehensive demographic analysis for the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet **Impact Factor:** 168.9 **Name of Author/s:** H Khajuria, B P Nayak, K Munjal, M Shannawaz, N Kumar, Prof H Kumar, V K Srivastava, E Upadhyay **Name of the Department/ University:** AIFS, AIP, AIPH, AUUP, Noida & AIB, AU Rajasthan	 Dr. Himanshu Khajuria AIFS, AUUP  Dr. Biswa P. Nayak AIFS, AUUP  Dr. Kavita Munjal AIP, AUUP  Dr. M. Shannawaz AIPH, AUUP  Dr. Naveen Kumar AIB, AUR  Dr. Harish Kumar AIB, AUR  Dr. V K Srivastava AUR  Dr. Era Upadhyay AIB, AUR
2	**Title of Paper:** Global age-sex-specific mortality, life expectancy, and population estimates in 204 countries and territories and 811 subnational locations, 1950–2021, and the impact of the COVID-19 pandemic: a comprehensive demographic analysis for the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet **Impact Factor:** 168.9 **Name of Author/s:** Himanshu Khajuria, Biswa Prakash Nayak, Era Upadhyay, Sapna Gupta, Kavita Munjal, Madhulata Kumari **Name of the Department/ University:** AIFS, AIP, AUUP, Noida & AIB, AU Rajasthan	 Dr. Himanshu Khajuria AIFS, AUUP  Dr. Biswa P. Nayak AIFS, AUUP  Dr. Era Upadhyay AIB, AUR  Ms. Sapna Gupta AIES, AUUP  Dr. Kavita Munjal AIP, AUUP  Dr. Madhulata Kumari AIB, AUR
3	**Title of Paper:** Burden of disease scenarios for 204 countries and territories, 2022–2050: a forecasting analysis for the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet **Impact Factor:** 98.4 **Name of Author/s:** Ruchi Jakhmola Mani, H Khajuria, B P Nayak, K Munjal, M Shannawaz, Prof H Kumar, E Upadhyay **Name of the Department/ University:** AIB, AIFS, AIP, AIPH, AUUP, Noida & AIB, AU Rajasthan	 Dr. Ruchi J. Mani AIB, AUUP  Dr. Himanshu Khajuria AIFS, AUUP  Dr. Biswa P. Nayak AIFS, AUUP  Dr. Kavita Munjal AIP, AUUP  Dr. M. Shannawaz AIPH, AUUP  Dr. Harish Kumar AIB, AUR  Dr. Era Upadhyay AIB, AUR
4	**Title of Paper:** Global burden of 288 causes of death and life expectancy decomposition in 204 countries and territories and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet **Impact Factor:** 98.4 **Name of Author/s:** H Khajuria, B P Nayak, K Munjal, Prof H Kumar, M Kumari, E Upadhyay, V K Srivastava **Name of the Department/ University:** AIFS, AIP, AUUP, Noida & AIB, AU Rajasthan	 Dr. Himanshu Khajuria AIFS, AUUP  Dr. Biswa P. Nayak AIFS, AUUP  Dr. Kavita Munjal AIP, AUUP  Dr. Harish Kumar AIB, AUR  Dr. Madhulata Kumari AIB, AUR  Dr. Era Upadhyay AIB, AUR  Dr. V K Srivastava AUR

5	**Title of Paper:** Global incidence, prevalence, years lived with disability (YLDs), disability-adjusted life-years (DALYs), and healthy life expectancy (HALE) for 371 diseases and injuries in 204 countries and territories and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet **Impact Factor:** 98.4 **Name of Author/s:** H Khajuria, B P Nayak, P Puri, K Munjal, M Shannawaz, E Upadhyay **Name of the Department/ University:** AIFS, AIP, AIPH, AUUP, Noida & AIB, AU Rajasthan	 Dr. Himanshu Khajuria AIFS, AUUP  Dr. Biswa P. Nayak AIFS, AUUP  Dr. Pooja Puri AIFS, AUUP  Dr. Kavita Munjal AIP, AUUP  Dr. M. Shannawaz AIPH, AUUP  Dr. Era Upadhyay AIB, AUR
6	**Title of Paper:** Global burden and strength of evidence for 88 risk factors in 204 countries and 811 subnational locations, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet **Impact Factor:** 98.4 **Name of Author/s:** H Khajuria, B P Nayak, K Munjal, E Upadhyay **Name of the Department/ University:** AIFS, AIP, AUUP, Noida & AIB, AU Rajasthan	 Dr. Himanshu Khajuria AIFS, AUUP  Dr. Biswa P. Nayak AIFS, AUUP  Dr. Kavita Munjal AIP, AUUP  Dr. Era Upadhyay AIB, AUR
7	**Title of Paper:** Global burden of bacterial antimicrobial resistance 1990–2021: a systematic analysis with forecasts to 2050 **Name of Journal:** The Lancet **Impact Factor:** 98.4 **Name of Author/s:** H Khajuria, B P Nayak **Name of the Department/ University:** AIFS, AUUP, Noida	 Dr. Himanshu Khajuria AIFS, AUUP  Dr. Biswa P. Nayak AIFS, AUUP
8	**Title of Paper:** Global, regional, and national stillbirths at 20 weeks' gestation or longer in 204 countries and territories, 1990–2021: findings from the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet **Impact Factor:** 98.4 **Name of Author/s:** Shannawaz, Mohammed **Name of the Department/ University:** AIPH, AUUP, Noida	 Dr. M. Shannawaz AIPH, AUUP
9	**Title of Paper:** Theranostic Fluorescent Probes **Name of Journal:** Chemical Reviews **Impact Factor:** 62.1 **Name of Author/s:** Dr. Amit Sharma **Name of the Department/ University:** ASCS, Amity University Punjab	 Dr. Amit Sharma ASCS, AUP, Mohali

10	**Title of Paper:** Click Chemistry for Biofunctional Polymers: From Observing to Steering Cell Behavior **Name of Journal:** Chemical Reviews **Impact Factor:** 51.4 **Name of Author/s:** Mishra, Vivek **Name of the Department/ University:** AICCRS, AUUP, Noida	 **Dr. Vivek Mishra** **AICCRS, AUUP**
11	**Title of Paper:** Global, regional, and national burden of disorders affecting the nervous system, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet Neurology **Impact Factor:** 48 **Name of Author/s:** Khajuria H., Nayak B.P. **Name of the Department/ University:** AIFS, AUUP, Noida	 **Dr. Himanshu Khajuria** **AIFS, AUUP**  **Dr. Biswa P. Nayak** **AIFS, AUUP**
12	**Title of Paper:** Global, regional, and national burden of stroke and its risk factors, 1990–2021: a systematic analysis for the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet Neurology **Impact Factor:** 46.5 **Name of Author/s:** M Shannawaz **Name of the Department/ University:** AIPH, AUUP, Noida	 **Dr. M. Shannawaz** **AIPH, AUUP**
13	**Title of Paper:** Smart molecular designs and applications of activatable organic photosensitizers **Name of Journal:** Nature Reviews Chemistry **Impact Factor:** 38.1 **Name of Author/s:** Dr. Amit Sharma **Name of the Department/ University:** ASCS, AUP, Mohali	 **Dr. Amit Sharma** **ASCS, AUP, Mohali**
14	**Title of Paper:** Global, regional, and national age-specific progress towards the 2020 milestones of the WHO End TB Strategy: a systematic analysis for the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet Infectious Diseases **Impact Factor:** 36.4 **Name of Author/s:** H Khajuria, B P Nayak, V K Srivastava **Name of the Department/ University:** AIFS, AUUP, Noida & AIB, AU Rajasthan	 **Dr. Himanshu Khajuria** **AIFS, AUUP**  **Dr. Biswa P. Nayak** **AIFS, AUUP**  **Dr. V K Srivastava** **AUR**

15	**Title of Paper:** Trends and levels of the global, regional, and national burden of appendicitis between 1990 and 2021: findings from the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet Gastroenterology and Hepatology **Impact Factor:** 30·9 **Name of Author/s:** Khajuria H. **Name of the Department/ University:** AIFS, AUUP, Noida	 **Dr. Himanshu Khajuria** **AIFS, AUUP**
16	**Title of Paper:** Forecasting the effects of smoking prevalence scenarios on years of life lost and life expectancy from 2022 to 2050: a systematic analysis for the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet Public Health **Impact Factor:** 25.4 **Name of Author/s:** Himanshu Khajuria; B P Nayak; M Shannawaz **Name of the Department/ University:** AIFS, AIPH, AUUP, Noida	 **Dr. Himanshu Khajuria** **AIFS, AUUP**  **Dr. Biswa P. Nayak** **AIFS, AUUP**  **Dr. M. Shannawaz** **AIPH, AUUP**
17	**Title of Paper:** Unravelling the potential of sigma hole-assisted co-crystallization: Highlighting recent developments **Name of Journal:** Coordination Chemistry Reviews **Impact Factor:** 22.315 **Name of Author/s:** Rafia Siddiqui, Ranjan Patra **Name of the Department/ University:** AICCRS, AUUP, Noida	 **Dr. Ranjan Patra** **AICCRS, AUUP**
18	**Title of Paper:** Evolution of reactive oxygen species cellular targets for plant development **Name of Journal:** Trends in Plant Science **Impact Factor:** 20.5 **Name of Author/s:** Tripathi D.K. **Name of the Department/ University:** AIOA, AUUP, Noida	 **Dr. Durgesh Kumar Tripathi** **AIOA, AUUP**
19	**Title of Paper:** Unlocking a 'lock–key' mechanism governing pollen–pistil interactions **Name of Journal:** Trends in Plant Science **Impact Factor:** 20.5 **Name of Author/s:** Tripathi D.K. **Name of the Department/ University:** AIOA, AUUP, Noida	
20	**Title of Paper:** Organoiridium-catalyzed bioorthogonal chemistry **Name of Journal:** Coordination Chemistry Reviews **Impact Factor:** 20.3 **Name of Author/s:** Prasad, Puja **Name of the Department/ University:** AICCRS, AUUP, Noida	 **Dr. Puja Prasad** **AICCRS, AUUP**

21	**Title of Paper:** Hydrophobic assembly of molecular catalysts at the gas–liquid–solid interface drives highly selective CO2 electromethanation **Name of Journal:** Nature Chemistry **Impact Factor:** 19.2 **Name of Author/s:** Singh, Harishchandra **Name of the Department/ University:** AIAS, AUUP, Noida	 **Dr. Harishchandra Singh** **AIAS, AUUP**
22	**Title of Paper:** ABLs and transmembrane kinases shape extracellular auxin perception **Name of Journal:** Trends in Plant Science **Impact Factor:** 17.3 **Name of Author/s:** Tripathi, Durgesh Kumar **Name of the Department/ University:** AIOA, AUUP, Noida	 **Dr. Durgesh Kumar Tripathi** **AIOA, AUUP**
23	**Title of Paper:** Nanoscale materials and NO-ROS homeostasis in plants: trilateral dynamics **Name of Journal:** Trends in Plant Science **Impact Factor:** 17.3 **Name of Author/s:** Kandhol N.; Pandey S.; Tripathi D.K. **Name of the Department/ University:** AIOA, AUUP, Noida	 **Ms. Nidhi Kandhol** **AIOA, AUUP**  **Dr. Sangeeta Pandey** **AIOA, AUUP**  **Dr. Durgesh K Tripathi** **AIOA, AUUP**
24	**Title of Paper:** Effect of single-metal-atoms in electrovalorization of biomass and paired electrolysis **Name of Journal:** Chemical Engineering Journal **Impact Factor:** 16.744 **Name of Author/s:** Yadav A., Dutta S. **Name of the Department/ University:** AICCRS, AUUP, Noida	 **Dr. Saikat Dutta** **AICCRS, AUUP**
25	**Title of Paper:** Recovery of sulfuric acid during sugar purification from pretreated wheat straw hydrolysate using electro-electrodialysis system for 2G bioethanol production **Name of Journal:** Chemical Engineering Journal **Impact Factor:** 16.744 **Name of Author/s:** Dr. Moondeep Chauhan **Name of the Department/ University:** Central Instrumental Lab, Amity University Punjab	 **Dr. Moondeep Chauhan** **CIL, AUP, Mohali**
26	**Title of Paper:** Clinically relevant mutations in regulatory regions of metabolic genes facilitate early adaptation to ciprofloxacin in Escherichia coli **Name of Journal:** Nucleic acids research **Impact Factor:** 16.6 **Name of Author/s:** Patil, Nikita G. **Name of the Department/ University:** AIVI, AUUP, Noida	 **Ms. Nikita G. Patil** **AIVI, AUUP**

27	**Title of Paper:** De Novo Designed Ru(II) Metallacycle as a Microenvironment-Adaptive Sonosensitizer and Sonocatalyst for Multidrug-Resistant Biofilms Eradication **Name of Journal:** Angewandte Chemie - International Edition **Impact Factor:** 16.6 **Name of Author/s:** Amit Sharma **Name of the Department/ University:** ASCS, AUP, Mohali	 **Dr. Amit Sharma** **ASCS, AUP, Mohali**
28	**Title of Paper:** Augmenting Cancer Therapy with a Supramolecular Immunogenic Cell Death Inducer: A Lysosome-Targeted NIR-Light-Activated Ruthenium(II) Metallacycle **Name of Journal:** Journal of the American Chemical Society **Impact Factor:** 16.383 **Name of Author/s:** Dr. Amit Sharma **Name of the Department/ University:** ASCS, AUP, Mohali	 **Dr. Amit Sharma** **ASCS, AUP, Mohali**
29	**Title of Paper:** From Coordination to π-Hole Chemistry of Transition Metals: Metalloporphyrins as a Case of Study **Name of Journal:** Angewandte Chemie - International Edition **Impact Factor:** 16.1 **Name of Author/s:** Siddiqui R.; Dhamija S.; Patra R. **Name of the Department/ University:** AICCRS, AUUP, Noida	 **Dr. Ranjan Patra** **AICCRS, AUUP**
30	**Title of Paper:** Novel Discoveries and Clinical Advancements for Treating Onychomycosis: A Mechanistic Insight **Name of Journal:** Advanced Drug Delivery Reviews **Impact Factor:** 16.1 **Name of Author/s:** Sharma R., Nirbhavane P. **Name of the Department/ University:** AIP, AU Madhya Pradesh & AIP, AU Haryana	 **Dr. Rajeev Sharma** **AIP, AUMP**  **Dr Pradip Nirbhavane** **AIP, AUH**
31	**Title of Paper:** An Ultrasound-Activated Supramolecular Modulator Enhancing Autophagy to Prevent Ventricular Arrhythmias Post-Myocardial Infarction **Name of Journal:** Angewandte Chemie - International Edition **Impact Factor:** 16.1 **Name of Author/s:** Dr. Amit Sharma **Name of the Department/ University:** ASCS, AUP, Mohali	 **Dr. Amit Sharma** **ASCS, AUP, Mohali**
32	**Title of Paper:** Immunosensors in food, health, environment, and agriculture: a review **Name of Journal:** Environmental Chemistry Letters **Impact Factor:** 15.7 **Name of Author/s:** Dr Ashok Kumar Pathera **Name of the Department/ University:** AIFT, AUUP, Noida	 **Dr Ashok Kumar Pathera** **AIFT, AUUP**

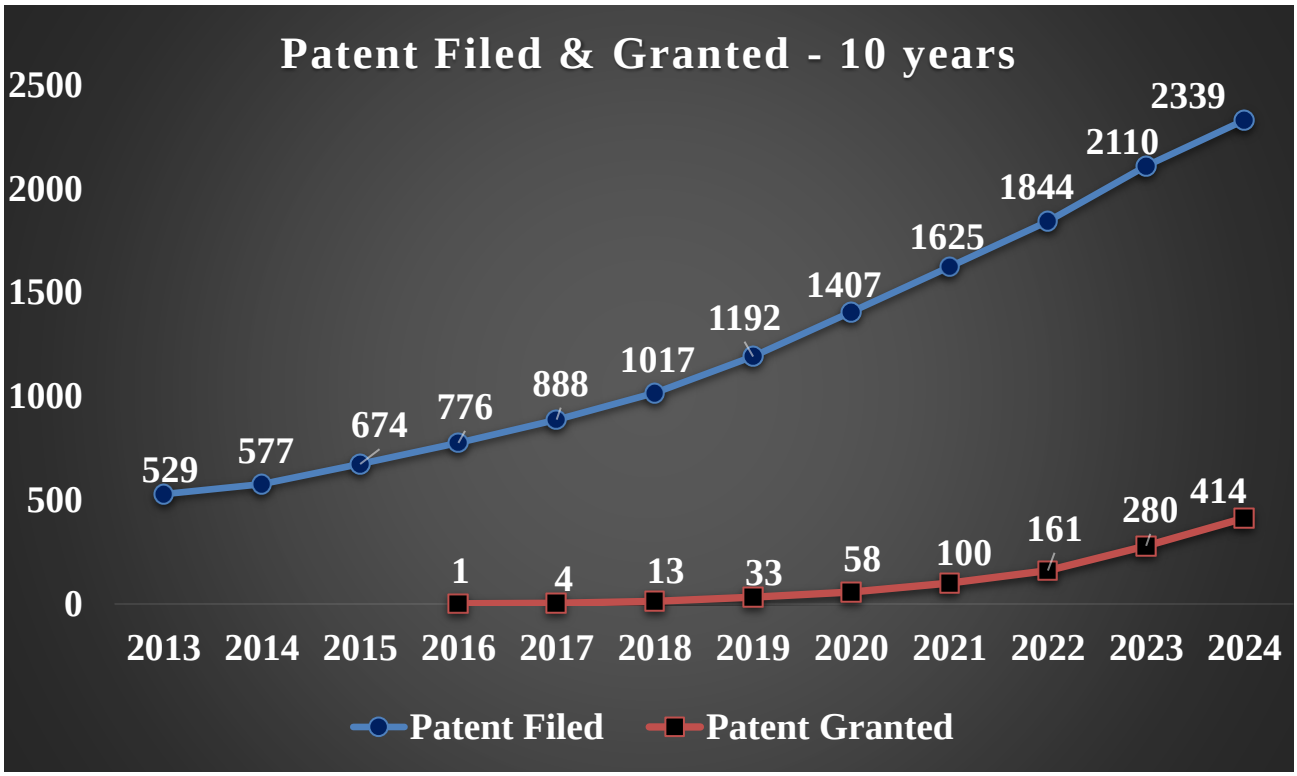
33	**Title of Paper:** Acute and multigenerational toxicity of polylactic acid microplastics on a copepod bioindicator **Name of Journal:** Environmental Chemistry Letters **Impact Factor:** 15.7 **Name of Author/s:** Das S. **Name of the Department/ University:** ACMST, AIB, AUUP, Noida	 **Dr. Shagnika Das,** **ACMST, AIB, AUUP**
34	**Title of Paper:** Innovative technologies for the fabrication of 3D/4D smart hydrogels and its biomedical applications - A comprehensive review **Name of Journal:** Advances in Colloid and Interface Science **Impact Factor:** 15.6 **Name of Author/s:** Saraswat A., Chawla S. **Name of the Department/ University:** AIAS, AUUP, Noida	 **Dr. Shashi Chawla** **AIAS, AUUP**
35	**Title of Paper:** Cationic nanocarriers: A potential approach for targeting negatively charged cancer cell **Name of Journal:** Advances in Colloid and Interface Science **Impact Factor:** 15.6 **Name of Author/s:** Dr. Tanweer Haider **Name of the Department/ University:** AIP, AUMP, Gwalior	 **Dr. Tanweer Haider** **AIP, AUMP**
36	**Title of Paper:** Role of augmented reality in surgery: editorial **Name of Journal:** International journal of surgery (London, England) **Impact Factor:** 15.3 **Name of Author/s:** Munjal K. **Name of the Department/ University:** AIP, AUUP, Noida	 **Dr. Kavita Munjal** **AIP, AUUP**
37	**Title of Paper:** Global, regional, and national burden of neck pain, 1990–2020, and projections to 2050: a systematic analysis of the Global Burden of Disease Study 2021 **Name of Journal:** The Lancet Rheumatology **Impact Factor:** 15.0 **Name of Author/s:** H Khajuria **Name of the Department/ University:** AIFS, AUUP, Noida	 **Dr. Himanshu Khajuria** **AIFS, AUUP**

Chapter – 3 IPR GENERATED

(Patents, Copyrights & Trademarks)

1. Intellectual Property Rights (IPR) generation is a testament to an organization's prowess in fostering original concepts and pioneering research. Amity University's annual IPR achievements is a reflection of its unwavering dedication to advancing innovation, significantly contributing to the creation of new knowledge and technology. Amity University achieved a significant milestone in 2024 by filing 229 patents, 421 copyrights.

2. Amity University has filed a remarkable total of **2,339 patents**, with **414 patents granted till December 2024**. This accomplishment positions Amity as one of the leading institutions in India for patent filings.



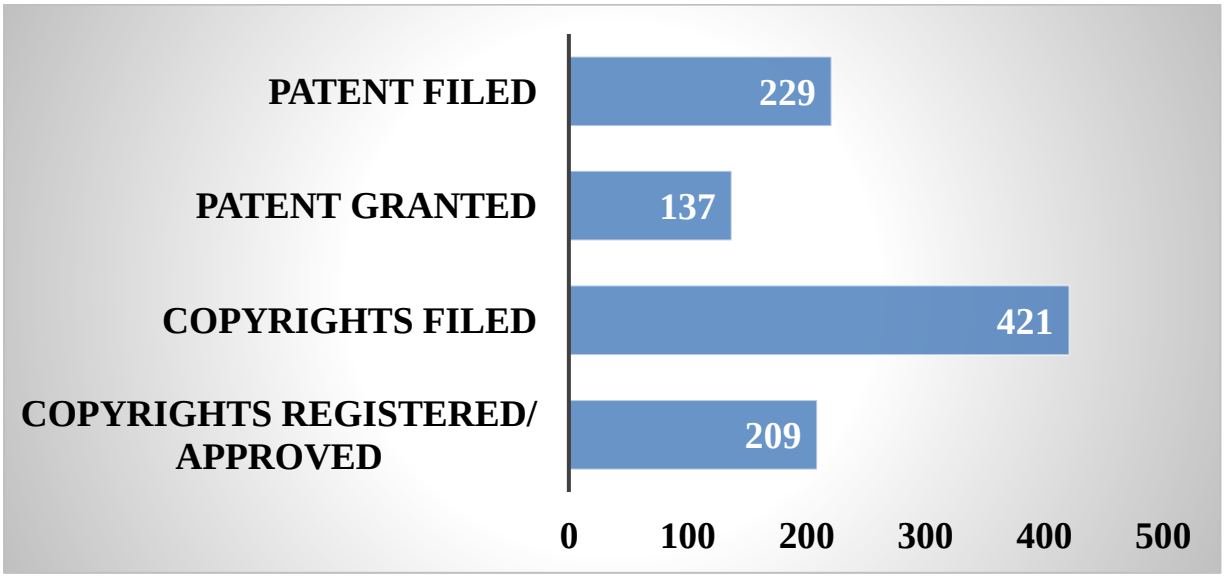
Graphical representation of Patents filed & granted

3. In recognition of the excellent achievement, Amity has bagged two notable awards namely,

- **Best Patent Portfolio – 10th CII Industrial Intellectual Property (IP) Awards 2024.**

- **Best University for Strong IP Ecosystem award – ASSOCHAM 4th IP Excellence Awards 2024** Global Conclave

4.1 GLIMPSE OF IPR GENERATED IN 2024

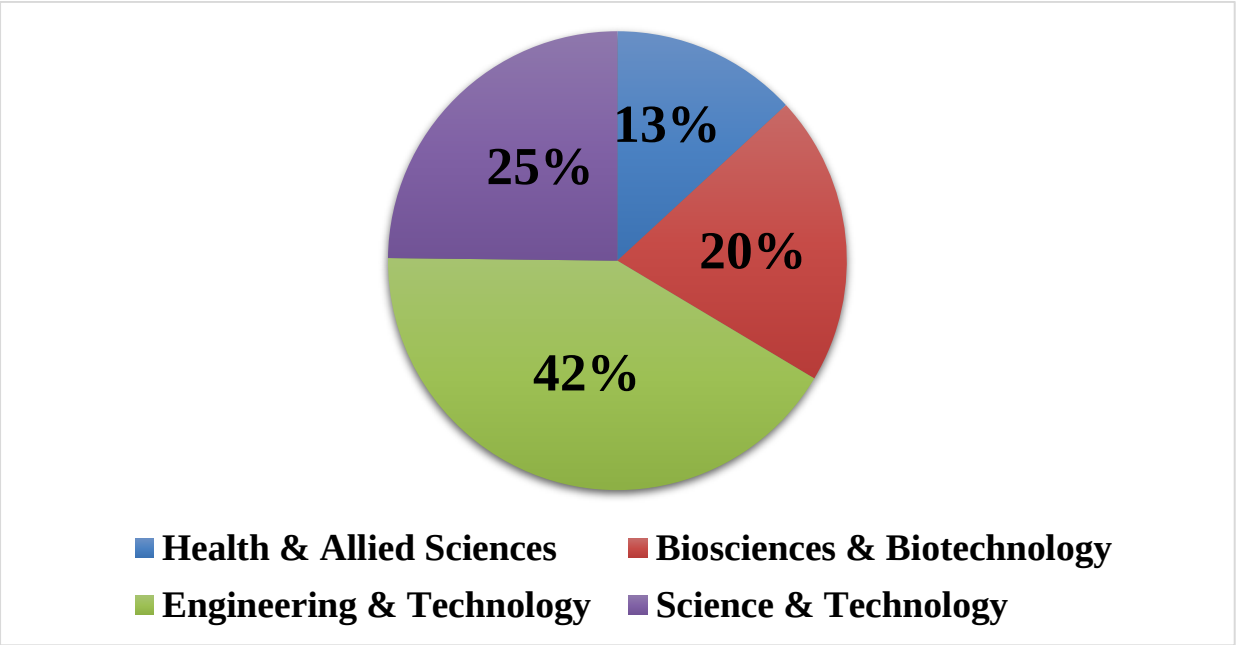


4.2 CAMPUS WISE PATENT FILING DURING 2024

NAME OF THE APPLICANT	PATENT FILED	PERCENTAGE CONTRIBUTION
Amity University Uttar Pradesh, Noida	125	54.59
Amity University Haryana, Manesar	27	11.79
Amity University Uttar Pradesh, Lucknow	16	6.99
Amity University Madhya Pradesh, Gwalior	14	6.11
Amity University Uttar Pradesh, Greater Noida	12	5.24
Amity University Rajasthan, Jaipur	11	4.80
Amity University Chhattisgarh, Raipur	6	2.62
Amity University Jharkhand, Ranchi	6	2.62
Amity University West Bengal, Kolkata	5	2.18
Amity University Maharashtra	3	1.31
Amity University Bihar, Patna	2	0.87
Amity University Punjab, Mohali	2	0.87
TOTAL	229	100.00

4.3 PATENT GRANTED IN 2024 - DOMAIN WISE

-



4.4 RECOGNITION FOR IP PORTFOLIO AT VARIOUS PLATFORMS DURING PREVIOUS YEARS

Chapter - 4 TECHNOLOGIES TRANSFERRED

Research and Innovation has been the core focus area of the University with an aim to develop products and ensure that it reaches society for ultimate use. With this aim, Amity has established the Directorate of Innovation & Technology Transfer (DITT) to emphasize the importance of realizing the practical application of cutting-edge research findings, turning academic discoveries into tangible products, processes, or services that can benefit society at large. The transfer of technology involves a two-way exchange of knowledge between academia and industry. Effective transfer of technology has also enhanced Amity's global competitiveness.

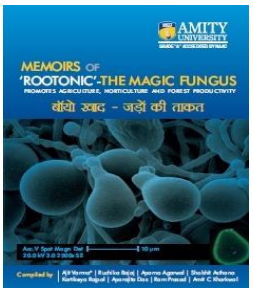
4.1 Amity has transferred 35 technologies to the industry so far, out of which the following three technologies have been transferred to the industries for commercialization in the year 2024 itself:

- **ROOTONIC developed by Prof. Ajit Varma of Amity Institute of Microbial Technology, Noida was transferred to M/s INERA Cropscience Pvt. Ltd.**

ROOTONIC is the magic fungus (*Piriformospora indica*) that promotes agriculture and horticulture by enhancing productivity and was discovered by Prof. (Dr.) Ajit Varma, Gp. Dy. VC / Distinguished Scientist & Professor of Eminence, Amity Institute of Microbial Technology. Several green-house experiments, and field trials were conducted in various parts of India including Punjab, Himachal Pradesh, Haryana, Gujarat, Karnataka, Delhi NCR and Rajasthan and extreme cold terrains of Leh-Ladakh with the fungus and the most

astonishing part was that even fungus which was screened from the extreme hot deserts functioned well in extreme cold crops.

The results showed a remarkable increase in the productivity of various plants. This is a unique symbiotic fungus that not only promotes plant growth but also has multi-functional activities including abiotic stress tolerance. This technology has helped to improve productivity per hectare as observed in a few experiments conducted by us over the years.



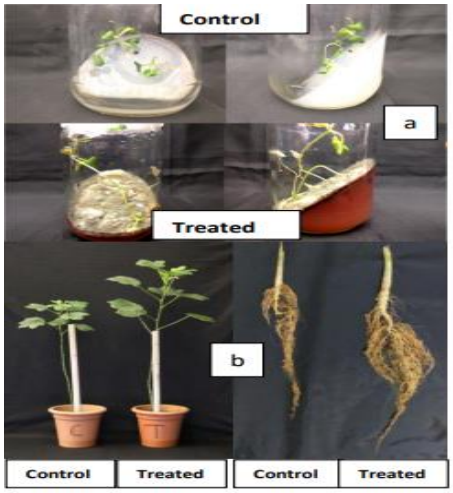
- **Herbal Blue Color developed by Prof. Harsha Kharkwal of Amity Institute of Phytochemistry and Phytomedicine, Noida was transferred to M/s Radha Kishan Bishan Dass Rang Rasayan Pvt. Ltd**

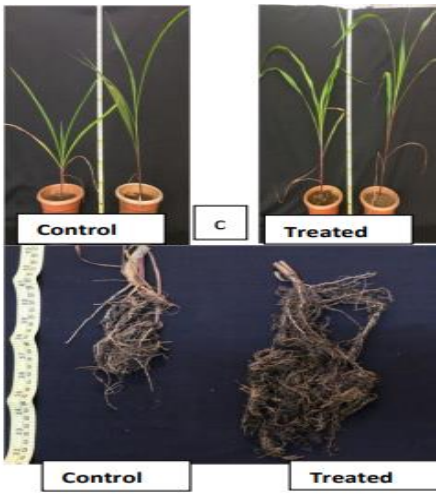
This novel invention introduces a sustainable and eco-friendly method for extracting a natural blue color from herbal sources, offering a viable alternative to synthetic dyes. The extraction process employs both cold extraction and environmentally friendly solvent extraction techniques to ensure minimal environmental impact. The extracted color undergoes rigorous testing for color intensity, with adjustments made as necessary to enhance its vibrancy and application potential. To ensure durability and colorfastness, natural binding agents are incorporated into the final product. The resulting herbal blue color is suitable for various applications and represents a step forward in the development of sustainable, non-toxic colorants.

- **Method to establish the tripartite interaction between endophyte Talaromyces albobiverticillius HNB9 formerly known as Talaromyces Pureopgenus HNB9 developed by Dr. Amit C. Kharkwal of Amity Institute Microbial Technology, Noida was transferred to M/s Myodelphia Biotech Research Company.**

This invention introduces a novel method for establishing a tripartite interaction between the endophyte *Talaromyces purpureogenus HNB9* and two otherwise incompatible entomopathogenic fungi, *Metarhizium anisopliae* and *Beauveria bassiana*.

By leveraging the presence of *Talaromyces purpureogenus HNB9* or its culture filtrate, the invention addresses the feasibility of combining these incompatible fungi into a functional consortium. It specifically relates to the formulation of a synergistic consortium comprising the growth-promoting endophytic fungus *Talaromyces purpureogenus HNB9* along with the biological control agents *Metarhizium anisopliae* and *Beauveria bassiana*. This consortium has been shown to induce plant defense mechanisms against a wide variety of insect pests. The growing use of entomopathogenic fungi as biocontrol agents is a response to critical challenges posed by conventional chemical interventions, including their detrimental impact on environmental health and the escalating issue of insecticide resistance.





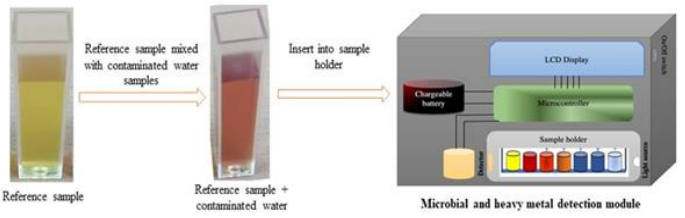
This innovation provides a sustainable and eco-friendly alternative to chemical interventions by combining the plant-growth-promoting benefits of endophytes with the pest-control efficacy of entomopathogenic fungi.

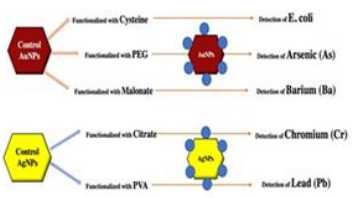
4.2 The **Ami Aqua Tester**, a cutting-edge device for **chromium detection in water**, developed by **Dr. V.K. Jain** and his team at **Amity Institute of Advanced Research and Studies (AIARS)**, was officially launched on **April 10, 2024**. Facilitated by **DST-Amity TEC**, the technology was successfully transferred to **M/s Glorisa Technovation Pvt. Ltd., Ghaziabad, on June 20, 2023**, ensuring its commercialization and impact. This milestone highlights the synergy between academia and industry in translating research into societal benefits.

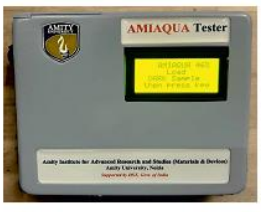
4.3 Some Advanced Technologies Available for Transfer:

- **Multi-Contaminant Water Quality Tester**

This device has been developed to revolutionize water quality assessment by detecting and quantifying seven key contaminants—Barium (Ba), Arsenic (As), Lead (Pb), Strontium (Sr), Iodine (I), Cesium (Cs), and Escherichia coli (E. coli)—along with Chromium in a





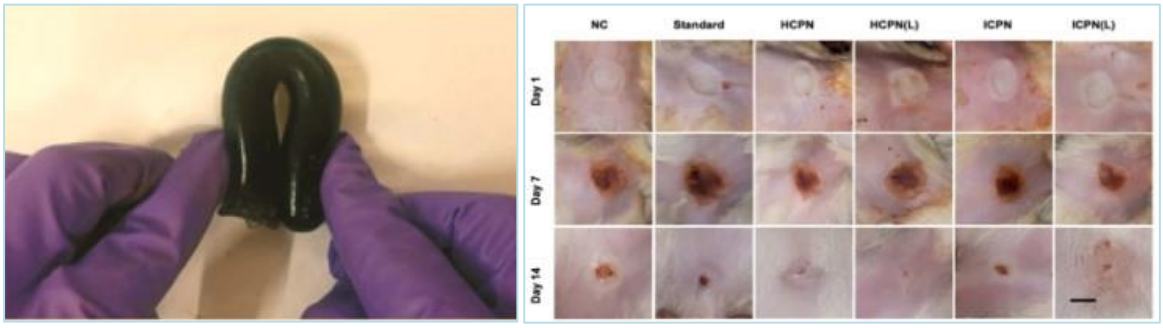


single, compact device. This innovative tester features a **nanomaterial-based sensing mechanism** for high-precision colorimetric detection, ensuring **comprehensive and simultaneous analysis** of multiple contaminants in real time. Designed with **user-friendly functionality**, it integrates LEDs and Light Dependent Resistors (LDRs) for efficient testing, displaying results in **ppm or ppb** on a digital screen. The device is **portable, lightweight, and powered by a rechargeable battery,** making it ideal for on-site applications. This device enhances environmental safety and empowers industries, regulatory bodies, and communities to proactively monitor and address water contamination challenges.

- **Novel method for establishing a tripartite interaction between the endophyte *Talaromyces purpureogenus HNB9* and two others incompatible entomopathogenic fungi.**

This novel method establishes a tripartite interaction between the endophyte *Talaromyces purpureogenus* HNB9 and two incompatible entomopathogenic fungi, *Metarhizium anisopliae* and *Beauveria bassiana*. Utilizing *T. purpureogenus* HNB9 or its culture filtrate, this innovation enables the formulation of a synergistic consortium that enhances plant defence against pests. By integrating plant-growth-promoting endophytes with biocontrol fungi, this approach offers a sustainable alternative to chemical pesticides, addressing environmental concerns and insecticide resistance. The increasing use of entomopathogenic fungi features the need for eco-friendly pest control strategies, making this technology a promising solution for sustainable agriculture.

- **N-doped Carbon Nano Sheet based hydrogel composite for wound healing**



A topical technology exhibiting excellent mechanical and thermal properties and can be tailored for expedited wound healing with the addition of

therapeutic agents into the hydrogel. The hydrogel's maximum swelling occurs at physiological pH 7.4, ensuring optimal performance in the body. Its stability in both acidic and basic environments further enhance its versatility. It promotes wound healing by forming a protective barrier against infection and stimulating cell growth and migration, leading to faster recovery. The technology is tested on rat model.

- **Graphene quantum dots-based hydrogel nanocomposites for site specific sustained drug release**

  The graphene Quantum dots-based hydrogel composite combines viscoelastic and super adsorbent properties, making it a suitable therapeutic agent carrier owing to its ability for pH sensitive delivery of a biologically active agent. It displays improved swelling and release characteristics. The quantum dots are fabricated from agro waste, making it highly biocompatible with 92%, 95% cell viability with DF1 and HEK293 cell line. The cell viability and compatibility are not compromised, rather increased, after the Quantum dot hydrogel composite formation. The above technology is tested on rat model. Further, as per the inventor, the above technology is also tested on rabbit model.

- **A Novel Nanolipoidal Delivery System for the treatment of Dermatitis**

  Dermatitis encompasses a spectrum of conditions characterized by cutaneous inflammation. Manifestations typically include pruritus, erythema, and the presence of a rash. The etiologies and precipitating factors vary significantly across different types of dermatitis.

  This technology facilitates the conversion of phytoconstituents into a novel nanolipoidal delivery system. The primary objective of this technology is to establish a novel, synergistic system that leverages the combined benefits of an edge activator and a natural oil. The edge activator imparts exceptional deformability to the system, while the natural oil enhances transdermal penetration. This invention pertains to the development of an innovative nanolipoidal system for the efficacious treatment of dermatological disorders. The present approach emphasizes the targeted delivery to skin layers through the incorporation of transfersomal formulations within a gel matrix for enhanced user-friendliness. This nanolipoidal system exhibits the capacity for prolonged drug delivery with specific targeting of inflamed and affected

regions. Consequentially, this technique significantly mitigates drug degradation, pre-systemic metabolism, and adverse systemic effects arising from drug accumulation in non-target organs.

- **A Seedling Bucket from Organic Wastes to Transport Plant Materials**

The seedling bucket is made from organic waste materials for transporting plant materials from nurseries to plantation sites. Organic waste materials such as cow dung, waste flowers, and banana pseudostems are used to prepare the seedling bucket. Waste flowers and neem tree leaves protect the bucket from various fungi.

A nutrient-rich medium for plants is prepared using aloe vera juice and agropeat treated with cow urine, without involving any major processing steps. The antibacterial properties of aloe vera protect plants from harmful pathogens while serving as a natural fertilizer, providing essential enzymes and hormones to the plants. The developed seedling bucket enhances the efficiency of plant transportation without causing damage and significantly reduces dependency on plastic bags for plant transportation.

- **Mosquito Repellent Paint Additive**

Mosquitoes are pervasive, highlighting the critical need for enhanced protection. Amity Institute of Nanotechnology, Noida has pioneered an innovative, highly efficient mosquito repellent solution. This groundbreaking product is derived from plants and meticulously engineered at the nano level to serve as a paint additive. Extensive testing, both in controlled laboratory environments and real-world scenarios, has demonstrated its remarkable effectiveness for repellence for over two years.

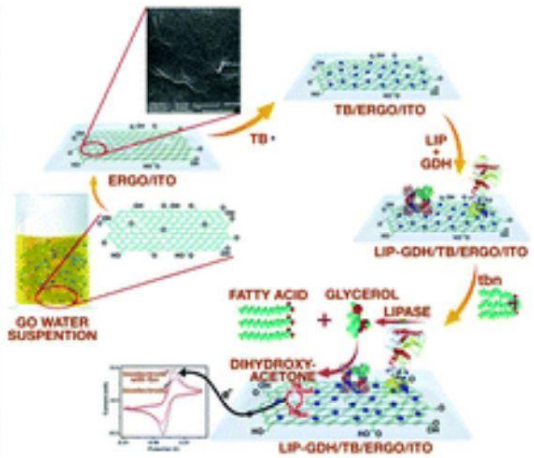
- **Bio-Pesticide Against Rice Blast**

Rice Blast disease, which destroys 10 to 35% of the global rice crop, demands our attention. Rice is extensively cultivated in India, and the rice blast disease tends to appear in areas with high humidity and low temperatures during nights.

A potential bio-pesticide for managing Rice Blast Fungus, Magnaporthe oryzae, was identified by Amity Institute of Biotechnology.

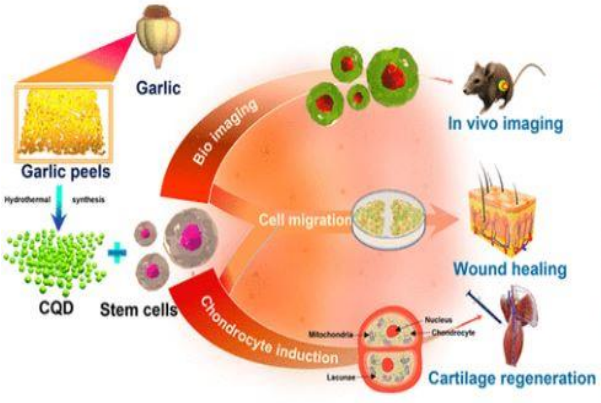
- **Triglyceride Sensor**

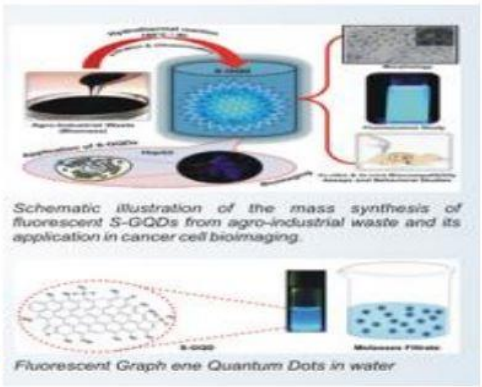
A novel electrochemically reduced graphene oxide (ERGO) platform was utilized to create a triglyceride (TG) biosensor. The sensor was developed by immobilizing lipase (LIP) and glycerol dehydrogenase. This innovative sensor developed by Amity Center for Nanomedicine has the capability to detect tributyrin within the concentration range of 50-400 mgdL^-1, displaying high sensitivity at 29 pA mg^-1dL when tested with human serum samples.



- **Novel Biogenic Carbon Quantum Dots**

Amity Institute of Click Chemistry Research & Studies has developed Biogenic Carbon Quantum Dots (BCQDs) which facilitate Stem cell





migration, imaging and simultaneously direct chondrogenesis for cartilage formation. These BCQDs are synthesized from biowaste using simple hydrothermal processes, offering cost-effective and eco-friendly production.

- **Biodegradable Edible Film**

The Amity Institute of Phytochemistry and Phytomedicine (AIPP) developed a biodegradable edible film for wrapping fruits to enhance shelf life.

- **Plant Growth Promoting Consortia**

Commercialized sample

Consortia of Talaromyces purpureogenus HNB9 and Bacillus subtilis promote plant growth and development, provide resistance against biotic stress, and enhance yields in diverse crops. This novel technology harnesses the power of beneficial fungi residing within the roots of plants to enhance nutrient uptake, improve plant growth, and mitigate environmental challenges. The holistic use of microbial consortia gives value addition to plants including biomass and nutritional content. Simultaneously, they also provide tolerance against biotic and abiotic stresses; show various PGPR (Plant Growth Promoting Rhizospheric microbes) properties like Phosphate, Zinc, Iron and Silica solubilization and auxin production, add to soil fertility.

Chapter - 5 CONSULTANCY PROJECTS & TRAINING PROGRAMMES

5.1 Expanding the Impact of Universities Beyond Academics

The success of a university is not solely measured by the academic achievements of its students; it also depends on its engagement with the community, industry, and society at large. By fostering partnerships and providing consultancy and training programs, universities extend their expertise beyond classrooms, contributing significantly to capacity building and national development.

5.2 Consultancy and Industry Engagement at Amity

Amity Universities have established strategic collaborations with various industries, offering consultancy services across multiple domains, including science, engineering, technology, business management, and research & development. Faculty members actively engage in industry-driven projects, providing innovative solutions and expert insights to tackle sector-specific challenges.

5.3 Achievements in Consultancy & Training

In 2024, Amity successfully executed over **400 consultancy projects and training programmes**, generating a revenue of approximately **₹17.88 crore**. These projects have supported numerous industries, government bodies, and research organizations, reinforcing Amity's role as a key contributor to policy development, technological advancements, and economic growth.

5.4 Key Consultancy Projects

Amity University has provided consultancy services to a wide range of organizations, including:

- **Corporate & Industrial Sector:** Sodhani Biotech Pvt. Ltd., Glorisa Technovation India Pvt. Ltd., CCFT Laboratories Pvt. Ltd., Agriland Biotech Ltd., APS Lifetech, Warkem Biotech Pvt. Ltd., Shree Biocare Solutions Pvt. Ltd., Medarmi Biophar Pvt. Ltd., Omaxe Limited, Delta Electronics India Pvt. Ltd., Kalpataru Projects International Ltd., Incedo Technology Solutions Ltd., Aerosol Filters Pvt. Ltd., Adamus University.

- **Government & Public Sector:** Ministry of Earth Sciences (MoES), and Ministry of Education, Uttar Pradesh Metro Rail Corporation Ltd. (UPMRC), Small Farmers Agribusiness Consortium, Property Research Trust, Caritas India, National Monuments Authority, Ministry of External Affairs, Ministry of Youth Affairs & Sports (GOI), National Commission for Women, Reserve Bank of India, Department of Science & Technology (DST), Central Pollution Control Board (CPCB),
- **Research & Academic Institutions:** Harish Chandra Research Institute, Rajiv Gandhi Centre for Biotechnology, National Institute of Plant Genome Research, Indian Council of Philosophical Research (ICPR), Haryana State Council for Science, Innovation & Technology, Chhattisgarh Grameen Aajeevika Samwardhan Samiti, Karnatak University Dharwad, National Institute of Animal Nutrition & Physiology.

5.5 Training & Capacity Building Initiatives

Amity University has conducted specialized training programs to enhance professional skills across diverse industries. These programs include workshops and seminars on **leadership, communication, project management, and emerging technologies**. The university has partnered with leading organizations such as:

- **Corporate & Industry Leaders:** Doceree Media India Pvt. Ltd., Merino Industries Ltd., Reliance Industries Ltd., Tata Motors Ltd., Wipro GE Healthcare, Uniphos Envirotronic Pvt. Ltd., Bharti Airtel Ltd., Wonder Home Finance, Celebal Technologies Pvt. Ltd.
- **Financial & Banking Sector:** HDFC Bank Ltd., Punjab & Sind Bank, India Post Payments Bank Ltd., IDFC First Bank, AU Small Finance Bank Ltd., Ujjivan Small Finance Bank Ltd.
- **Government & Public Sector:** Bharat Electronics Ltd., West Bengal State Rural Livelihoods Mission, Rural Livelihoods Division, Haryana Yog Ayog, Indian Council of World Affairs (ICWA), Indian Postal Services, Turnitin India Pvt. Ltd.
- **Educational & Research Institutions:** Post Graduate Institute of Media Education, Jaipur School of Business, Gurukul Foundation School, Lucknow Public Educational Society, Baba Educational Society, The Institute of Chartered Accountants of India.

5.6 Commitment to Excellence

Through its extensive consultancy and training programs, Amity University continues to bridge the gap between academia and industry, fostering innovation, enhancing workforce skills, and contributing to national and global progress. By engaging with leading organizations and government agencies, Amity remains dedicated to shaping a future-ready society empowered with knowledge, expertise, and technological advancements.

5.7 GLIMPSE OF SOME TRAINING PROGRAMMES HELD DURING 2024

Workshop on "Radiation Detection Systems for Safety, Security and Societal Applications" at Amity University Noida

Three-day Training Workshop for Indian Forest Service (IFS) officers at Amity University Noida

Training Programme on "Auto Electrical & Electronics" for TATA Motors employees, at Amity University Noida

Five-day hands-on-training Programme on "Tools and Techniques of Water Quality Monitoring, Sampling, Analysis, and Quality Assurance" at Amity University Noida

Workshop on Science, research, and innovation protection supported by DST-PURSE at Amity University Rajasthan

My Bharat and Digital Literacy-Master the Trainers in collaboration with the Ministry of Youth Affairs and Sports, Govt of India at Amity University Haryana

Workshop cum Training Programme on "Policies and Practices for Managing Climate-Induced Disaster for Sustainable Future" sponsored by Ministry of Earth Sciences at Amity University Noida

Amity University Noida in collaboration with Navbharat Times organized a "Cyber Security Awareness Workshop' under "NBT Cyber Suraksha Kavach Abhiyan

Amity Humanity Foundation, in collaboration with Indraprastha Gas Limited (IGL), organizes ASMO Training Program, for empowering Underprivileged Sections of the society

Amity University Noida in collaboration with International Bar Association Young Lawyers Committee organized Training Programme on "Fundamentals of International Legal Business Practice"

Chapter - 6 AWARDS & FELLOWSHIPS

6.1 Introduction

Awards and fellowships play a pivotal role in faculty and student development, serving as third-party endorsements of their academic and research excellence and thereby providing necessary impetus to their existing motivation to excel better. These recognitions significantly contribute to career advancement and enhance the institutional reputation of Amity University.

Amity University actively encourages faculty, researchers, and students to participate in national and international forums for research, innovation, and academia, ensuring that their contributions receive well-deserved recognition.

6.2 Institutional Awards

Amity University was honored with several prestigious institutional awards in 2024. A glimpse of some such prestigious awards is shown below:

Amity University was bestowed with the Excellence in Globalisation of Education" Award at the FICCI Higher Education Excellence Awards 2024

Amity University was conferred with the "Best University for Strong IP Ecosystem Award" during ASSOCHAM 4th IP Excellence Awards and Global Conclave, on the theme, "Innovative Bharat: India's IP Ecosystem Paving the Future".

C

'Best Patent Portfolio' award at the 10th CII Industrial IP Awards 2024

SIDM (Society of Indian Defence Manufacturers) Champion Award 2024 in Category: Development of Technology/Product Innovation to address Defence Capability Gaps

Amity University Madhya Pradesh conferred title of "Institution of Happiness- 2024" by QS I-Gauge

Amity University Maharashtra, Mumbai was bestowed with the "Award for Academic Excellence" & ranked top among the prestigious educational brands of 2024-25. The award was presented by Prof. T.G. Sitharam, Chairman, AICTE.

6.3 In 2024, over **200 prestigious awards, fellowships, and travel grants** were conferred upon faculty members of the Amity Education Group, recognizing their outstanding contributions to research.

6.4 Some notable awards received by our faculty members in 2024 include:

- **AWARDS:-**

➢ **National**

- **Dr. Rajendra Prasad** – Ranked #2 in India for Biology and Biochemistry Leader Award 2024 (Research.com)
- **Dr. Indu Shekhar Thakur** – Lifetime Achievement Award (Biotech Research Society, India)
- **Dr. Smita Sahu** – Recognized as one of the Top 3 IP Educators of the Year (IP Leadership Awards & Summit 2024)
- **Dr. Monalisa Mukherjee** – Padma Vibhushan Dr. A.R. Kidwai Memorial Oration Award (Institute of Nano Medical Sciences, University of Delhi)
- **Dr. Deepak Ganjewala** – Distinguished Scientist Award 2024 (Society for Plant Research, India)
- **Dr. Sumit Narula** – IRE Excellence Award 2024 (All India IRE Conference & Awards)
- **Dr. PCS Devara** – World Class Scientist Award (World Class Educators Honors-24, Noida)
- **Dr. Kamlesh Kumar Singh** – Best Emerging Branch Award to IEEE Amity University UP (IEEE UP Section)
- **Dr. Vikas Madhukar** – Educator Excellence in Higher Education Award (Education Leaders Conclave & Awards 2024)
- **Dr. K. Muthuvel** – Dr. Sarvepalli Radhakrishnan Best Faculty Award 2023 in French
- **Dr. Sanjna Vij** – National Green Practices Promoting and Development Award (Indian Institute of Ecology & Environment, New Delhi)
- **Dr. Seema Garg & Dr. Sumit Kaur Bhatia** – World Class Women Engineering Faculty Award (Rethink India)

International

- **Dr. Madhumita P. Ghosh** – Women Researcher Award (International Research Award on Neurology & Neuro Disorders, Germany)
- **Dr. Renjith V. R. & Dr. Shagnik Das** – National Coordinators for the Citizen of the Ocean Youth-led Forum at UN Ocean Conference 2025 (Nausicaa, France)
- **Dr. Alka Lohani** – Best Dream Project Award (Neuroscience School Nepal 2024, funded by IBRO)

- **Dr. Manish Dwivedi** – EMBO Travel Award (European Molecular Biology Organization, Heidelberg, Germany)

- **FELLOWSHIPS**

➢ **National**

- **Dr. Arindam Pramanik & Dr. Navneet Sharma** – INSA Visiting Scientist Fellowship (Indian National Science Academy)
- **Dr. Shashank Kamble** – SERB Fellowship (Science and Engineering Research Board)
- **Dr. Ujjaini Dasgupta** – SERB-POWER Fellowship (Science and Engineering Research Board)
- **Dr. Manali Datta** – Tata Innovation Fellowship (Department of Biotechnology, Govt. of India)
- **Dr. Monika Kamboj** – IASc-INSA-NASI Summer Research Fellowship (Indian Academy of Sciences, Indian National Science Academy, and National Academy of Sciences, India)
- **Dr. Monika Kamboj** – Science Academies Summer Research Fellowship Program for Students and Teachers 2024 (Indian Academy of Sciences)
- **Dr. Suchinder Sharma** – Travel Grant (French Institute in India, Embassy of France)
- **Dr. Diksha Rana** – Travel Grant (SERB International Travel Support (ITS) Scheme)

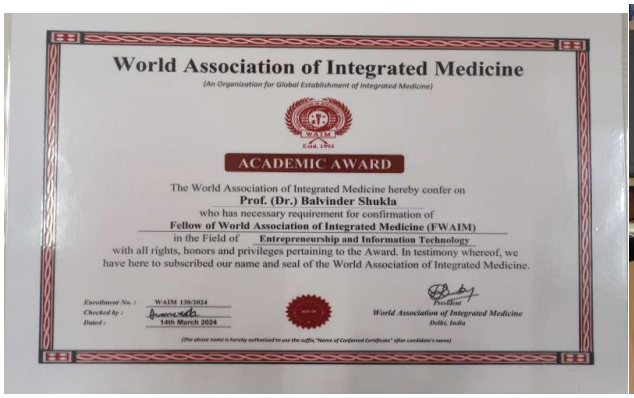
International

- **Dr. Seema Bhatnagar** – Adjunct Research Scholar Fellowship (Luddy School of Informatics, Computing, and Engineering, Indiana University)
- **Dr. Seema Bhatnagar** – UICC Yamagiwa-Yoshida Memorial International Cancer Study Grant, Union for International Cancer Control, Switzerland
- **Dr. Rachna Mehta & Dr. Kalpana Chaswal** – IBRO Speaker Fellowship (International Brain Research Organization)
- **Dr. Hridayesh Prakash** – IGSTC-SING Grant Fellowship (Indo-German Science and Technology Centre)
- **Dr. Devlina Pramanik** – Travel Grant Fellowship (University of Kanazawa)
- **Dr. Alka Lohani** – Travel Grant Fellowship (International Brain Research Organization)
- **Dr. Archana Tiwari** – Visiting Professor Fellowship (CAPES-PrInt-UFPR Fellowship)
- **Dr. Swati Sharma** – International Travel Grant Fellowship (Science and Engineering Research Board, Govt. of India)

- **Dr. A. Bhoomadevi** – Fellowship (International Society for Quality in Health Care)
- **Dr. Atanu Banerjee** – ASM Future Leaders Mentorship Fellowship (International Fellowship)
- **Dr. Hardial Singh** – International Fellowship (Monash University)
- **Dr. Malabika Ghosh** – NSTC International Internship Pilot Program (IIPP) Fellowship (National Science and Technology Council, Taiwan)
- **Dr. Threws Fellowship** – Strengthen Educational Welfare Society
- **Dr. Manish Kumar** – Travel Bursary Award (University of Birmingham, UK)
- **Dr. Aditya K. Shukla** – Travel Grant (United World School of Liberal Arts and Mass Communication, Karnavati University, Gandhinagar)
- **Dr. Deep Chakraborty** – Early Career Training Grant (Health Effects Institute, USA)
- **Dr. Anil K. Sharma** – Fellow of the Royal Society of Biology (Royal Society of Biology)
- **Dr. Anil K. Sharma** – Fellow of the Royal Society of Chemistry (Royal Society of Chemistry)
- **Dr. Jyotisankar Ray** – Fellowship (West Bengal Academy of Science and Technology)
- **Dr. Aditi Singh** – Travel Award (International Conference of Medicinal Chemistry and Drug Design, Sofia, Bulgaria)

Dr. Ashok K Chauhan, Founder President bestowed with "Lifetime Achievement Award" at the Defence Conclave 2024, organized by the Economic Times-Government

Dr. W. Selvamurthy presented with Yoga Ratna Award 2024


World Association of Integrated Medicine
(An Organization for Global Establishment of Integrated Medicine)
ACADEMIC AWARD
The World Association of Integrated Medicine hereby confer on
Prof. (Dr.) Balvinder Shukla
who has necessary requirement for confirmation of
Fellow of World Association of Integrated Medicine (FWAIM)
in the Field of Entrepreneurship and Information Technology
with all rights, honors and privileges pertaining to the Award. In testimony whereof, we have here to subscribed our name and seal of the World Association of Integrated Medicine.
Enrollment No. : WAIM 130/2024
Checked by :
Dated : 14th March 2024
World Association of Integrated Medicine
Delhi, India

Dr. Balvinder Shukla being bestowed with the fellow of World Association of Integrated Medicine

Dr. Smita Sahu

Winner in the 2nd IP Leadership Awards 2024 by ASSOCHAM

Dr. Seema Bhatnagar

Yamagiwa-Yoshida Memorial International Cancer Study Grant Award

Dr. Ranu Nayak

Short Research Trip to France (SRTF) by The French Institute in India

Dr. Shagnika Das

Visiting lecturer at the Laboratory of Oceanology and Geosciences (LOG), CNRS, University of Lille, France

Dr. Mallika Chatterjee

Fulbright-Nehru Academic and Professional Excellence Fellowship Award

Prof Hridayesh Prakash

Bilateral Indo-German Science & Technology Centre- SING Grant

Dr. Monika Kamboj

INSA-IASc-NASI Summer Research Fellowship

Dr. Archana Tiwari

Visiting Professor at Bioprocess Engineering Department, Universidade Federal do Paraná (UFPR), Brazil

Dr. Arindam Modak

INSA Visiting Scientist Award

Dr. Navneet Sharma

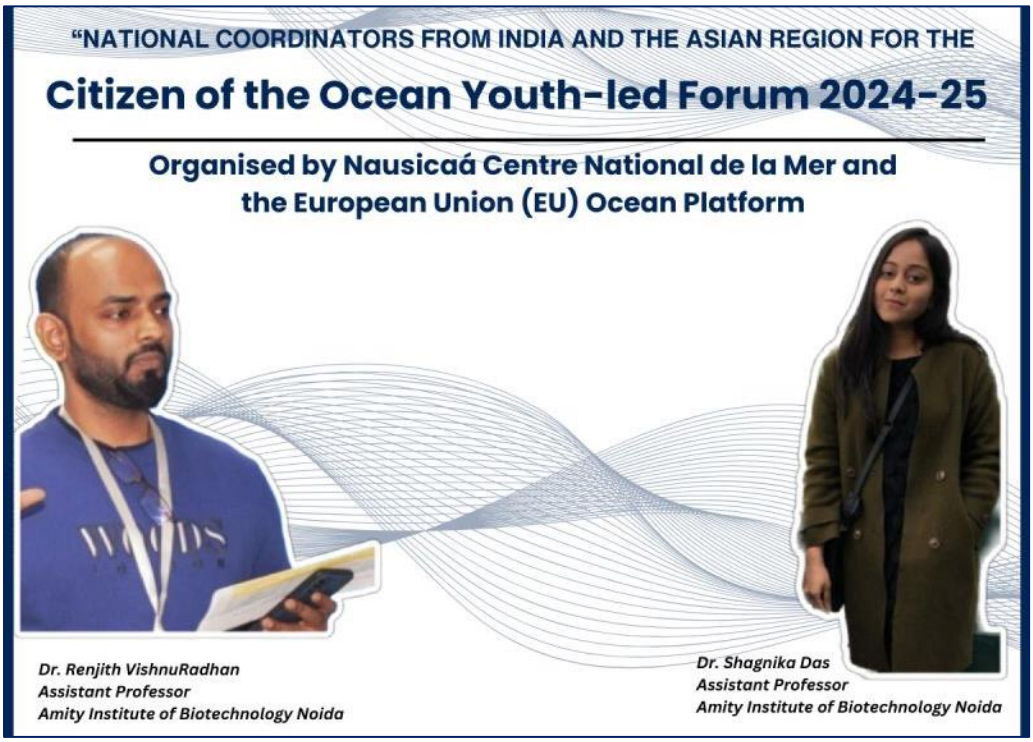
INSA Visiting Scientist Award

Dr. Shinjinee Dasgupta

DBT Wellcome Trust Early Career Fellowship

Dr. Manali Datta

TATA Innovation Fellowship Award



6.5 Forty- Six Amity University faculty members have been featured in the top 2% of global researchers from India, as per Stanford University's 2024 list.

6.6 Amity University students also excelled in 2024, securing **100+ awards and fellowships** for research excellence. Notable recognitions include:

- *France Excellence Charpak Master Scholarship 2024*
- Khorana Scholar 2024
- Science Academies Summer Research Fellowship Program for Students and Teachers 2024.
- Chhattisgarh Young Scientist Award 2024
- EMBO Scientific Exchange Grant
- NSTC International Internship
- MEXT Govt. fellowship
- SERB International Travel Support (ITS) Scheme
- Fellowship for Training of Young Scientist, MPCST

Ms. Ria Dey's, innovative project "Aquarius" has been awarded a grant from AICTE & MINISTRY OF EDUCATION, GOVERNMENT OF INDIA's Innovation Cell during YUKTI Innovation Challenge

Amity Institute of Biotechnology student researchers under the guidance of Dr. Alok K. Singh secured a Grant for Innovation under E-Yuva Scheme funded by BIRAC

Students Team of Amity Noida received 1st position at the Hackaccino 24-hour National-Level Hackathon for their project 'BhasaBuddy.'

Amity University remains committed to fostering a culture of excellence, encouraging both faculty and students to achieve global recognition for their contributions to academia and research

6.7 RAMALINGASWAMI, RAMANUJAN & DST-INSPIRE FELLOWS 2024

Several distinguished researchers who have been awarded prestigious fellowships, such as the Ramalingaswami Re-entry Fellowship, Ramanujan Fellowship, DST-INSPIRE Faculty Fellowship, and others, have been associated with Amity University in recent years. Currently, the total number of such fellows across Amity University campuses is as follows:

Type of Fellowship	Total
Ramalingaswami Fellow	18
DST Inspire Faculty Fellow	5
Ramanujan Fellow	10
SERB SRS Fellow	1
DBT Wellcome Trust Fellow	1
Women Scientist (ICMR, DST)	2
DBT-BioCARe Women Scientist Fellowship	1
Total	38

Among these, 22 fellows are currently active, while 16 have completed their tenure and have been successfully absorbed into faculty positions within Amity University

DBT - Ramalingaswami re-entry Fellows


Dr. Adhiraj Roy


Dr. Subrata Pore


Dr. Jayasha Shandilya


Dr. Veerendra Kumar


Dr. Ankan Dutta Chowdhury


Dr. Manoranjan Nayak


Dr Amrita Pathak


Dr Souvik Ghatak


Dr Bhuvana Kamath Shanbhag


Dr. Amit Kumar Sharma


Dr. Amanpreet Kaur


Dr. Amit Ranjan Maity

Ramanujan Fellows


Dr. Harishchandra Singh


Dr. Uttam Gupta


Dr. Anwesha Bhattacharyya


Dr. Sneha Gokani


Dr. Suman Majumdar


Dr. Sushant Prabhakar Sahu Majumder


Dr Milan Bera


Dr Manoj Kumar Kalra


Dr Rakesh Bhatia

Chapter - 7 COLLABORATION

7.1 Expanding Global and National Partnerships: Strengthening Academic and Research Excellence

- Collaborations through Memoranda of Understanding (MoUs) are instrumental in fostering academic, research, and institutional growth. These agreements serve as vital bridge between industries, academia, and government agencies, enhancing knowledge exchange, innovation, and technological advancements.

- At Amity University, partnerships with national and international organizations enable a culture of lifelong learning and global engagement across the academic community.

- **Key Areas of Collaboration:**
  - ✓ Joint Research Projects
  - ✓ Co-authored Publications
  - ✓ Intellectual Property Creation
  - ✓ Product & Technology Development
  - ✓ Joint Ph.D. Programs
  - ✓ Student Exchanges
  - ✓ Dissertations & Research Projects
  - ✓ Adjunct & Honorary Professorships
  - ✓ Faculty Visits & Knowledge Sharing
  - ✓ International Conferences, Seminars & Workshops

- **Collaboration Milestones in 2024**

In 2024, Amity University signed 157 MoUs, reinforcing its commitment to global knowledge-sharing and innovation. This includes **116 National and 41 International MoUs envisaged with the aim of** strengthening academia-industry partnerships and expanding global engagement with leading universities and research institutions worldwide.

- **International Collaborations**

Amity's global footprint spans across leading institutions worldwide, enabling cross-border knowledge exchange and research synergies. Some of our esteemed international partners include:

➢ **Asia & Pacific:**

- ✓ National Chung Cheng University, Taiwan
- ✓ Taylor's University, Malaysia
- ✓ Hiroshima University, Japan
- ✓ Pukyong National University, South Korea
- ✓ School of Computing & Information Technology, Eastern International University, Vietnam

➢ **Europe:**

- ✓ University of York, UK
- ✓ Nottingham Trent University, UK
- ✓ Loughborough University, UK
- ✓ International Hellenic University, Greece
- ✓ Tomsk State University, Russia

➢ **Americas & Africa:**

- ✓ IEEE, USA
- ✓ Temple University, USA
- ✓ University of Buenos Aires, Argentina
- ✓ University of Pretoria, South Africa
- ✓ Colorado State University, USA

MoU signing with **Pukyong University, South Korea**

MoU with **University of York, UK**


MOU signing between Amity Centre for BRICS Studies and **TV BRICS,** MOU signing with Ibaraki Prefecture, Japan

MOU signing with **Colorado State University, USA**

- **National Collaborations**

Amity University has partnered with leading Indian research institutions, industries, and government agencies to drive innovation and societal impact. Some key national collaborations include:

➢ **Research & Government Agencies:**

- ✓ Council of Scientific & Industrial Research (CSIR), Delhi
- ✓ Central Council for Research in Unani Medicine (CCRUM)
- ✓ Naval Material Research Laboratory (NMRL), DRDO, Ministry of Defence
- ✓ All India Institute of Medical Sciences (AIIMS), Deoghar, Jharkhand
- ✓ Indian Institute of Information Technology (IIIT), Ministry of Education, Govt. of India
- ✓ Pharmacopoeia Commission for Indian Medicine and Homoeopathy (PCIM&H), Ghaziabad (Ministry of Ayush, Govt. of India)

➢ **Industry & Corporate Collaborations:**

- ✓ Tata Community Initiatives Trust
- ✓ Amulya Herbs
- ✓ Infosys
- ✓ Pidilite Industries Limited

- ✓ Wipro Technologies
- ✓ Oppo Mobiles India Pvt. Ltd

➢ **Healthcare & Social Impact:**

- ✓ Apollo Spectra Hospitals
- ✓ Indian Spinal Injuries Centre, Delhi
- ✓ Mahaveer Cancer Sansthan & Research Centre, Patna
- ✓ Ethos Foundation

➢ **Skill Development & Education:**

- ✓ NASSCOM
- ✓ Rubicon Skills Development (Barclays CSR Project)
- ✓ Entrepreneurship Development Institute of India
- ✓ The Institute of Chartered Accountants of India (ICAI)
- ✓ Strategic Electronics Division Pvt Ltd

MoU with **Women and Child Safety Cell Gautam Buddh Nagar**

MoU (renewal) with **Central Council for Research in Unani Medicine (CCRUM)**

MoU signing with ***Merck Life Science***

MoU signing with ***Wipro Technologies Ltd.***

MoU signing (renewal) with ***All India Institute of Ayurveda***

MoU signing (renewal) with ***Indian Council of Agricultural Research***

MoU signing with ***India Convention Promotion Bureau (Ministry of Tourism, Govt. of India)***

MoU signing with ***Pharmacopoeia Commission for Indian Medicine & Homoeopathy (PCIM&H), Ministry of AYUSH***

Amity University remains committed to expanding its collaborative ecosystem, strengthening its research capabilities, and driving academic excellence on a global scale. These partnerships continue to accelerate breakthrough innovations, cutting-edge research, and transformational learning experiences for students and faculty.

A brief of the outcome of some of the MoUs are shared below: -

NATIONAL

1. **ICAR Collaboration with Amity University**

- 36 research scholars from ICAR have joined Amity University for Ph.D. programs under the co-supervision of ICAR scientists, receiving fee concessions as per the MoU.
- ICAR has sanctioned six research projects to Amity University, Noida.

- Collaboration between ICAR scientists and Amity researchers has resulted in 352 joint research papers in reputed scientific journals.
- Amity University Chhattisgarh has partnered with the National Institute of Biotic Stress Management-ICAR, Raipur, since June 2020 for PG student training and research.
- Amity University Rajasthan has active collaborations with ICAR-Indian Institute of Wheat and Barley Research, Karnal (Haryana) since 2019, and Sri Karan Narendra Agriculture University, Jobner (Jaipur), Rajasthan, since 2020.
- Scientists from ICAR are **Departmental Research Committee (DRC) Members at Amity University**
- Amity University has filed four joint patents with ICAR.
- 22 external co-guides from ICAR are mentoring Amity Ph.D. scholars.
- Amity researchers and ICAR scientists have actively participated in conferences, workshops, and symposiums.
- Ph.D. students from Amity Institutes, including Biotechnology, Virology, and Agriculture, have utilized ICAR laboratory facilities such as the Plant Virology Lab at IARI, New Delhi.
- PG students from Amity Institutes, including Biotechnology, Organic Agriculture, Microbial Technology, and Food Technology, have undertaken research internships at ICAR institutes.

Key Conferences and Events

- **National Conference on Agricultural Sustainability** – Amity University Chhattisgarh, in collaboration with ICAR-National Institute of Biotic Stress Management, Raipur, and ICAR-National Institute of Abiotic Stress Management, Baramati, Maharashtra, is organizing a national conference on "Novel Strategies for Mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability" on 28-29 February 2024.
- **Academic Engagements** – Amity University has hosted key ICAR scientists as keynote speakers from premier institutes, including the Indian Institute of Sugarcane Research, UP Council of Agricultural Research, and National Bureau of Fish Genetic Resources, Lucknow.

2. **CSIR Collaboration**

- **Publications**: 443 joint research papers in Biochemistry, Material Sciences, Environmental Sciences, Medicine, Immunology, and Agriculture.
- **Ongoing Research Projects**: 6 joint research projects
- **Sanctioned Projects**: 13 projects worth Rs. 291+ lakhs sanctioned by CSIR.
- **Intellectual Property**: 2 joint patents filed, 3 patents granted.
- **Student Engagements**:
  - 23+ Amity students completed internships and dissertations at CSIR labs.
  - 30+ Ph.D. scholars have CSIR scientists as co-guides.
- **Joint Initiatives**:
  - 3 Joint Workshops/Symposiums organized.
  - The **Amity-CSIR Joint International Conference on Millet Fusion** to be held in January 2025.

3. **CCRUM Collaboration with Amity University**

- **Publications**: 10 joint publications with CCRUM scientists.
- **Research Grants**: 4 research projects sanctioned under CCRUM.
- Prof. (Dr.) Asim Ali Khan, former Director General, CCRUM, completed his Ph.D. at Amity University on Unani medicine utilization.
- Amity is in discussion with hospitals for **mega clinical trial on Dawa-ul-Kurkum for liver cancer treatment.**

4. **Merck Life Sciences**

- **Amity-Merck Certificate Program**: Advanced training in biological sciences, focusing on techniques and instrumentation.

5. **SAS India at Amity University Rajasthan**

- Integration of SAS analytics software in MBA (Business Analytics), MCA, and MSc (Data Science & AI) programs.
- **Key Outcomes**:
  - 5,000+ students trained in analytics tools.
  - 30% increase in placements in analytics-based roles.
  - Certification programs enhanced employability.
  - SAS-aligned projects led to internships at SAS India.

6. Collaboration with HCL Tech through Amity University Online

- **Specialized Courses Introduced**:
  - MCA: Cybersecurity, Software Engineering
  - BCA: Data Engineering, Software Engineering
  - BBA: Data Analytics
- **Key Outcomes**:
  - 3,000+ students enrolled in 2024.
  - 60%+ students secured internships/jobs via HCL Tech's Career Shaper platform.
  - Enhanced industry-readiness through real-world projects.

INTERNATIONAL

1. Colorado State University, USA

- **Participation in Amity US Conference:** Dr. Stene Verhulst, Director of the International Enrollment Center, participated in the Amity US Conference held at the Fairleigh Dickinson University (FDU) campus on 13 May 2024.

2. Nottingham Trent University, UK

- 10 students and 1 faculty member participated in the India Immersion Program from 27 July to 9 August 2024.
- One faculty from Amity International Business School (AIBS) visited NTU for the Global Responsibility Week at Nottingham Business School from 18-21 March 2024.

4. School of Computing & Information Technology, Eastern International University, Vietnam

- **Participation in Confluence 2024:** Dr. Narayan C. Debnath, Dean, School of Computing & Information Technology, participated in Confluence 2024, organized by the Amity School of Engineering and Technology (ASET).

5. University of York, UK

- **Joint Research Project:** AIBS and the University of York are jointly working on a UKIERI project titled "Advancing Healthcare through Predictive Analytics: A Machine Learning Approach 2024-26."

- **Conference & Thought Leadership Participation:**

✓ Prof. Charlie Jeffery, Vice Chancellor and President, virtually participated in the GCMH Conference held in France on 21 May 2024.

✓ Prof. Kiran Trehan participated in the GCMH Conference in France on 21 May 2024 and virtually attended INBUSH 2024.

6. University of Buenos Aires, Argentina

- **Indo-Argentina Webinar Series:**Initiated by AFAF, the first webinar was held on 21 May 2024.
- Speakers included Dr. Nutan Kaushik and Dr. Sumita Shukla from Amity University and Prof. Gerardo Rubio and Jorge Zavala from the University of Buenos Aires.

7. Fairleigh Dickinson University, USA

- **Participation in Amity US Conference:** Dr. James Almeida, Dean of Silberman College of Business, participated online in the US Conference held at FDU campus on 13 May 2024.

8. George Brown College, Canada

- **Participation in Amity US Conference:** David Begg, Associate Vice President for Global Partnerships, participated in the Amity US Conference held at the FDU campus on 13 May 2024.

9. Stuart School of Business, Illinois Institute of Technology, USA

- **Participation in Amity US Conference:** Prof. Mallik Sundharam, Vice President at Illinois Institute of Technology, participated in the US Conference held at FDU campus on 13 May 2024.

10. American University, USA

- **Participation in Amity US Conference:** Dr. Tashina Giraud, Director of International Partnerships and Strategic Initiatives, participated in the US Conference held at the FDU campus on 13 May 2024.

6.2 CONFERENCE/WEBINARS/ VISITS

Amity University, with its commitment to academic excellence and research innovation, has been at the forefront of knowledge dissemination and intellectual engagement. In 2024, Amity organized an extensive array of conferences, webinars, and institutional visits, fostering collaboration, idea exchange, and professional development.

Key Highlights

- **1000+ Webinars and Expert Lectures featuring global thought leaders and industry experts.**
- **200+ Conferences, Seminars, Workshops, and Faculty Development Programs (FDPs) across diverse disciplines.**
- **Distinguished Visits by renowned academicians, industry professionals, and policymakers.**
- **Collaborations with leading global institutions and research organizations.**

- **Webinars & Expert Lectures: Igniting Research Acumen & Knowledge Sharing**

Amity University hosted over 1000 webinars and expert lectures throughout 2024, covering a broad spectrum of disciplines. These sessions provided a platform for faculty members, researchers, and students to stay updated with the latest advancements in their respective fields.

Notable Webinars & Lecture Series

- ✓ AI and Emerging Technologies: A deep dive into the role of AI in sustainable development.
- ✓ Climate Change & Healthcare: Discussion on proactive solutions for climate-related health challenges.
- ✓ Intellectual Property Rights & Innovation: Insights from global legal experts on patenting and IP strategies.
- ✓ Space Science & Defence Technology: Contributions of academia towards Aatmanirbhar Bharat in defence and aerospace sectors.
- ✓ Traditional Medicine & Integrative Healthcare: Unani Medicine and its future in modern healthcare.

Impact:

- ✓ Engaged 50,000+ participants including faculty, students, and professionals.
- ✓ Enhanced interdisciplinary knowledge exchange.
- ✓ Strengthened industry-academia collaboration.

- **Conferences, Seminars, and Workshops: Promoting Research & Technological Advancements**

Amity University organized over 200 international and national conferences, workshops, and faculty development programs (FDPs), attracting eminent speakers and researchers from around the world.

Glimpse of Conferences Conducted

- ✓ International Conference on AI-Powered Technology Integration for Sustainability (AI-PTIS-2024)
- ✓ 4th Biennial International Conference on Future Learning Aspects of Mechanical Engineering (FLAME-2024)
- ✓ Unani Day 2024: Innovations in Unani Medicine for Integrative Health Solutions
- ✓ Defence Conclave 2024: Technology Absorption in the Indian Army
- ✓ Amity International Conference on Renewable Energy & Hydrogen Technologies

Glimpse of Workshops & FDPs

- ✓ Advanced Data Analytics & AI for Research Excellence
- ✓ Cybersecurity & Ethical Hacking
- ✓ Sustainable Practices in Biotechnology
- ✓ Translational Research in Healthcare & Pharma

Outcomes:

- ✓ Encouraged interdisciplinary research collaborations.
- ✓ Empowered faculty and students with cutting-edge knowledge.
- ✓ Strengthened partnerships with global academic and research institutions.

- **Distinguished Visits & Collaborations: Fostering International & Industry Collaborations**

Amity University regularly invites distinguished personalities from academia, industry, and government to foster cross-disciplinary learning and collaborations.

Key Visits in 2024

- ✓ ISRO & DRDO Scientists: Discussions on India's advancements in space and defense technologies.
- ✓ Global Academic Leaders: Delegations from Harvard, MIT, and Oxford visited Amity for research collaborations.
- ✓ Industry Experts from Fortune 500 Companies: Engaging with students and faculty on industry trends and job market readiness.
- ✓ Policy Makers & Government Officials: Engaged in roundtable discussions on India's education and research policy.

"ISRO-Amity Joint Workshop" at Amity University Bengaluru on 15th May 2024. The event was graced with benign presence of Dr. Somanath S, Secretary, Department of Space and Chairman, Space Commission. The program was also joined by senior scientists from ISRO - Indian Space Research Organization and distinguished faculties of Amity Universities.

Amity University Uttar Pradesh, Noida hosted the momentous Bhartiya Raksha Vimarsha (Indian Defence Dialogue) in collaboration with Bharat Forge Ltd

In 2024, Amity University successfully reinforced its reputation as a global knowledge hub by hosting numerous high-impact events. Moving forward, Amity aims to:

- Expand its global academic and industry collaborations.
- Increase the number of interdisciplinary research forums.
- Foster greater industry participation in academic events.
- Enhance digital engagement through hybrid and virtual conferences.

Boot Camp on the Start-up Ecosystem

Guest Lecture on Innovation and Inspiration for a Better Tomorrow

63rd National Pharmacy Week Celebration

Symposium on "Advancing Evidence - Based Practices family Strengthening and Alternative Care"

Workshop-cum-Seminar on New Criminal Laws

"Bharat Startup Festival (Noida Edition)"

Workshop on "Entrepreneurship and Innovations for Career Opportunities"

Workshop on "Radiation Detection Systems for Safety, Security and Societal Applications"

International Conference on Ecotoxicology and Environmental Sciences (ICEES-2024)

Conference on "NexGen Jurisprudence: AI Governance and the Evolving Legal Landscape"

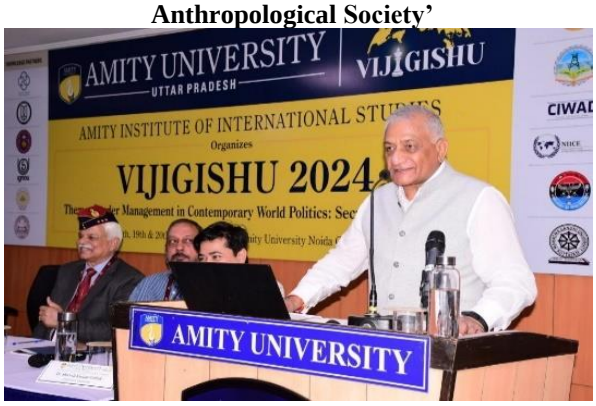
Conference on "Global Sustainability Summit for a Secure Future"

International Workshop on Digital Twin Technology (IWDTT-2024) in collaboration with Digital Twin Consortium and Open Health System Laboratory, USA

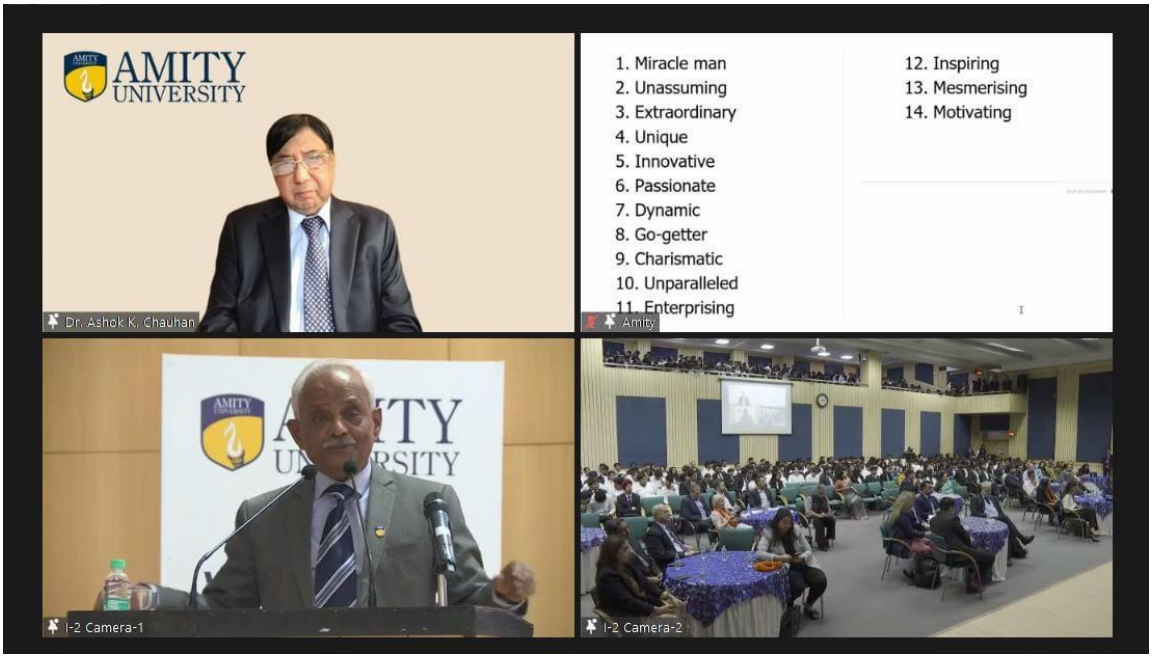
6th International Conference on Entrepreneurship, Innovation and Leadership (ICEIL-2024)

54th Annual Conference of 'Indian Anthropological Society'

International Conference "VIJIGISHU-2024" on the theme, "Border Management in Contemporary World Politics: Security and Beyond"



9th Global Leadership Research Conference (GLRC-2024)



24th INBUSH ERA World 2024 Conference

11th International Conference on Reliability, Infocom Technologies and Optimization (ICRITO'2024)

11th International Conference on Signal Processing and Integrated Networks (SPIN-2024)

4th International Conference on Information Technology (InCITe)

NCIIPC-AICTE Pentathon 2024

BIOPHARMA & HEALTHCARE CONCLAVE 2024

7.3 HONORARY DOCTORATES/PROFESSORS

- Amity University has a longstanding tradition of honouring individuals who have made significant contributions to their respective fields by conferring honorary doctorates and professorships. This practice underscores the university's commitment to academic excellence and the advancement of knowledge.
- The recipients of these honorary titles bring a wealth of experience, expertise, and influence to the university community. Their association enhances the institution's prestige, fosters collaboration, and positions Amity University as a leader in academic and research endeavours. Moreover, these awards serve as a source of inspiration for students, faculty, and staff, opening avenues for valuable connections and partnerships within the broader academic and professional communities.
- So far, Amity University has conferred a total of 239 Honorary Doctorate degrees upon distinguished individuals who have made significant contributions at the national and international levels through their outstanding research, academic achievements, and leadership. Notably, 23 of these prestigious honours were awarded in 2024.
- Additionally, in 2024, the university recognized 36 eminent Scientists, Industrialists, and Technocrats with Honorary Professorships, bringing the total number of Honorary Professors to 399.

Dr. Sangita Reddy, Joint Managing Director of Apollo Hospitals Enterprise Ltd. receiving the Honorary Doctorate from Founder President Dr. Ashok K Chauhan, Dr. Atul Chauhan, Chancellor AUUP, Dr. Aseem Chauhan, Chancellor, AUH and Dr. Balvinder Shukla, Vice-Chancellor, AUUP at Amity University Noida

HONORARY DOCTORATES AWARDED IN 2024

S. No.	Name	Designation/ Position/ Organisation/ University at the time of Award	Awarded on
AMITY UNIVERSITY UTTAR PRADESH			
1	Dr. Ajit Kumar Mohanty	Chairman, Atomic Engergy Commission, Secretary, Department of Atomic Energy, Govt. of India	30-11-2024
2	Dr. Sangita Reddy	Jt. Managing Director, Apollo Hospitals Enterprise Ltd.	30-11-2024
Amity University Haryana			
3	Prof. Govindan Rangarajan	Director of Indian Institute of Science	03-02-2024
4	Shri. Kishore Jayaraman	President of Rolls- Royee India and South Asia	03-02-2024
5	Mr. Shardul S. Shroff	Executive Chairman of Shardul Amarchand Mangaldas, India	03-02-2024
Amity University Rajasthan			
6	Prof. Purnendu Ghosh	Executive Director of Birla Institute of Scientific Research, Jaipur	19-01-2024
7	Maj. Gen. J. K. S. Parihar (Retd.)	Senior Consultant - Ophthalmology & Head, Academics and Trg & Professor of Ophthalmology, Centre for Sight, New Delhi	19-01-2024
Amity University, Madhya Pradesh			
8	Shri Amit Vyas	Managing Director of Amul Dairy	10-02-2024
Amity University Jharkhand			
9	Mr. Sunil Duggal	Chairman of Strategy & Policy, Vedanta Ltd.	30-03-2024
10	Mr. Anil Jain	Managing Director, Accenture	30-03-2024
11	Dr. Habil Khorakiwala	Founder and Chairman, Wockhardt	17-12-2024
12	Mr. Rajeev Chopra	Managing Director - Legal for Accenture in India	17-12-2024

Amity University Kolkata			
13	Dr. Amit Sharma	Managing Director and CEO of TATA Consulting Engineers Ltd	20-02-2024
14	Mr. Aditya V. Agarwal	Second Generation Entrepreneur and the Non Executive Director of Emani Limited	20-02-2024
15	Mrs. Geetanjali Vikram Kirloskar	Chairperson & Managing Director, Kirloskar Systems Pvt. Ltd.	26-11-2024
16	Mr. Sandeep Kumar	CEO L&T Semiconductor Technologies Ltd.	26-11-2024
Amity University, Mumbai			
17	Dr. S Somnath	Chairman ISRO	29-02-2024
Amity University Patna			
18	Shri Jayen Sharadchandra Mehta	Managing Director of the Gujarat Cooperative Milk Marketing Federation (GCMMF)	24-02-2024
19	Mr. Bharat Kaushal	Managing Director of Hitachi India Pvt Ltd.	24-02-2024
20	Mr. Sanjiv Bajaj	Joint Chairman and Managing Director of Bajaj Capital	14-12-2024
21	Mr. Aseem Puri	CEO, Unilever International	14-12-2024
Amity University Chhattisgarh			
22	Dr. Himanshu Pathak	Secretary, Dept of Agricultural Research and Education (DARE), Director General Indian Council of Agricultural Research, ICAR, Krishi Bhavan, New Delhi	15-03-2024
Amity University Dubai			
23	His Excellency Sherzod Sheraton	Minister of Digital Technologies of the Republic of Uzbekistan	14-02-2024

HONORARY PROFESSORSHIP AWARDED IN 2024

AUUP Noida Campus			
S. No.	**Name**	**Designation / Position/ Organisation / University/ at the time of Award**	**Date of Award**
1	Prof. (Dr.) Chandrajit Bajaj	Computational Applied Mathematics Chair in Visualization and Professor of Computer Science, University of Texas, Director of the Centre for Computational Visualization University of Texas	18-01-2024
2	Prof. (Dr.) Alfredo Cuzzocrea	Professor of Computer Engineering University of Calabria, Rende, Italy	19-01-2024
3	Prof. (Dr.) Dinesh Manocha	Paul Chrisman Iribe Professor of Computer Science and Electrical and Computer Engineering, University of Maryland	19-01-2024
4	Dr. Christian Blum	Senior Research Scientist, Artificial Intelligence Research Institute (IIIA), Spanish National Research Council (CSIC), Spain	06-03-2024
5	Prof. Afaq Ahmad	Professor of Electrical and Computer Engineering, Sultan, Qaboos University	15-03-2024
6	Dr. Rajeev Singh Raghuvanshi	Drugs Controller General of India (DCGI)	20-03-2024
7	Dr. Corinne Malpuech Brugère	Professor at Clermont Auvergne University (UCA), France and Director of the Human Nutrition Centre at Clermont Auvergne University, France.	20-03-2024
8	Mr. Nitin Bansal	Managing Director, India Head-Networks, Market Area South East Asia, Oceania and India at Ericsson	21-03-2024
9	Mr. George Paul	Director – Corporate Strategy & Govt. Relations, Sahasra Electronics Private Limited	21-03-2024
10	Ms. Tala Alamuddin	International Designer, Singapore	09-04-2024
11	Dr. P.K. Saxena	Former PSA Fellow O/o PSA to GoI & Director, Systems Analysis Group (SAG), DRDO	23-04-2024

12	Dr. Márton TAKÁCS	Head of Department Associate Professor Department of Manufacturing Science and Engineering Budapest University of Technology and Economics, Hungary; Email: takacs.marton@gpk.bme.hu	02-08-2024
13	Dr. Jaesun Lee	Director of Smart Manufacturing Engineering on Regional Innovation Platform Associate Dean of Planning Associate Professor School of Mechanical Engineering, Changwon National University, South Korea; Email: jaesun@changwon.ac.kr	02-08-2024
14	Prof. (Dr.) Edgar Estupiñan	Professor & Head Department of Mechanical Engineering Universidad de Tarapacá, Arica - CHILE Email:eestupin@academicos.uta.cl	02-08-2024
15	Prof. Ir. Ts. Dr. Sivarao Subramian	Professor of Innovation & Technology Transfer Faculty of Industrial and Manufacturing Technology and Engineering Universiti Teknikal Malaysia Melaka Durian Tunggal, Melaka Malaysia; Email: sivarao@utem.edu.my	02-08-2024
16	Prof. (Dr.) Henry C. Lee	Emeritus Professor, Henry C. Lee Institute of Forensic Science, University New Haven, Connecticut, USA	27-08-2024
17	Dr. Yusuf Mehta	Professor and Director of CREATEs, Henry M. Rowan College of Engineering, Rowan University, USA	15-10-2024
18	Dr. Nidhi Nagabhatla	Global Council Member, World Agriculture Forum & Cluster Lead - Climate, Natural Resources and Health & Senior Fellow, United Nations University Institute on Comparative Regional Integration Studies, United Nations University, Belgium	15-10-2024

19	Dr. Sudharshan N. Raman	Associate Professor, Malaysia School of Engineering, Monash University, Malaysia	16-10-2024
20	Prof. (Dr) Anusha Shah	Senior Director, Resilient Cities and UK Climate Adaptation Lead- Arcadis & President, Institution of Civil Engineers (ICE), UK	16-10-2024
21	Dr. V.K. Singh	Professor, Uniformed Services University of the Health Sciences, Bethesda, MD, USA	18-11-2024
22	Dr. Sanjay Sachdeva	Vice Chairman, ENT, Max Healthcare	30-11-2024
23	Mr. Tarun Singhal	Director - Business Development, Marketing, Branding and External Communications at Sopra Steria India & Sopra Banking Software in India	16-01-2025
24	Prof. (Dr.) Narayan C. Debnath	Dean of the School of Computing and Information Technology at Eastern International University, Vietnam	17-01-2025
AUUP Lucknow Campus			
25	Mr. Vinod Pandey	General Manager, Taj Group of Hotels, Lucknow	02-12-2024
26	Mr. Sudhir Misra	Resident Editor, Navbharat Times, Lucknow	02-12-2024
Amity University Haryana			
27	Prof. (Dr.) Chin-Tsan Wang	Director of Science and Technology Division at Taipei Economic and Cultural Center in India and Distinguished Professor of Mechanical and Electro-Mechanical Engineering at National I-Lan University, Taiwan	03-02-2024
28	Dr. Brent N Holben	Project Leader for the Global AERONET sun-sky radiometer network	03-02-2024
29	Dr. Mukund Vinayak Deshpande	Chief Scientist CSIR-NCL and Director, Greenvention Biotech Pvt. Ltd.	03-02-2024

Amity University Rajasthan			
30	Ms. Tripti Pandey	Renowned Personality in the field of Tourism, Culture and Travel Writing	19-01-2024
31	Mr. Sandeep Sapra	Managing Director, Amol Pharmaceuticals Pvt. Ltd.	19-01-2024
Amity University Madhya Pradesh			
32	Dr. C.P. Bansal	Pediatrics and Adolescent Medicine	10-Feb-24
33	Shri Ashish Nigam	Head of Transformation at Reddy's Laboratories	10-Feb-24
Amity University Maharashtra (Mumbai)			
34	Dr. Manju Tanwar	Principal Scientific Officer and Head of Research and Development at Organic Recycling Systems Ltd.	29-02-2024
35	Dr. Sanjeev Gupta	Sr. Vice President and Head of the Biosimilar Division for R&D, manufacturing and business development at IPCA Laboratories Ltd.	29-02-2024
36	Dr. Santanu Dasgupta	Sr. Vice President, R & D Reliance Industries Ltd.	29-02-2024

Honorary Causa Doctor of Science (D. Sc) Degree being awarded to Dr. Shardul Shroff, Executive Chairman of Shardul Amarchand Mangaldas, India by Chancellor Dr. Aseem Chauhan, and Prof. P.B Sharma, Vice- Chancellor at Amity University Haryana

Dr. S. Somanath, Chairman of the Indian Space Research Organisation (ISRO) receiving Honorary Doctorate from Dr. Aseem Chauhan, President and Prof. A.W Santosh Kumar, Vice- Chancellor at Amity University Maharastra

Chancellor Dr Atul Chauhan presenting 'Honoris Causa to Mr Aseem Puri, CEO, Unilever International at Amity University Bihar

Dr Habil Khorakiwala, Chairman-Wockhardt Group receiving the Honorary Doctorate from Dr. Atul Chauhan Chancellor at Amity University Jharkhand

Tala Alamuddin, internationally renowned Fashion Designer from Singapore was bestowed upon 'Honorary Professorship' by Amity School of Fashion Technology, Amity University Noida by Dr. Balvinder Shukla, Vice-Chancellor, AUUP; Dr. Divya Chauhan, Chairperson, Amity School of Fashion Technology and Amity School of Fine Arts and Prof (Dr) Pradeep Joshi, Director General & Dean (Applied Arts/Fine Arts/Performing Arts/Visual Arts)

Chapter - 8

SCIENTIFIC SOCIAL RESPONSIBILITY

Amity University reaffirmed its commitment to **Scientific Social Responsibility (SSR)** through impactful extension initiatives that drive societal progress. From **community engagement and social entrepreneurship** to **healthcare, environmental sustainability, and technology-driven solutions**, Amity's efforts continue to empower communities and create lasting change.

- **Farmer Training & Agricultural Development**
  - **Empowering Farmers** – Conducted training programs on **precision agriculture, organic farming, soil health management, and sustainable irrigation techniques.**
  - **Innovative Agricultural Technologies** – Hands-on demonstrations introduced **biofertilizers, climate-resilient crops, and modern farming tools.**
  - **Collaborative Growth** – Partnered with government agencies and industry leaders for **capacity building and financial literacy programs.**

- **Healthcare & Medical Outreach**
  - **Health Check-up Camps** – Provided **free screenings** for diabetes, hypertension, vision, and dental health in collaboration with hospitals.
  - **Blood Donation Drives** – Mobilized students and faculty for **life-saving blood donation campaigns.**
  - **Telemedicine & AI Healthcare** – Deployed **AI-driven medical assistance** in rural areas, ensuring access to specialized healthcare.

- **Technology for Social Good**
  - **Affordable Healthcare Innovations** – Developed **low-cost biosensors** and **smart wearables** for health monitoring.
  - **Water Purification Initiatives** – Implemented **filtration systems** in villages to provide safe drinking water.
  - **AI-Driven Solutions** – Enhanced **crop monitoring, weather forecasting, and disaster preparedness** in vulnerable communities.

- **Environmental Sustainability & Green Initiatives**
  - **Tree Plantation & Awareness Drives** – Promoted **eco-friendly practices** on and beyond campus.
  - **Renewable Energy for Communities** – Installed **solar panels and biogas units** in rural schools and centers.
  - **Waste Management & Recycling** – Launched projects for **sustainable waste disposal and recycling initiatives.**

- **Skill Development & Social Entrepreneurship**
  - **Entrepreneurship Training** – Nurtured **innovative solutions** for real-world social challenges.
  - **Vocational & Upskilling Programs** – Provided **technical knowledge in digital literacy, business management, and self-employment.**

Impactful Initiatives by Amity Group

- Amity Humanity Foundation
  - **Amitasha** – Educating & Empowering Girls
  - **Atulasha** – Shaping the Future of Boys
  - **SWAYAM SIDDHA** – Women Empowerment
  - **Community Health** – HIV/AIDS Awareness Camps
  - **Rehabilitation** – Supporting the Differently Abled
  - **Rural Upliftment** – Village Adoption & Development

- **Awareness & Community Outreach**
  - **Amity School of Communication** – Science films & awareness videos on environmental issues
  - **Amity Community Radio** – Broadcasting educational & social programs
  - **Human Value Quarter (HVQ)** – Fostering ethical values & social consciousness
  - **Free Physiotherapy Clinic** – Providing healthcare support to the needy
  - **Mental Health Clinic ("Sambodhi")** – Addressing mental well-being & counseling services
  - **Legal Awareness ("Samadhan")** – Spreading knowledge on legal rights & justice
  - **International Moot Court** – Enhancing legal advocacy skills

- **Healthcare & Social Welfare Initiatives**
  - **Health Checkups & Blood Donation Camps** – Promoting a culture of wellness & giving back
  - **Rural Women & Farmers Training** – Strengthening self-reliance & economic empowerment
  - **Herbal Garden & Seed Distribution** – Supporting sustainable agriculture & herbal medicine
  - **Family Dispute Resolution Clinic (FDRC)** – Offering mediation for family conflicts

Amity Humanity Foundation, in collaboration with Indraprastha Gas Limited (IGL), organized ASMO Training Program, for empowering Underprivileged Sections of the society

Cancer Awareness Program & Pathology Exhibition

Awareness week on waste management

“Nutritional needs of adolescent girls, pregnant women and Older ladies"
- An awareness event under SDG-2

NGO Meet-2024

Awareness program on Mental Health

Blood Donation Camp

Cyber Awareness Program

Mushroom Excellence Centre under the theme "Mycelium to Marketplace: The Art of Mushroom Cultivation for Learning and Earning

Nurturing Young Minds with Educational and Recreational Activities

Distribution of Nutritional Supplements to Girl Child Campaign

Legal Awareness Camp for Police Constables

Community Awareness Program on "Antibiotic Resistance"

Awareness Program called 'Diabetes Screening Camp 2024'

Chapter - 9 RESEARCH ECOSYSTEM

9.1 RESEARCH CENTERS & CENTERS OF EXCELLENCE

Amity University houses a broad range of Research Centers and Centers of Excellence (CoEs) dedicated to advancing knowledge, promoting technological innovation, and tackling real-world challenges across multiple disciplines. Below is a comprehensive list of these centers categorized by field:

1. Agricultural, Food, and Environmental Sciences

Research in Agricultural, Food, and Environmental Sciences focuses on sustainable practices, food security, biodiversity, and environmental protection. These centers aim to advance technologies and solutions that address global challenges related to agriculture, food production, water management, and environmental conservation.

- **Amity University Uttar Pradesh:**
  - Amity Food & Agriculture Foundation (AFAF)
  - Amity Centre for Agricultural Extension Services (ACAES)
  - Amity Centre for Environmental Health and Sciences
  - Amity Centre for Antarctic Research and Studies (ACARS)
  - Amity Centre for Oceanography & Atmospheric Sciences (AIOAS)
  - Amity Institute of Water Technology and Management (AIWTM)
  - Amity Centre for Bio Control and Plant Disease Management (ACBPDM)
  - Mushroom Excellence Center
  - Amity Centre for Soil Sciences (ACSS)
  - Amity Centre for Bio Control & Plant Disease Management
- **Amity University Haryana:**
  - Amity Centre of Excellence in Bioenergy
  - Amity Centre for Bioenergy and Biofuels
  - Amity Centre for Ocean Atmospheric Science and Technology (ACOAST)
  - Centre for Air Pollution Control
- **Amity University Madhya Pradesh:**
  - Amity Centre of Excellence for Environmental Conservation and Biodiversity of Madhya Pradesh
- **Amity University Rajasthan**
  - Amity Centre for Water Studies and Research (ACWSR)

- **Amity University Chhattisgarh:**
  - Centre of Excellence in Ayurvedic Medicine & Research
  - Center of Excellence on Climate Energy and Environment

2. Artificial Intelligence, Robotics, and Technology

Artificial Intelligence (AI), Robotics, and Technology-related research at Amity aims to drive advancements in automation, machine learning, and AI solutions that have wide applications in industries such as healthcare, finance, and cybersecurity. These Centers focus on harnessing cutting-edge technologies for solving complex global problems and pushing the boundaries of scientific exploration.

- **Amity University Uttar Pradesh:**
  - Centre of Excellence for Artificial Intelligence
  - Amity Centre for Robotics and Artificial Intelligence
  - Amity Centre for Spintronic Materials (ACSM)
  - CISCO Networking Academy Lab
  - Centre for Excellence in Machine Learning and Artificial Intelligence
  - Amity Centre for Inter-Disciplinary Research (ACIDR)
  - Centre of Excellence in Photonics and Optoelectronics
  - Centre of Excellence in Financial Risk Management and Data Analytics
  - Centre for Cyber Forensics and Information Security
- **Amity University Haryana:**
  - Amity Centre for Robotics and Artificial Intelligence
  - Centre for Robotics
  - Amity Centre for Nanoscience & Nanotechnology (ACNT)
  - Centre for Nanotechnology
  - GE Healthcare Centre of Excellence
- **Amity University Rajasthan:**
  - Amity Centre for Nanobiotechnology and Nanomedicine (ACNN)
  - Centre of Excellence on Internet of Things
- **Amity University Madhya Pradesh:**
  - Amity Center for Quantum Intelligence and Research and Excellence [ACQUIRE]
  - Amity Centre for Blockchain, Cybersecurity, and Digital Forensics
- **Amity University Chhattisgarh:**
  - Centre of Excellence on Robotic Process Automation (RPA) Technologies (In association with Automation Anywhere, Inc. USA, UiPath)

- **Amity University Maharashtra:**
  - Centre for Nanoscience and Nanotechnology
  - Amity Centre for Nuclear Biotechnology (ACNB)

3. Biomedical, Life Sciences, and Health Research

In the realm of Biomedical, Life Sciences, and Health Research, Amity University focuses on enhancing human health through advanced medical research, stem cell research, biotechnology, and epidemiology. These centers are dedicated to understanding diseases, creating innovative therapies, and improving public health practices worldwide.

- **Amity University Uttar Pradesh:**
  - Amity Institute of Click Chemistry Research & Studies (AICCRS)
  - Amity Institute of Herbal Research and Studies (AIHRS)
  - Amity Institute of Genome Engineering (AIGE)
  - Amity Centre for Cancer Epidemiology and Cancer Research
  - Amity Centre for Nano Medicine (ACNM)
  - Amity Institute of Indian System of Medicine
  - Amity Centre for Bio Control & Plant Disease Management
  - Amity Center for Carbohydrate Research
  - Amity Centre for Yoga Education, Therapy and Research
  - Amity Society for Nuclear Security
- **Amity University Haryana:**
  - Amity Centre for Stem Cell Research
  - Centre for Medicinal Plants and Traditional Knowledge
- **Amity University Madhya Pradesh:**
  - Amity Centre of Excellence for Nanobiotechnology and Alternative Medicine
  - Center of Excellence of Chemical Biological Radiological and Nuclear (CBRN) Mitigation
- **Amity University Rajasthan, Jaipur**
  - ACCBI Centre (Amity Cognitive Computing & Brain Informatic)
  - Amity Microbial Culture Center (AMCC)
  - Amity Centre for Mycobacterial Disease Research (ACMDR)
- **Amity University Maharashtra:**
  - Centre for Proteomics and Drug Discovery (CPDD)
  - Centre for Drug Discovery and Development (CD3)
  - Centre for Computational Biology & Translational Research (CCBTR)

4. Social Sciences, Humanities, and Education

Research in the field of Social Sciences, Humanities, and Education at Amity focuses on exploring global challenges related to society, human behavior, cultural preservation, and the advancement of educational systems. These centers aim to foster a deep understanding of diverse cultures, societies, and historical perspectives while shaping innovative educational practices.

- **Amity University Uttar Pradesh**
  - Centre for VUCA Studies (CVS)
- **Amity University Haryana:**
  - Centre for BRICS Studies
  - Amity Centre for Innovation in Education
  - Yunus Social Business Centre (AUH-YSBC)
  - Amity Centre for Linguistics Studies
  - Nobel Laureate Kailash Satyarthi Centre for Child Rights & Development
  - Centre for Financial Analytics
- **Amity University Rajasthan:**
  - Amity Center for Positivism & Happiness
  - Yunus Social Business Centre (YSBC)
- **Amity University Chhattisgarh:**
  - Centre of Excellence on Tribal Studies / Development
  - Centre of Excellence on Gender Studies

5. Environmental, Energy, and Sustainability Studies

Environmental, Energy, and Sustainability Studies at Amity focus on creating sustainable solutions for energy conservation, climate change mitigation, and ecological preservation. The centers in this domain are committed to addressing pressing global environmental challenges through cutting-edge research and technological innovation.

- **Amity University Uttar Pradesh:**
  - Amity Centre for Environmental Health and Sciences
  - Amity Mega Centre for Natural and Man-Made Calamities
  - Electrochemical Energy Research
  - Amity Centre for Environmental Health and Sciences
- **Amity University Haryana:**
  - Amity Centre of Excellence in Bio-Energy

- **Amity University Madhya Pradesh:**
  - Centre of Excellence for Environmental Conservation and Biodiversity
- **Amity University Chhattisgarh:**
  - Centre of Excellence for Laws Relating to Intellectual Property Rights

6. Cybersecurity, Data Analytics, and Computational Studies

The Cybersecurity, Data Analytics, and Computational Studies centers at Amity focus on building secure and efficient systems for data management, protecting digital assets, and utilizing big data analytics to solve complex problems in various industries like finance, healthcare, and governance.

- **Amity University Uttar Pradesh:**
  - Centre for Cyber Forensics and Information Security
- **Amity University Haryana:**
  - Centre for Financial Analytics
- **Amity University Maharashtra:**
  - Centre for Computational Biology and Translational Research (CCBTR)
- **Amity University Madhya Pradesh:**
  - Centre of Excellence for Detection of Fake News and Disinformation

7. Astronomy, Physics, and Astrobiology

Research in Astronomy, Physics, and Astrobiology at Amity University explores the mysteries of the universe, space science, and fundamental physics, along with the possibility of life beyond Earth. The research centres in this domain aim to make significant contributions to space exploration, astrophysics, and cosmology.

- **Amity University Uttar Pradesh:**
  - Amity Centre for Astronomy and Astrophysics (ACAA)
  - Amity Institute of Oceanography & Atmospheric Sciences (AIOAS)
- **Amity University Maharashtra:**
  - Amity Centre of Excellence in Astrobiology

8. Media, Communication, and Cultural Studies

Media, Communication, and Cultural Studies at Amity University promote research into the role of media in society, communication technologies, and the preservation of cultural heritage. These centers help cultivate future media

professionals, researchers, and scholars who explore and contribute to the changing dynamics of communication and media.

- **Amity University Uttar Pradesh:**
  - Centre for Media Studies
  - Reiki Foundation Center for the Science of Happiness
- **Amity University Haryana:**
  - Amity Centre of Excellence in Indic and Sanskrit Studies
- **Amity University Chhattisgarh:**
  - Center of Excellence for Tribal Studies
  - Center of Excellence for Gender Studies

9. Innovation, Entrepreneurship, and Business

Innovation, Entrepreneurship, and Business research at Amity focuses on nurturing creativity, developing novel solutions for businesses, and driving entrepreneurship. These centers encourage startups, foster innovation, and enhance business practices across various sectors globally.

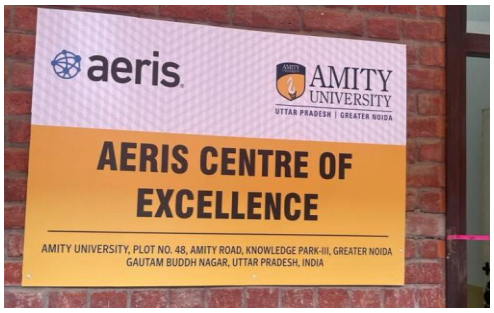
- **Amity University Haryana:**
  - AUH-E-Cell & IIC (Innovation Cell)
  - Kiran Majumdar Shaw Centre for Affordable Innovation
- **Amity University Uttar Pradesh:**
  - Amity CIMA Centre of Excellence
  - NRDC-Amity Innovation Facilitation Centre
  - Amity Centre for Entrepreneurship Development
  - Quanser Qube Laboratory
  - Amity Innovation and Design Centre
  - Amity University- Institution Innovation Council (Associated with MHRD's Innovation Cell)
  - DST - Technology Enabling Center (TEC)
- **Amity University Jharkhand**
  - Amity Centre for Research and Innovation Excellence (ACRIE)

10. Smart Cities, Urban Development, and Sustainable Technologies

The Smart Cities, Urban Development, and Sustainable Technologies research at Amity University aims to revolutionize urban planning, infrastructure, and sustainability. These centers focus on designing smart solutions for urban growth, infrastructure development, and addressing the challenges of modern cities.

- **Amity University Madhya Pradesh:**
  - Amity Centre of Excellence for Smart City-Gwalior

A GLIMPSE OF ACTIVITIES OF RESEARCH CENTERS & CoEs

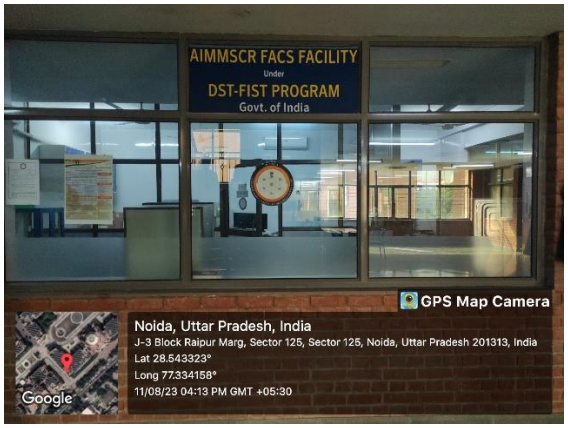


9.2 RESEARCH INFRASTRUCTURE

Amity Universities have established a robust research infrastructure through a combination of university funds, government-funded projects, and prestigious schemes such as DST-FIST, PURSE, and other national and international programs. The universities have made significant investments in state-of-the-art laboratories, advanced research facilities, and cutting-edge equipment to support interdisciplinary research. These initiatives have enabled faculty and researchers to engage in pioneering studies across domains such as biotechnology, nanotechnology, artificial intelligence, space sciences, and defense technology, positioning Amity as a leader in innovation and scientific advancements.

- **Amity University Uttar Pradesh**

- **<u>Central Instrumentation Centre</u>**



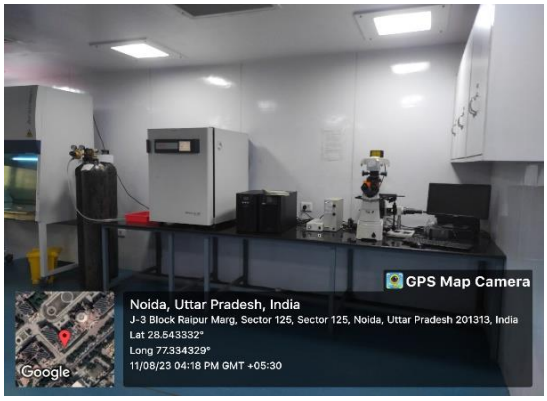
FACS Facility

BD FACS Cell Sorter & Flow Cytometer

Real Time PCR System (Step One Plus)

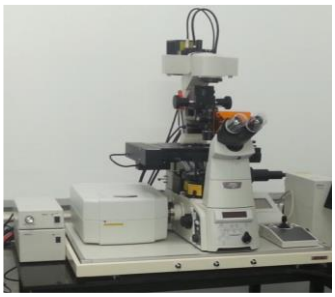
PCR (Pro Flex PCR System)

PCR (T100 Thermal Cycler)



Inverted Microscope

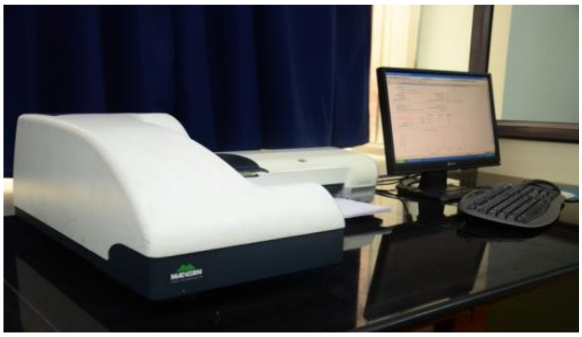
Real-Time PCR System, PCR (Thermal Cycler), Lyophilizer



Confocal Microscope

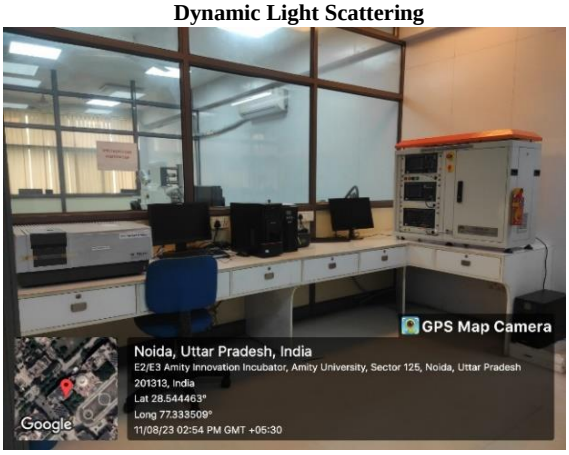
Atomic Force Microscope

X Ray Diffractometer



Dynamic Light Scattering

FTIR



Atomic Force Microscopy (AFM), Spectoflurophotometer and Particle Size & Zeta Potential Analyser

Scanning Electron Microscopy (SEM)

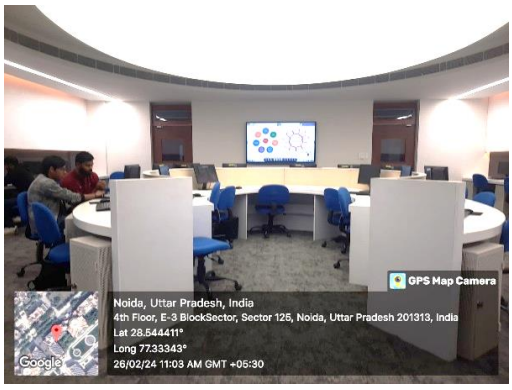
Advanced UV-VIS Spectophotometer Facility

Atomic Force Microscopy (AFM)

Microbial Culture Facility

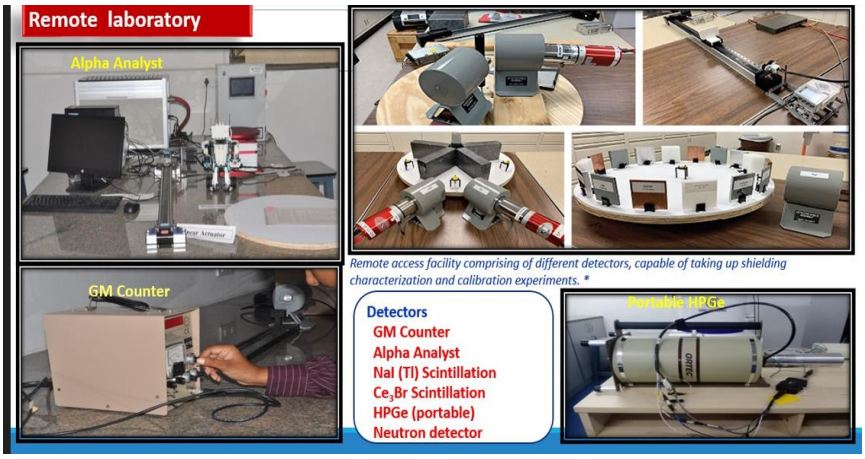
GC and GC/MS Facility

- **Amity Centre for Artificial Intelligence**

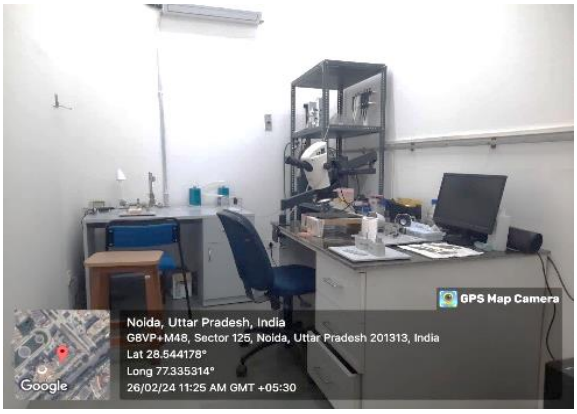


Amity Centre for Artificial Intelligence has the most advanced Supercomputing facility, NVIDIA DGX2 A100, the world's most powerful AI system to fuel research, development, and innovation. This Centre has 16 state-of-the-art NVIDIA A100 GPUs and 10 Petaflop computing power. This high-speed AI server delivers unparalleled performance, speed, and precision, allowing to accelerate AI workloads.

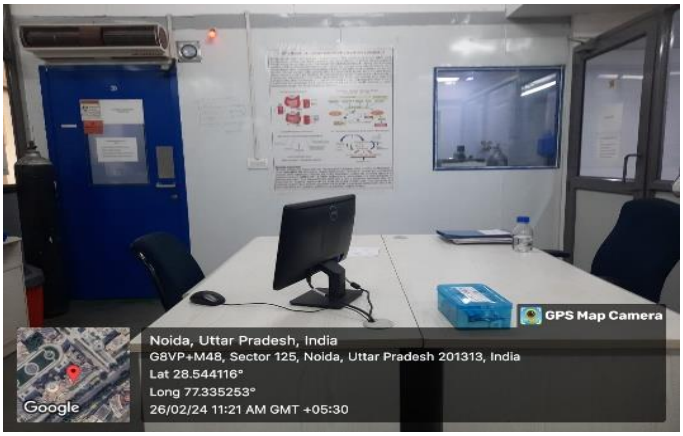
- **Nuclear Security Education Labs**



- **Amity Brain and Neuroscience Research Laboratories**



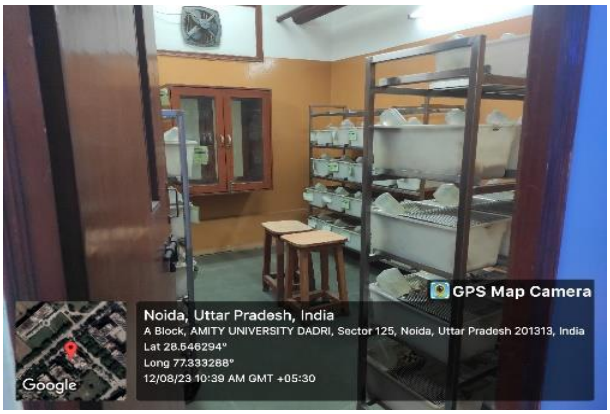
- **Amity Centre for Translational Research**



BSL-II facility

- **Amity Institute of Click Chemistry Research and Studies**

- **Animal House**



- **Green House**

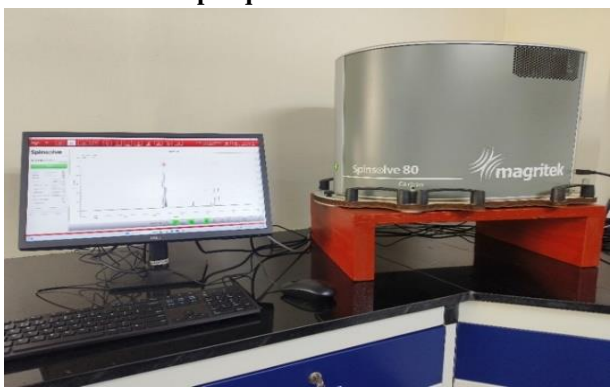
- **Amity Industry Connect**

- **Amity University Haryana**

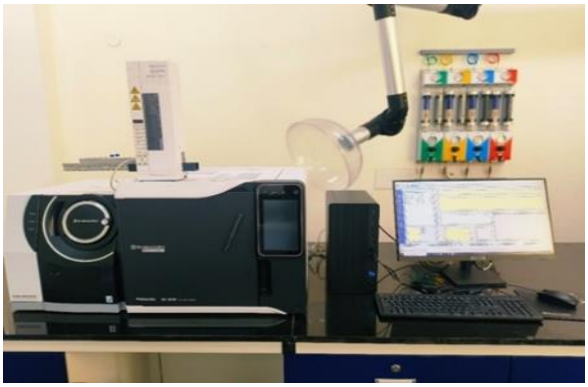
Central Instrument Research Facility	Lipidomics Research Facility	Materials Research Facility	Cheminnova Research Facility

Triple quad MS with ESI

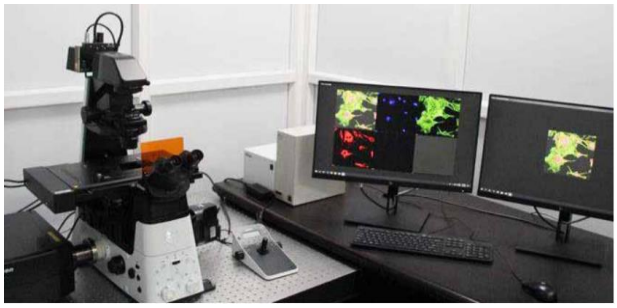
LC-MS



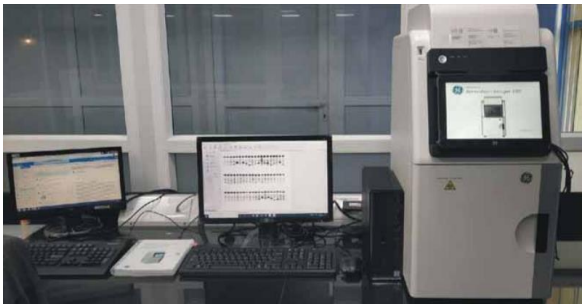
Nuclear Magnetic Resonance



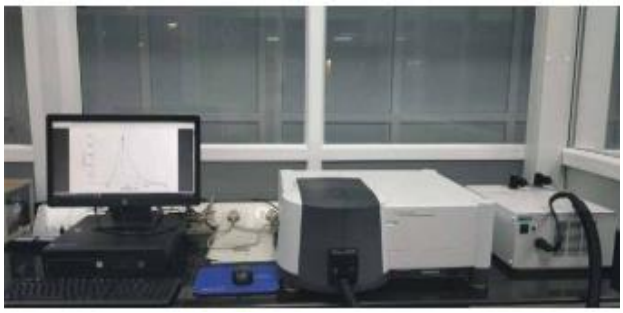
GC-MS



Confocal Microscopy



Gel Documentation System



Fluorscence Spectrometer

FT-IR

- **Amity University Rajasthan, Jaipur**

FE-SEM

GCMS

ICP-MS

ACTA FPLC

- **Amity University Punjab, Mohali**

LCMS/MS

Confocal microscope

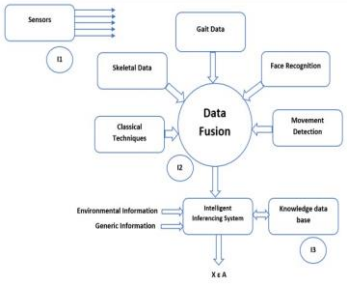
Chapter - 10 RESEARCH HIGHLIGHTS

AMITY UNIVERSITY UTTAR PRADESH, NOIDA

Divya Drishti

To design and develop

- An integrated approach for detecting a person by measuring:
  a. Skeletal parameters,
  b. Gait parameters
  c. Face recognition parameters
  d. Movement parameters (a new concept includes how a person moves /walks or stances taken)
- Intelligent inferencing system with LOW FALSE ALARM of recognition.



Innovation 1(I1): Multiple sensor /data correlation/sparse data handling

Innovation 2 (I2): Data fusion

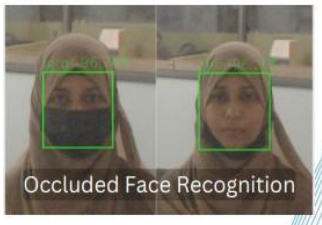
Innovation 3 (I3): Environment based / dynamic updates / use of cognitive technology

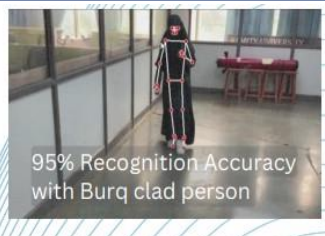
Innovative Features

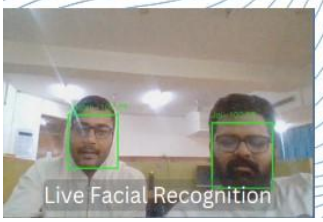
- Less Compute intensive; Offline Mode; Normal CCTV cameras installed on streets
- Unique Augmentation techniques for dataset building
- Identification and processing of Occluded Face, Partial Hidden Gait Parameters.
- Highly accurate AI Architecture for Integrated Parameters

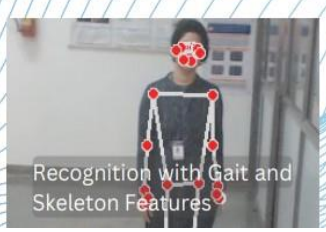
INGENIOUS RESEARCH SOLUTIONS PRIVATE LIMITED

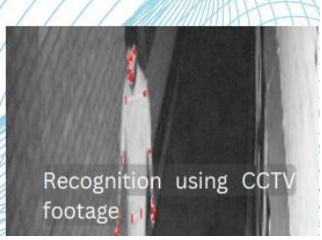
Project Divya Drishti : A Glimpse





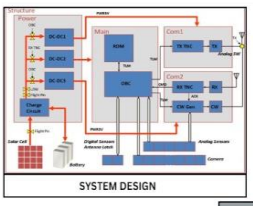


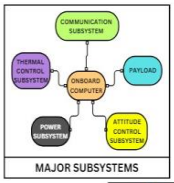




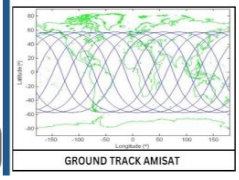
Divya Drishti

3U CubeSat (AmiSAT)


SYSTEM DESIGN



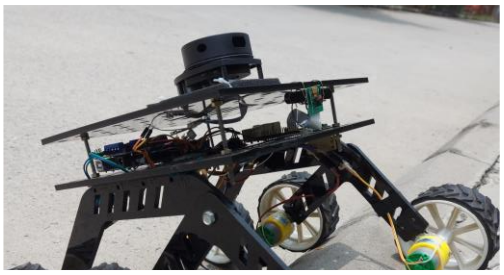
MAJOR SUBSYSTEMS

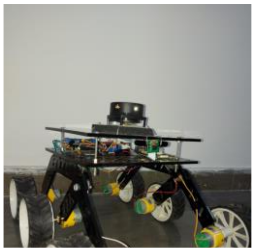

GROUND TRACK AMISAT


TRACKING ANTENNA


AMISAT STRUCTURE

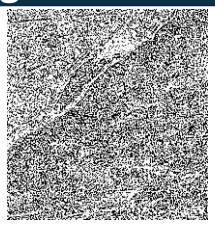
Unmanned Ground Vehicle

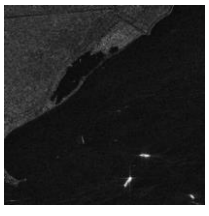




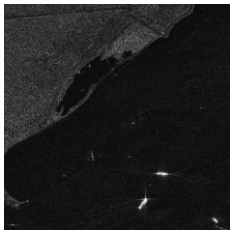
SAR Image Processing: Dark Vessel Detection

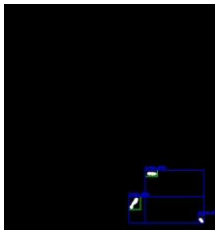

Histogram Equalization


Adaptive Thresholding

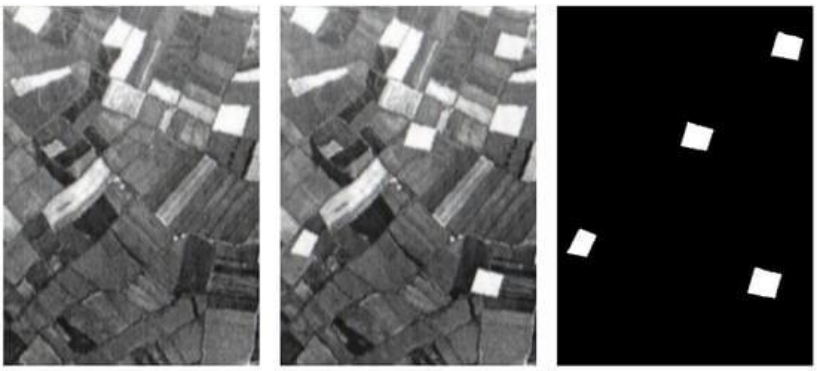

Speckle Filtering


Morphological operations


Original SAR Image

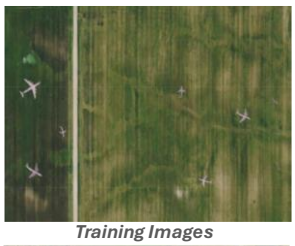

Ship Detection in SAR Image

SAR Image Processing: Land Cover Variations

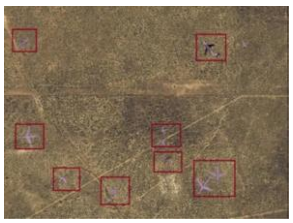


Village of Feltwell dataset. (a) image 1; (b) image 2; (c) Change detection

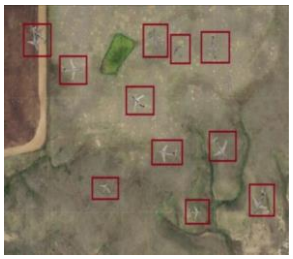
AI Based Optical Satellite Image Analysis



Training Images



Detection of Aircraft with bounding boxes

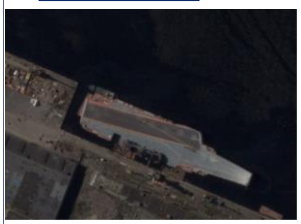


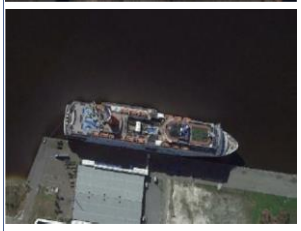
Accuracy: 98%

- Dataset Used: CGI plane, DOTA, Planesnet, Shipsnet, HRSC 2016
- Total 37133 images
- Training set: 20408 images (along with their labels); Testing set: 8000 images; Validation set: 8725 images

AI Based Ship detection (Optical Images)

Test Images :



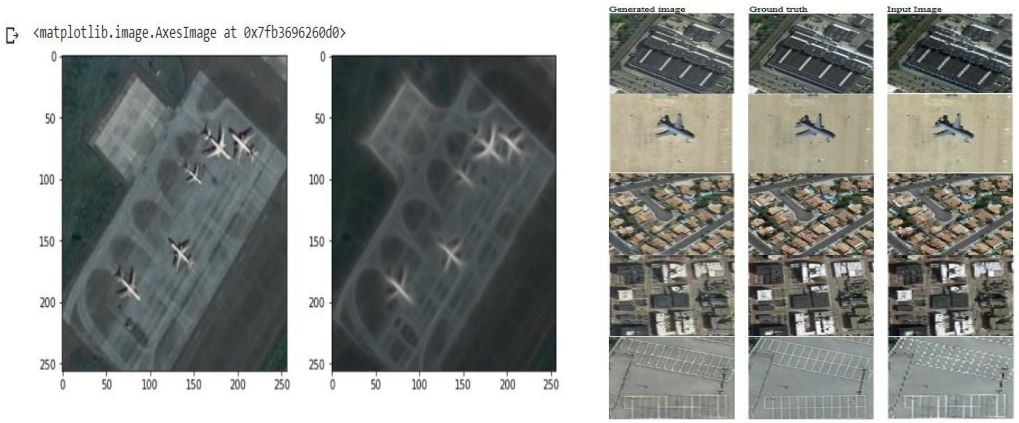


Ship Detection & Classification

Dataset Used: CGI plane, DOTA, Planesnet, Shipsnet, HRSC 2016

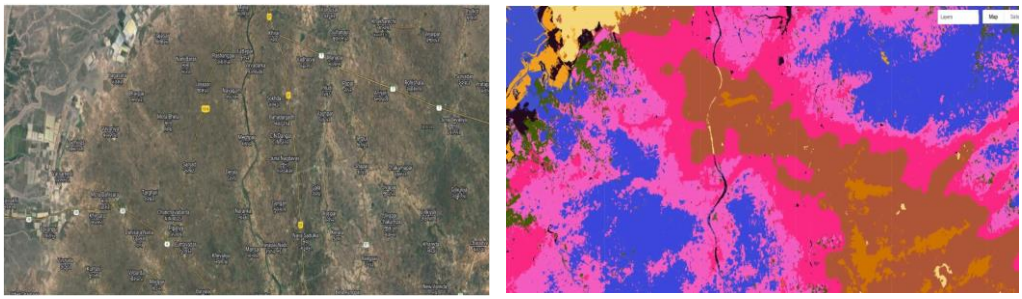
Total of 600 images
Training set: 400 images;
Validation set 150 images;
Testing set 150 images

Image Generation using Intelligent Super Resolution Techniques



Satellite Image Analysis

- K-means classifier
- Dataset: Sentinel 2 dataset; Timeframe of '2020-01-01' - '2020-05-11'; Kutch region of Gujarat
- Number of clusters:10



Land Use / Land Cover Classifications (LULC) Classification

- Leh area

- 4 classes are classified - buildings(blue) -road(yellow) - terrain(cyan) -desert(pink)

- 4 classes are classified
  - ✓buildings(blue)
  - ✓road(yellow)
  - ✓terrain(cyan)
  - ✓desert(pink)

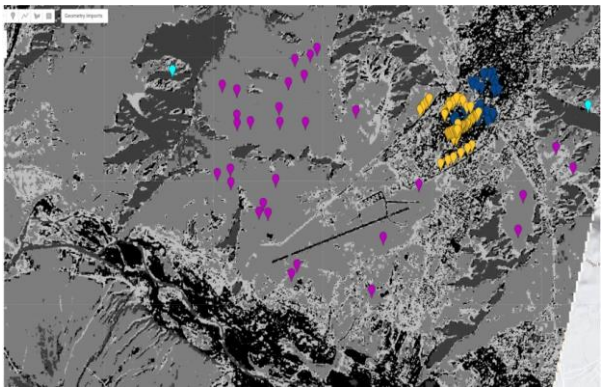
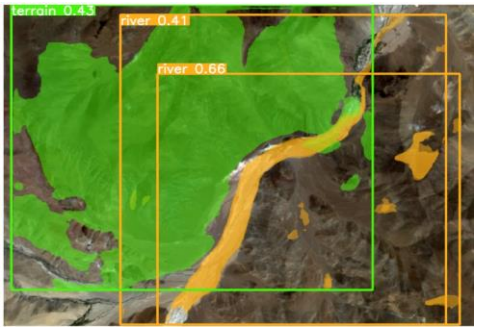


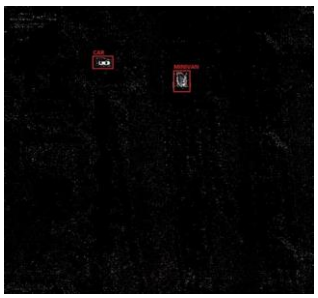
Image Segmentation

Dataset used-Sentinel 2 dataset
Region-Uttar Pradesh
Trained by manually annotating pixels



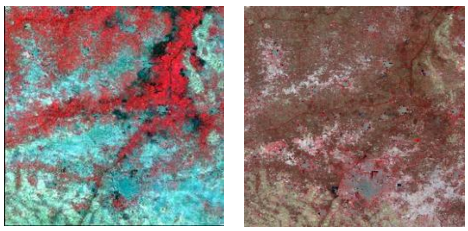
AI based Change Detection (High resolution Images)

Google Earth High Resolution Images

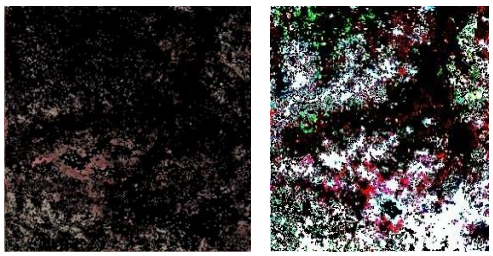


CHANGE DETECTION (High Resolution)

AI based Change Detection (Low Resolution Images)

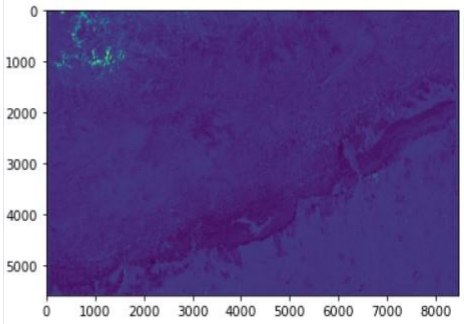


Left: Noida (2008); Right: Noida (2015)

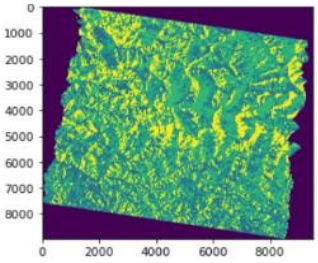


(Left) Difference obtained by converting original picture to grayscale and then subtracting and creating a mask; (Right) Subtraction of the normalised images.

Burnt Area Mapping: SAR Image

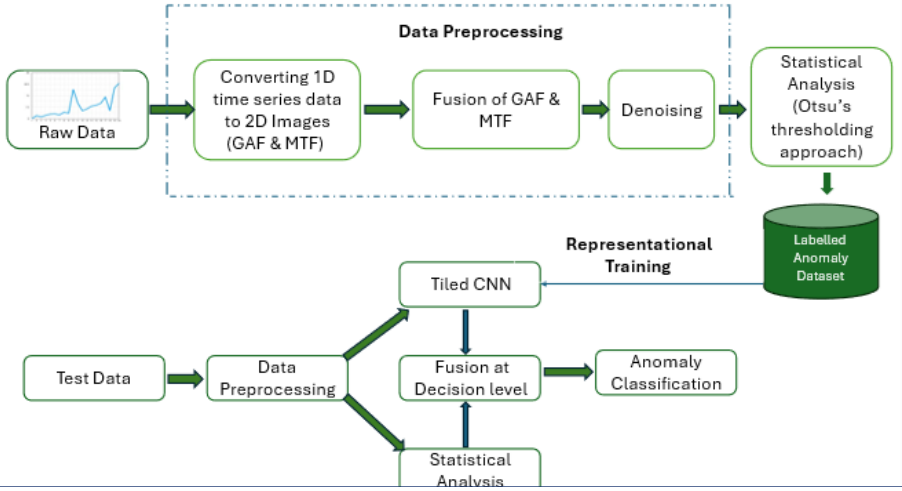


Burnt area classification of whole SAR data



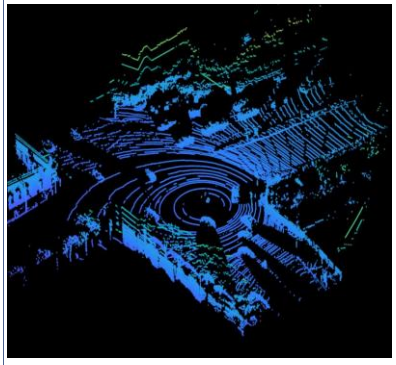
Burnt area classification of subset using K- means classification

Intelligent Anomaly Detection

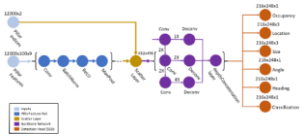


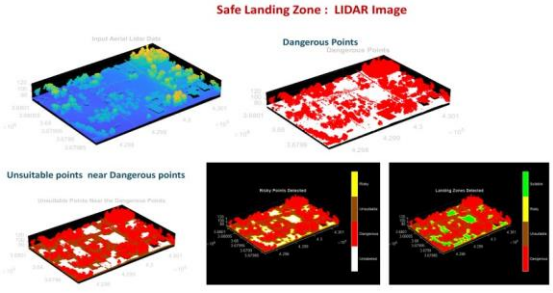
LIDAR Image processing

2560point clouds; each point cloud covers 360 deg of view, and is specified as a 64-by-1856 matrix



Pandaset_LidarData.tar.gz

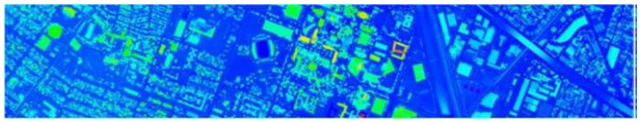


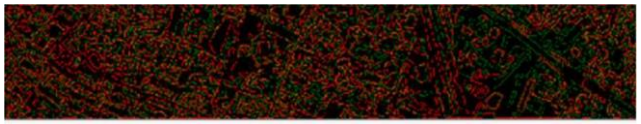


Fusion of Hyperspectral & LIDAR Images

Hyperspectral Image

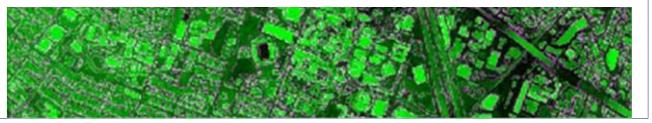
LiDAR-derived DSM



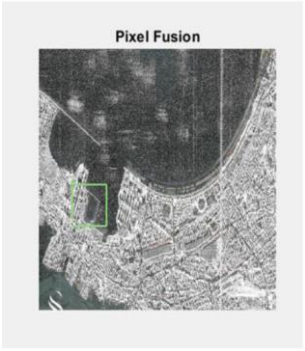


Edge blended image

Fused Image



Fusion of Optical & SAR Images

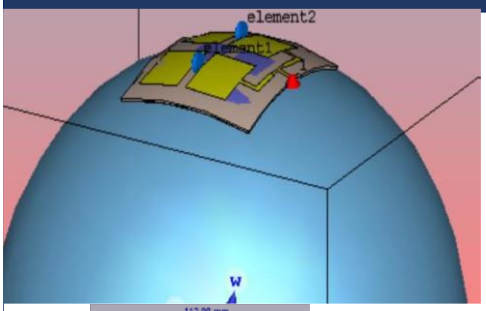


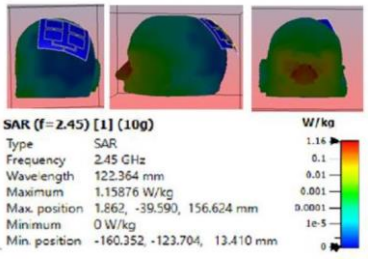
Input Optical Satellite Image

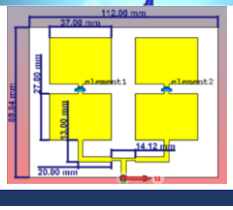
Input SAR Image

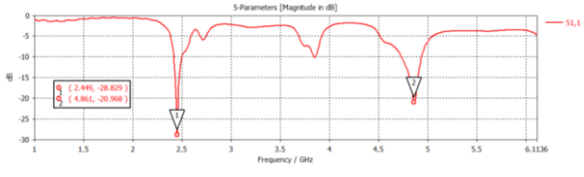
Fused Image

Helmet Mounted Conformal Antenna

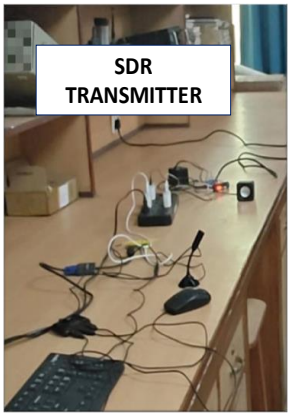




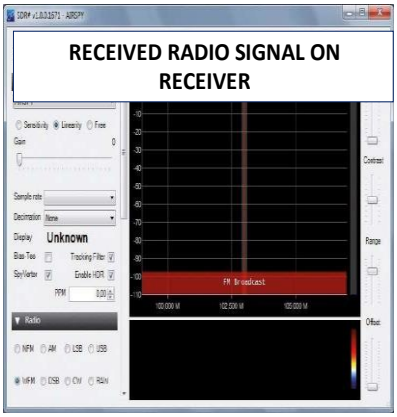




Low-Cost Software Defined Radio


SDR TRANSMITTER


SDR RECEIVER INTEGRATED WITH OSCILLOSCOPE


RECEIVED RADIO SIGNAL ON RECEIVER

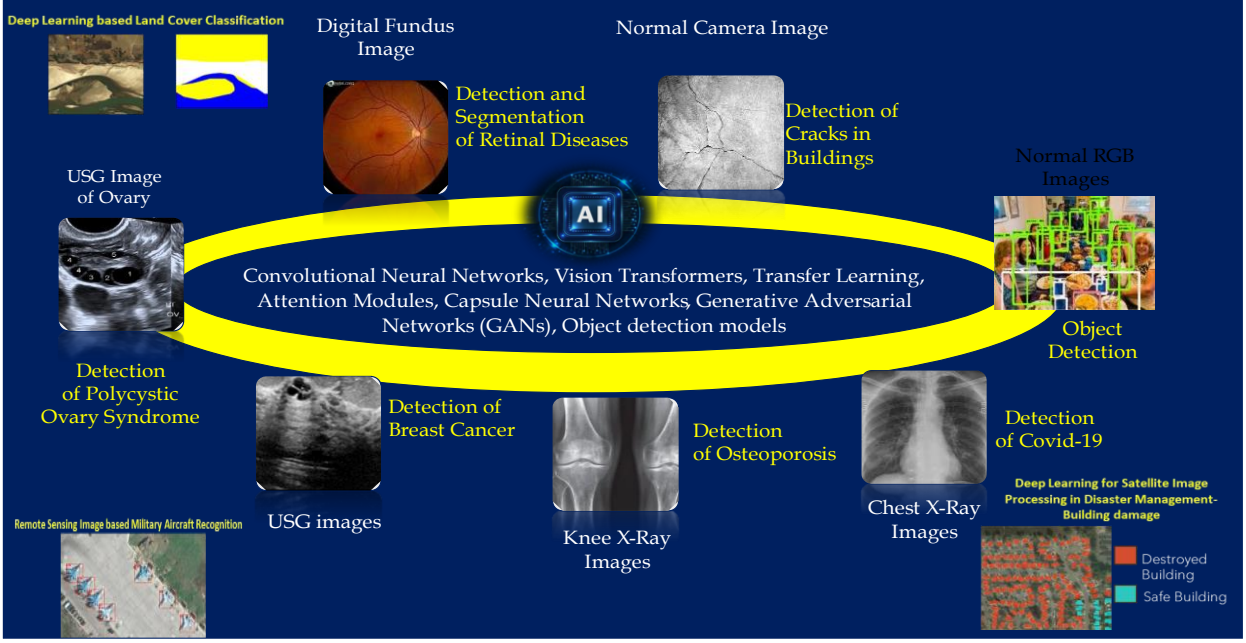
Cognitive Health Monitoring system for Spacecraft/ Aircraft

Objectives

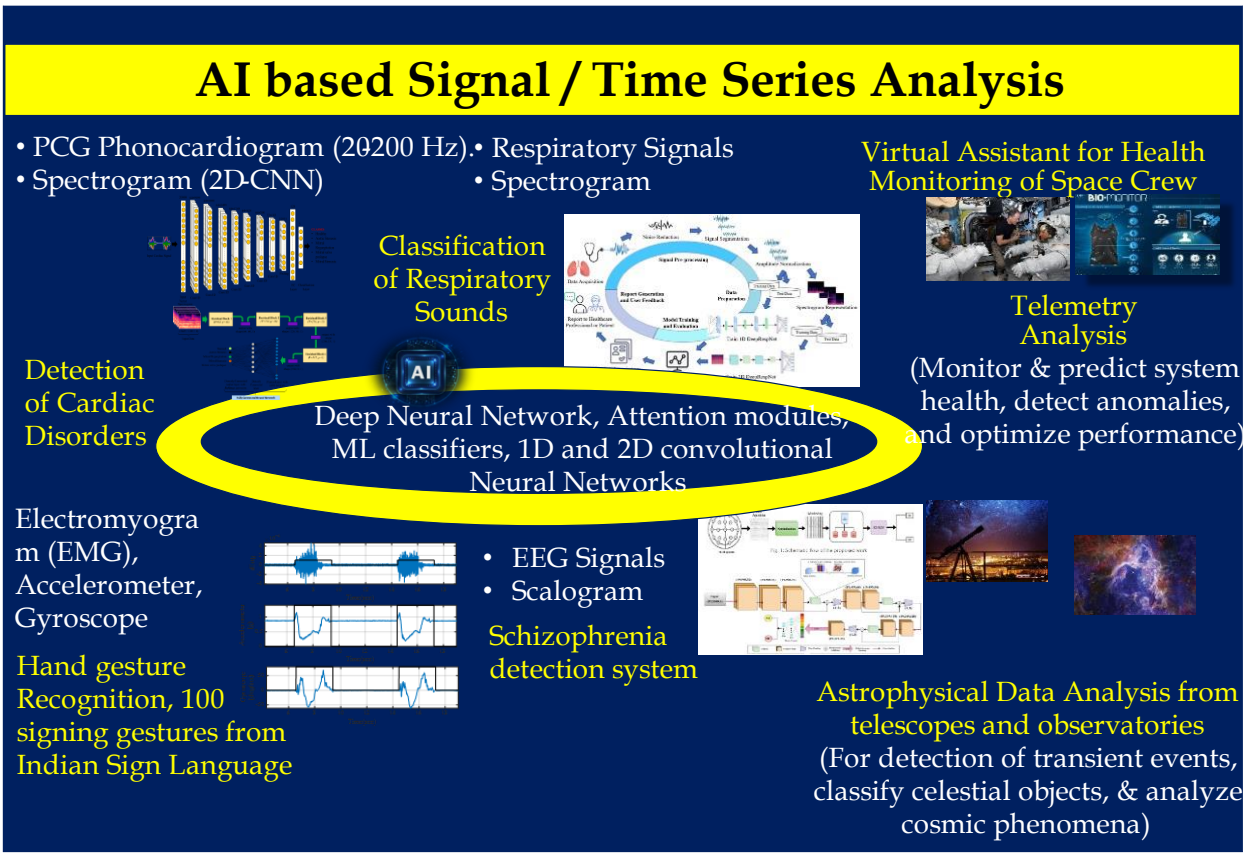
- Design an optimized cognitive system to analyze the collected data to perform self-calibration,
- Intelligent Anomaly/Fault Detection system.
- System capable of real-time, reliable and interpretable decision-making on-board

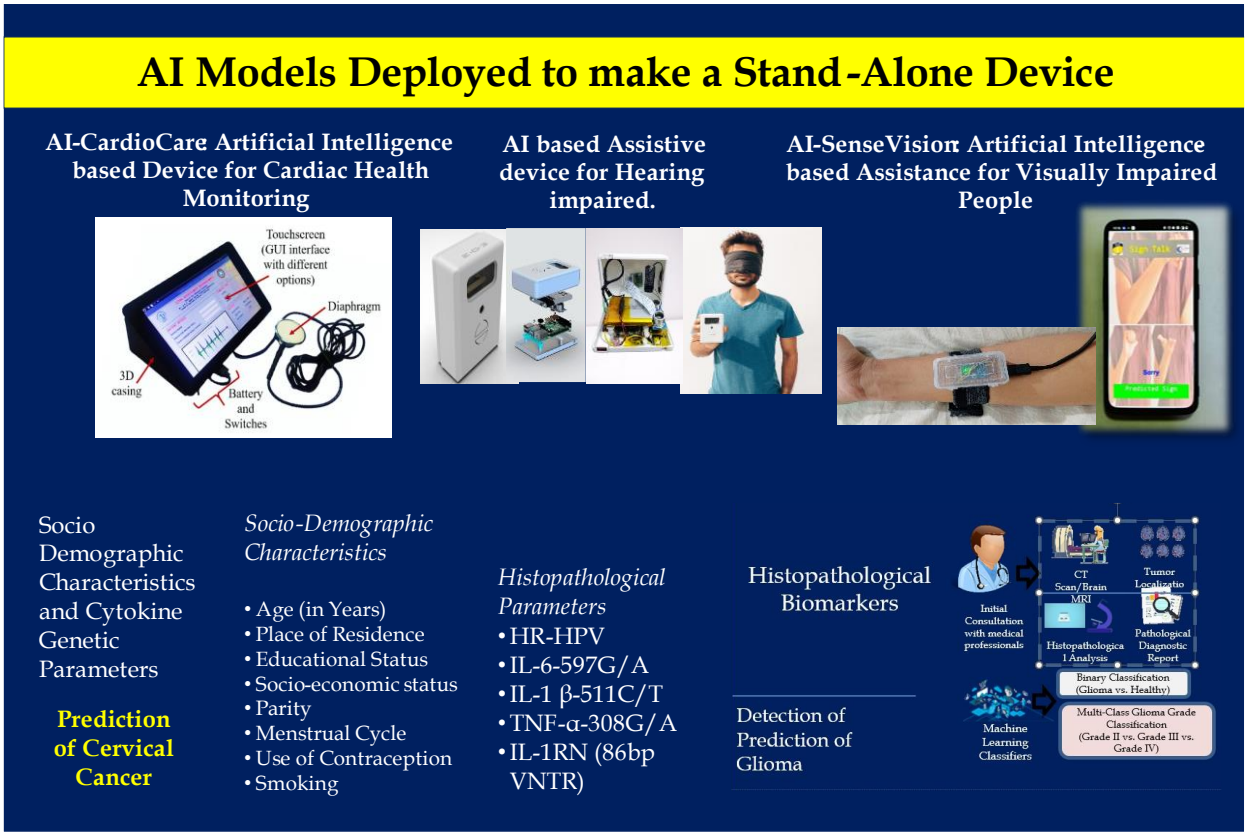
It would be an Intelligent inferencing system utilizing on-board computer data from spacecraft and telecommands from ground stations.

AI based Computer Vision Problems – Deep Vision



AI based Signal / Time Series Analysis





- **Exploring Fluid-Throat Effects: Dynamics of Multiphase Flow Choking from Deflagration to Supernova Explosions**

The comprehensive understanding of multiphase flow choking, shaped by the sonic-fluid-throat effect and governed by the Mach number equation in both reactive and non-reactive flow systems, has paved the way for significant advancements. These include predicting Deflagration-to-Detonation Transitions (DDTs), devising strategies to prevent coal gas explosions, and optimizing high-performance rocket port designs. A critical breakthrough involves preventing spontaneous detonation by maintaining the local total-to-static pressure ratio below the lower-critical-detonation-index (LCDI) through an unchoked fluid flow state. This principle applies universally to internal and external flows, spanning a vast range of scales from yocto to yotta.

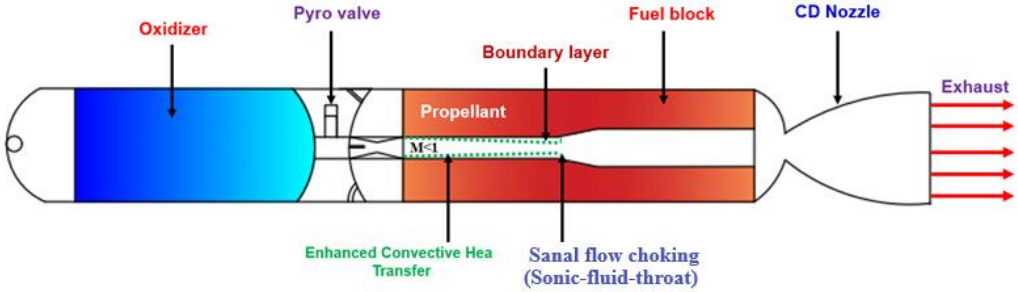


Fig. 1 Illustration of a high-performance hybrid rocket encountering sonic-fluid-throat effect.

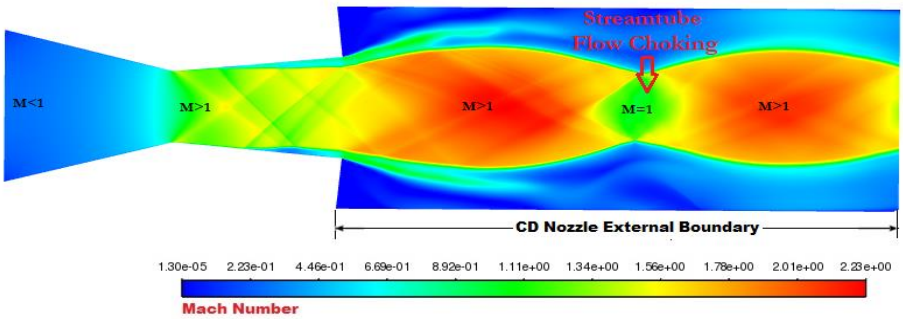


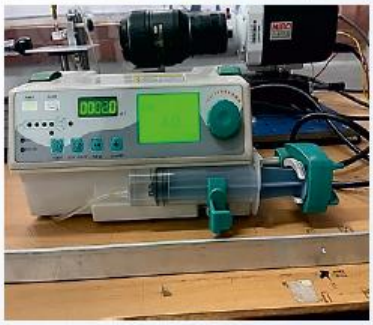
Fig. 2 In silico demonstration of sonic-fluid-throat effect in an external flow.

Beyond its direct applications in fluid dynamics and combustion science, this research also sheds light on environmental phenomena and supernova explosion mechanisms. The dual impact of these findings places this study at the forefront of scientific exploration, driving innovation and delivering transformative solutions to industrial challenges. The conceptualization of multiphase flow choking marks a paradigm shift in fluid-flow systems, highlighting its profound influence on both scientific understanding and practical applications.

INDIGENOUS MICRO-SYRINGE PUMP FOR MULTIPURPOSE APPLICATIONS

DESCRIPTION OF DEVICE

- A Micro-syringe pump is a device that flows liquid in control volume rate in the order of micro-liter per second (µL/sec) to milliliter per minute (mL/min).
- The major application of this device is in biomedical as well as in fundamental research of microfluidics and characterizes the surface in terms of hydrophobicity (measuring the Contact Angle, CA and Contact Angle Hysteresis, CAH).
- The micro-syringe pump designed and fabricated at Amity University can flow the volume from nanoliter per second (nL/sec) to milliliter per second (mL/sec) with 98% accuracy.



COMPONENTS USED

- Injection plunger motion by mechanical arrangement
- Pulse Width Modulated (PWM) Motor controller with micro-stepping embedded circuit
- Stepper Motor
- Power supply 12 VDC unit

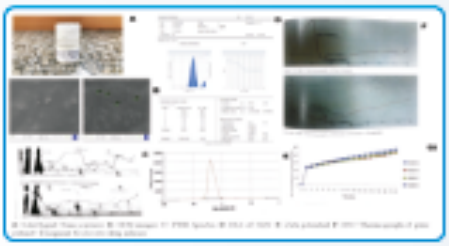
UNIQUE FEATURES OF MICRO SYRINGE PUMP

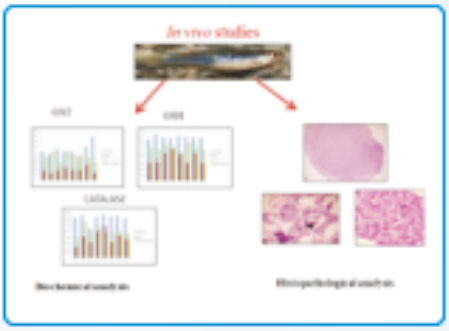
- Indigenous
- Low cost
- High accuracy
- Multipurpose application
- Compact and portable

A NOVEL COMPOSITION OF NATURAL L-DOPA FOR THE TREATMENT OF PARKINSON'S DISEASE

PRODUCT FEATURES AND CHARACTERISTICS

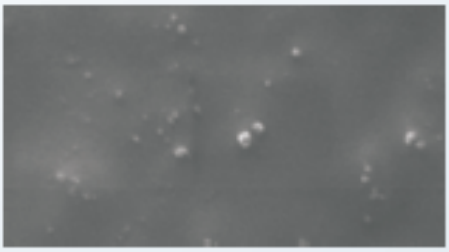
- Presently there is no cure of Parkinson's disease (PD). Also, a therapeutic effect to large doses being consistent no alternative diagnosis considered in patients who fail completely to respond.
- Improved formulation using L-DOPA with seasame oil as nano carriers for the treatment of PD.
- Helps in the sustained release of the drug from nanocarriers to treat Parkinson's disease and ensures regular supply of dopamine to the brain tissues.
- This nano-drug delivery system is able to transport the drug through brain endothelial cells and is also effective in crossing the blood brain barrier.
- Preclinical studies for Solid Lipid Nano carriers have been performed and human validation will be carried out in future.





UNIQUE SELLING POINTS (USPs)

- Solid lipid nanocarriers (SLN's) developed have excellent biocompatibility.
- Enhancesdrug stability.
- Maintain, controlled and target site drug delivery
- Easy to scale up and sterilize.
- Cost effective with no side effects.



Formulated Nanocarriers

BIOGENIC CARBON QUANTUM DOT IN STEM CELLS BIOLOGY FOR DIRECTING CHONDROGENESIS

ABOUT TECHNOLOGY

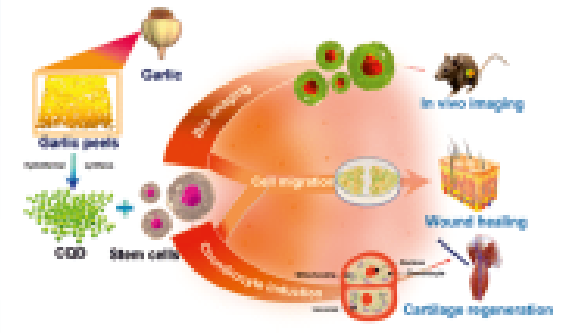
- Carbon Quantum Dots (CQDs) are synthesized from biowaste using simple hydrothermal one pot and rapid process.
- Exceptional biocompatibility, in-vitro and in-vivo.
- The development method of CQDs are eco-friendly, and cost-effective
- Improved therapeutic efficacy of Mesenchymal Stem Cells (MSCs) in a noninvasive domain of administration.
- Extend the period of safe tracking of the MSCs in the body to cognize the pharmacological characteristics.

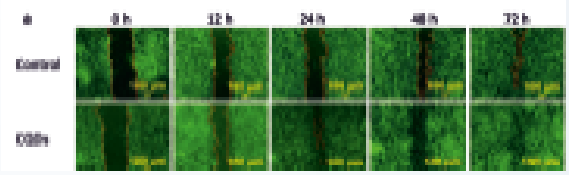
METHODOLOGY

UNIQUE FEATURES OF THE TECHNOLOGY

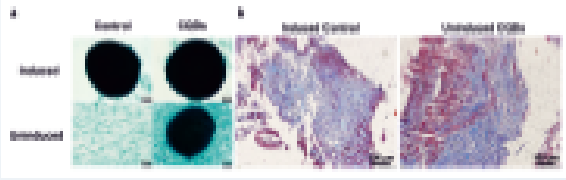
- Carbon Quantum Dots (CQDs) exhibit unique photoluminescence property for bioimaging.
- Facilitate Stem cell migration, imaging and simultaneously directing chondrogenesis
- This was orchestrated without the use of chondrogenic induction factors.
- This technology has immense potential in stem cell biology and regenerative medicine
- The complete technology is made under make in India program and the technology ready for transfer to an industry for production.

PRODUCT FEATURES AND CHARACTERISTICS





Imaging and analysis of wound closure in an in vitro model after CQDs treatment, using 3NF cells



Chondrocyte induction by Carbon Quantum Dots without using induction factors

A WEARABLE AND STRETCHABLE GRAPHENE-ON-PDMS SENSOR FOR STRAIN DETECTION ON HUMAN BODY PHYSIOLOGICAL AND JOINT MOVEMENTS

PRODUCT FEATURES AND SPECIFICATIONS

- Battery operated, room temperature, low cost, highly flexible and stretchable, responsive, skin mountable strain sensors
- The novel sensor provides exceptional robustness and versatility in detecting a broad spectrum of human movement and various modes of mechanical stimulation.
- Its ability to comprehensively track resistance changes across different human body joints and physiological movements highlights this strain sensor.

Fig. 1 A & nas. flexible strain sensors with electronic module and display, B flexible stain sensors on different human body joints.

UNIQUE FEATURES

- Pocket Friendly Device
- Highly flexible in operation
- Detects both weak and strong strains triggered by movements of human joints and physiological impulses.
- Stable and Durable
- Ideal for tailored health surveillance.
- Human skin mountable
- Consistent for a wide range of applied static stresses and frequencies
- Stretchable in nature
- Equipped with a high-tech microprocessor-controlled system
- Speedy response and retrieval

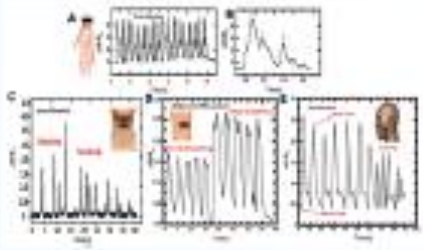


Fig. 2 Electrical responses of the flexible PGP strain sensor during detection of numerous subtle human physiological signals: A wrist pulse; B magnified view of a single pulse, revealing typical pulse characteristics; C larynx movement on shouting and speaking; D abdominal movement during normal and deep breathing; E jaw movement during mouth close, mouth open and chewing

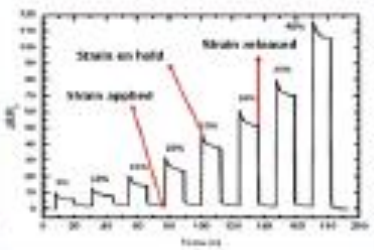


Fig. 3 Electrical responses of the PGP strain sensor: temporal response of the variation in electrical resistance of the sensor during stretching at different values 5–40% of applied strain with static-hold period

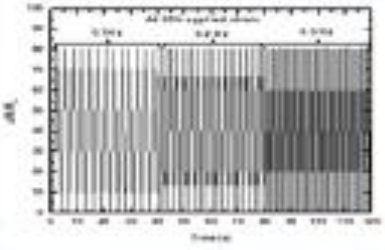
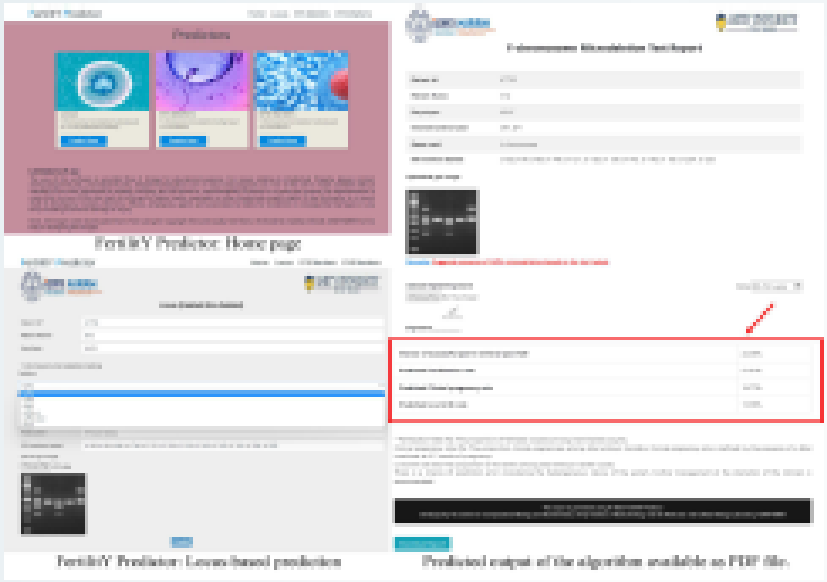


Fig. 4 Electrical responses of the PGP strain sensor: temporal response of the variation in electrical resistance of the sensor under cyclic stretching releasing cycle at different frequencies ranging from 0.1 to 0.3 Hz

INDUSTRIAL APPLICATIONS

- Effective solution for advanced biomedical and therapeutic device industry.
- Ideal for prosthetics, orthotics and robotic industry.
- Economic alternative for wearable electronic device industry.

FERTILITY PREDICTOR: AN ML-BASED FERTILITY PREDICTOR FOR MEN WITH Y-CHROMOSOME MICRODELETIONS IN ART



FertilitY Predictor: Home page

FertilitY Predictor: Locus-based prediction

Predicted output of the algorithm available as PDF file.

User Interface of the FertilitY Predictor software

- Portable clinician to effectively communicate the effects of YCMD on ART to patients, Fertility predictor, an ML-based tool is developed by Amity University.
- Our software works as an assistive component to a 14-marker diagnostic panel (developed by ICMR) that can detect 99.9% of YCMD in Indian males.
- Together, the assay and algorithm will improve the accurate diagnosis of YCMD and improve genetic counseling of infertile men.

SALIENT FEATURES

- Data from 3568 men with Y chromosome microdeletions were collated and used for the development of the predictive algorithm, FertilitYPredictor.
- Fertility Predictor provides an easy-to-use graphical user interface (GUI). It supports most of the web browsers such as Mozilla Firefox, Google Chrome, etc.
- Additionally, it also allows user to export their test report as a pdf file.

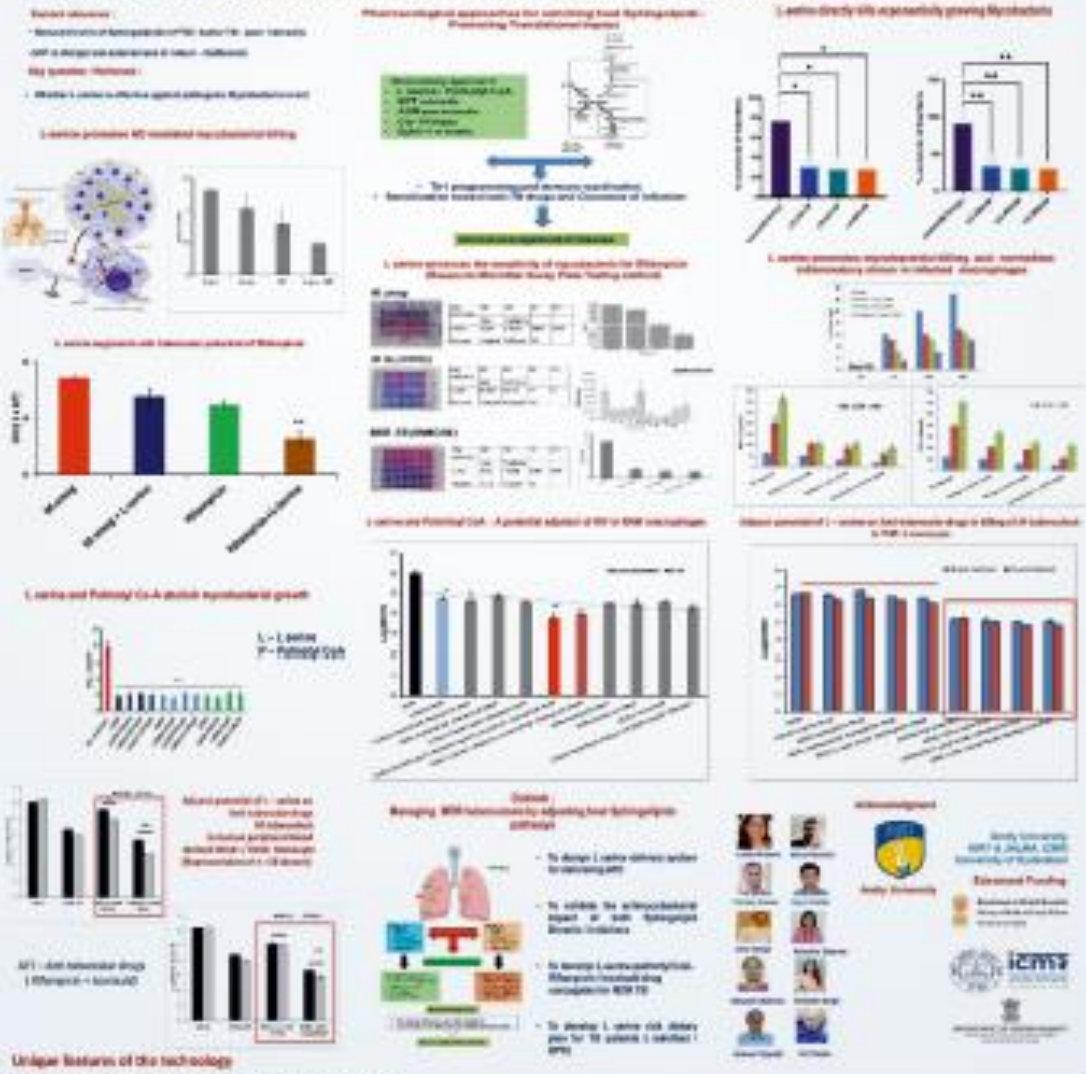
TARGET AUDIENCE

- Understanding chance for successful sperm retrieval and ART success.
- Improved counseling for couples considering ART.
- Assistance in decision-making regarding surgically invasive techniques.
- Confident prediction of prognosis for infertile men with Ychromosome microdeletions.
- Enhanced patient management and reduced financial and emotional burden.

L-SERINE: AN ADJUNCT FOR ANTI-TUBERCULAR DRUGS FOR CONTROLLING TUBERCULOSIS

Problem addressed

- Granulomatic lesions reflect an effective immune niche of TB patients which are able to contain disease.
- Various host derived factors like Sphingolipids can influence the formation of these lesions.
- Sphingolipids (S1P) can afford help to *M.tb* (H37Rv) infected animals for clearing infection
- Since S1P triggers allergic and autoimmune reactions therefore purified S-1P cannot be included in current TB regimen.
- L-serine can serve as adjunct to the anti-tubercular therapies for managing both active and MDR tuberculosis.



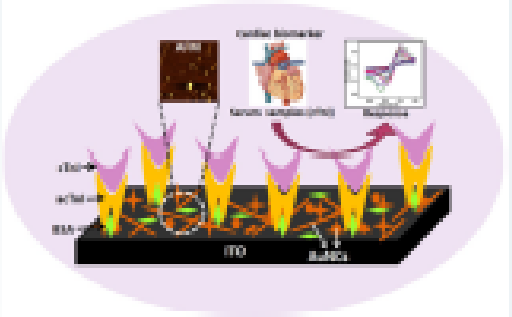
Unique features of the technology

L serine / Palmoyl CoA Control Mycobacterium tuberculosis
L serine / Palmoyl CoA will be developed as adjunct to 1st/ 2nd line tubercular drugs for breaking Antibiotic resistance in MDR TB infection.
L serine rich diet can improve response of MDR patients towards ATD
Patent filed – Sep., 2022, (Phase 1 data –non toxic nature of L serine)

MOBILE APP DEVICE FOR ULTRALOW DETECTION OF CARDIAC TROPONIN I

Product Features and Characteristics

- Detection range: 0.06 -100 ng/mL), high sensitivity (2.2 x 10^{-1}A ng^{-1} mL cm^{-2}), Limit of Detection (0.043 ng/mL), sensitivity of 2.2x 10^{-1}A ng−1 mL cm−2 with high association constant (Ka) of 3.025 × 10^{-2} M
- Tested in blood serum sample (with minimum interference (<15%),stability (30 days)



Need and Demand

- Acute Myocardial Infraction(AMI) comes under acute coronary syndrome, which is frequently identified as a heart attack.
- In the United States of America, approximately one million people suffer from a heart attack each year
- After heart attack, "Cardiac Biomarkers" such as, Cardiac Troponin I & T are discharged into the blood vessels from the damaged tissue of myocardium
- For the diagnosis of AMI, Cardiac troponin I (cTnI) is considered as the standard biological index for the prognosis of a patient susceptible to heart attack, as it increases specifically during myocardial damage (AMI)
- Hence, there is an urgent need for the quick monitoring of cTnI for prevention and early treatment of heart attack.

Detection of cTnI in Serum Samples.

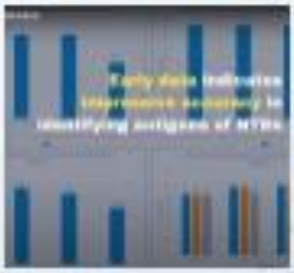
Sample no.	Actual spiked concentration (ng/ml)	Experimental concentration (ng/ml)	% error	Relative standard deviation
1	70	52	25%	6.9%
2	0.8	0.85	6.25%	5.16%
3	0.5	0.43	14%	5.34%

Unique Selling Point (USP's):

No commercial rapid (Point of care),onsite biosensing device exists for detection of Cardiac Troponin I, Maintains Historical records of patients

VAX-AI PLATFORM FOR ACCELERATING VACCINE DEVELOPMENT

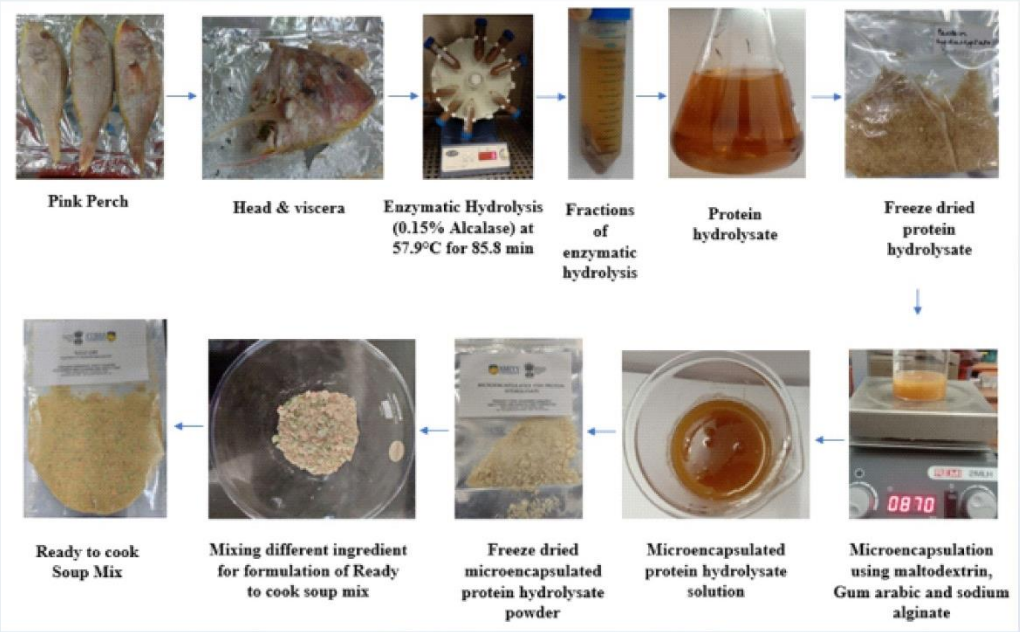
- Infectious Diseases impact over 1 billion individuals, leading to disability, disfigurement, and loss of life.
- Our AI platform demonstrated over 95% accuracy in FDA-approved vaccines and candidates.
- Solution utilizes bioinformatics, computational modeling, deep learning, and ChatGPT's capabilities.
- Unconventional idea: Combining cutting-edge technologies to match human expert intelligence.
- Targeted at research institutions, pharmaceutical companies, government health agencies, and WHO.
- Big idea: Achieve 40% cost reduction and accelerate vaccine development by 2 times.
- Work includes data collection, AI algorithm development, ChatGPT integration, testing, and refinement.
- Collaboration with research institutions like BCM, MIT, and Harvard, and pharmaceutical companies like Biological E.
- Platform tested on 1500 validated antigen datasets for 50 infectious diseases, free for global scientists.
- Plan to expand accessibility worldwide, support clinical trials, global vaccination efforts, and address biases.
- Emphasis on knowledge sharing, capacity building, technology transfer, collaborations, and continuous improvements.



PROTEIN HYDROLYSATE AND READY TO COOK SOUP FROM FISH INDUSTRY BY-PRODUCTS

- India is one of the world's largest producer of fish which is exporting 13,77,244 MT of fish.
- Fish are important source of animal protein and Omega-3-polyunsaturated fatty acids (EPA – eicosapentanoeic acids and DHA-decosahexanoic acids) which has many health benefits.
- 60% of the developing countries derives more than 30% of their animal protein from fish and constitute an important food component for a large section of the world population (Bialkowska et al., 2016).
- At the same time, large amounts of fish by-products (head, viscera, skin and bones) are being generated (approximately 50-60% of total fish capture) during fish processing.
- The formulation of Ready to cook (RTC) soup mixes rich in protein aid to fight against protein deficiency in the country.
- The Physio-chemical and sensory analysis of Ready to Cook soup mixes was conducted and observed that microencapsulated soup mixes contain approximately high amount of protein content (15%) with acceptable aroma and taste.
- These Ready to Cook soup powder can be potential alternative food for the protein deficient peoples.

Funding: This research was funded by the Department of Biotechnology, Governmentof India, Grant no. BT/IN/INNO- INDIGO/12/NK/2017-18 & 21/2/2018



Unique innovative product developed by Amity Faculty

ROOTONIC THE MAGIC FUNGUS

PROMOTES AGRICULTURE, HORTICULTURE AND FOREST PRODUCTIVITY

Rootonic - A Novel Root Endophyte

Model Organism

Origin & Discovery

Growth on Synthetic Medium

Piriformospora indica: Symbiotic fungus, isolated from Hot Desert (+50 °C) also effectively works in Cold Desert (-18 °C)

MANUFACTURING & APPLICATION

Batch Culture — Formulation with Talcum Powder

Mixing with Seed — Application to the Field

BIOCONTROL OF DISEASE - BOTTLE GOURD

Control — Treated

FUNCTIONS AND CAPABILITIES

- Promotes plant growth • Provides resistance against diseases
- Helps in value addition of harvest • Improves soil fertility

TECHNOLOGY HIGHLIGHTS

- Easy to culture • Applicable to large number of plants
- Easy to formulate • Simple one time seed/seedling/tree application

PLANT GROWTH PROMOTION AT EXTREME LOW TEMPERATURE

Polyenc Greenhouse DRDO Leh — Control — Treated

BEETROOT

SPECIFICATIONS

- Biomass: Piriformospora indica • Carrier: Magnesium Sulphite (Talcum Powder)
- Colony Forming Unit Count: 104/gm • Moisture Content: 8-10% • Shelf Life: One year at room temperature

HNB9: NOVEL PHOSPHATE SOLUBILIZING FUNGAL BIOFERTILZER

PRODUCT FEATURES AND CHARACTERISTICS

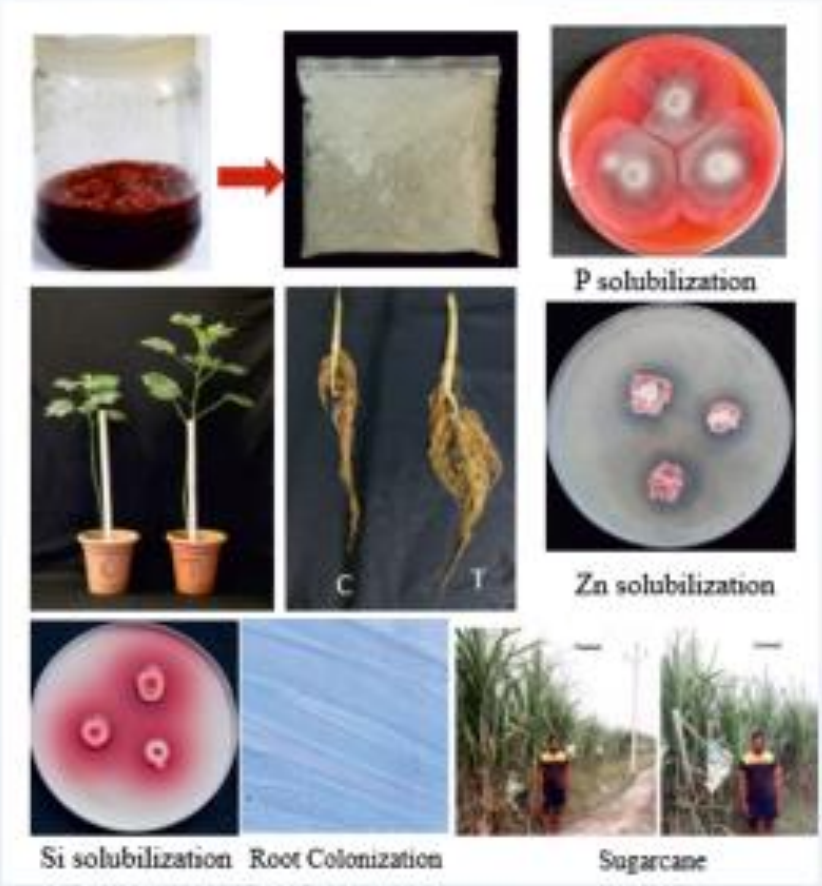
Talaromyces albobiverticillus (HNB9) is an axenically cultivated, novel root colonizing patented phosphate solublizing fungal strain.

UNIQUE SELLING POINTS

Colonization of plant roots by fungus results in pronounced growth enhancement and crop yield.

NEED AND DEMAND

The fungus has exhibited various plant growth promoting (PGP) activities like phosphate, zinc, silica, iron solubilization and auxin production etc.



DEVELOPMENT OF A NOVEL BIOAGENT CONSORTIA FOR AGRICULTURE

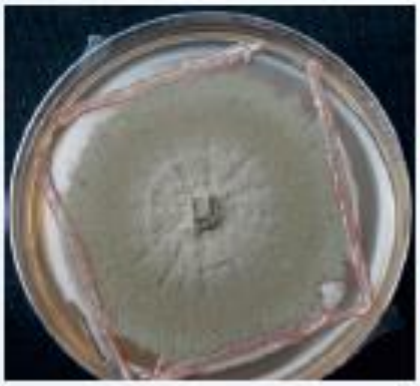
Brief about your technology: *Talaromyces albobiverticillius* HNB9 is an axenically cultivated, novel root colonizing patented phosphate solubilizing fungal strain

- ***Bacillus subtilis*** is a moderately salt tolerant, phosphate solubilizing and auxin producing strain
- Co cultivation of the bacteria with fungi increases fungal spore count and size significantly

Unique features of the technology: Colonization of plant roots by the consortia results in pronounced growth enhancement and crop yield

- The consortia is nontoxic and has the potential to be a multifunctional bioagent in agriculture

Problem it is addressing: The technology has application in addressing the problems of sustainable agriculture.



Dual Culture Interaction

Root treatment of Rice plantlets

Treatments	Control	HNB9	HNB9 + Bs
Yield (Qt/Acre)	18.34	25.25	29.64

Final Yield data of rice variety PB1718

DEVELOPMENT OF A NOVEL BIOPESTICIDE FOR AGRICULTURE

Brief about your technology: *Talaromyces albobiverticillius* HNB9 is an axenically cultivated, novel root colonizing patented phosphate solubilizing fungal strain

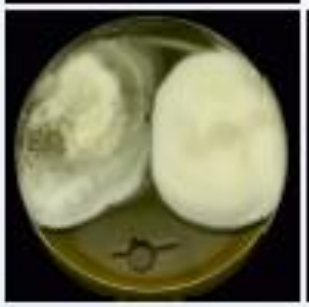
- *Metarhizium anisopliae* and *Beauveria bassiana* are incompatible entomopathogenic fungi
- Co-Cultivation of *M. anisopliae* and *B. bassiana* with the fungus HNB9 resulted in positive interaction between the two incompatible entomopathogenic fungi

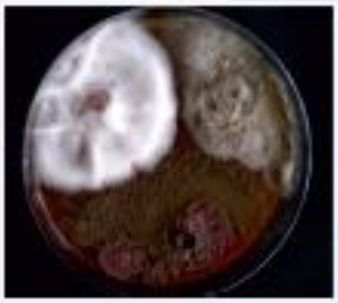
Unique features of the technology: Colonization of plant roots by fungus results in pronounced growth enhancement and crop yield

Problem it is addressing: The consortia has potential to be wide range insect biocontrol agent in agriculture.

After 20 days of inoculation, lysed hyphae of *M.anisopliae* is observed

Microscopy of lysed portion on PDA plate confirmed dead hyphae of *M.anisopliae*





Bi and Tripartite interaction: After 20 days no lyses of *M.anisopliae* is observed due to *B.bassiana* in the presence of Culture Filtrate/HNB9

DEVELOPMENT OF NOVEL AND THERMOSTABLE PROTEASE ENZYME WITH SIGNIFICANTLY HIGH ACTIVITY FOR INDUSTRIAL APPLICATIONS

Product Features and Characteristics

Proteases have applications in several biotechnological processes, research, and many industries including pharma sector. The Protease Enzyme Purified from Ginger variety is-

- Novel
- Significantly High activity
- Source- Ayurvedic herb (Ginger-household spice)
- Thermostable
- Anticancer potential (In vitro)

- Protease enzymes account for nearly 60% of the industrial enzyme market in the world.
- According to Markets and Markets, the industrial enzymes market is projected to reach USD 8.7 billion by 2026.
- The global protease market is projected to grow at a CAGR of 5.8% during the forecast period (2022 - 2027) (Mordor Intelligence Report).
- Acc.to Market research future-Proteases Market is expected to grow at a 5.5% CAGR and reach USD 5,762.9 Million by 2030

Industrial Application Development Avenues

USP in relation to Industrial Sectors

A novel thermostable protease enzyme from plant source (household spice) with significantly high specific activity

USP in relation to Pharma sector

A novel thermostable protease enzyme from plant source (household spice) with significantly high specific activity exhibiting substantial cytotoxic effect against Human Breast Cancer Cells

Unique Selling Points (USPs)

The Novel Protease candidate have applications in several biotechnological processes, research, and industries including-

- Food processing
- Detergent
- Breweries
- Textile
- Leather
- Dairy
- Baking
- Beverages
- Poultry
- Infant Formula
- Bakery
- Soy
- Silk
- Meat
- Chemical
- Industrial Waste Mgmt.
- Silver Recovery
- Pharmaceutical Industries

BIODEGRADABLE MULCH FILMS

Plastic mulch films, especially in the Indian market, mainly consist of low-density and linear low-density polyethylene, which do not readily biodegrade. These polyethylene-based mulches must be retrieved and disposed of after usage. As a result, agricultural plastic mulch films are often contaminated with soil and are not accepted by many recycling facilities. Indeed, the presence of microplastics in farmlands resulting from nondegradable mulch film is a severe soil threat that hinders the sustainable development of agriculture.

To address this critical problem, Amity University has collaborated with Technical University Munich, Germany and have developed Mulch Films.

SALIENT FEATURES:

- Made from Indigenous Raw Material.
- Consist of Novel Polysaccharides.
- Cost-Effective.
- Environment-Friendly.
- Degrades completely with 1 year under soil conditions according to ASTM WK2902.

BIODEGRADABLE PLASTIC

GRANTED PATENT

- Simple chemical process and an easier manufacturing procedure
- Exhibits excellent synergy through the use of Polysaccharides
- Thickness and strength variation can be customized.
- Safe disposal

ECONOMIC, SAFE AND NON-TOXIC

- PLA Free • Cost effective
- Environment friendly
- Easy availability of raw materials

Industrial scale Environmental-Friendly Cost-Effective Disposable Plates, Spoons and Pots

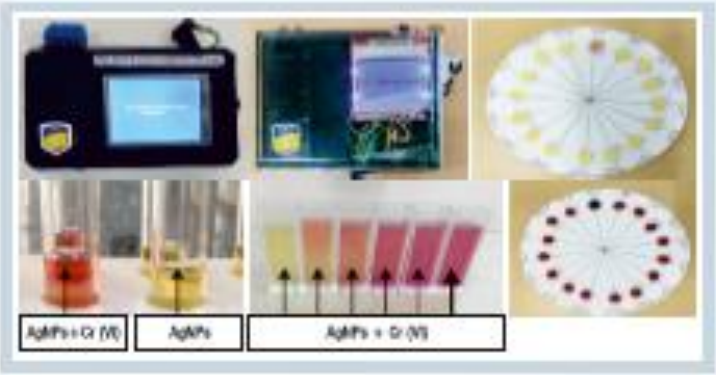
Bioplastic film

Injection Mouldable Biodegradable plastic for warming food

Biodegradable Plastic Products 100 % degraded within 60 days under Soil conditions

POINT OF CARE DEVICE FOR ON-SPOT DETECTION OF CHROMIUM IN CONTAMINATED WATER

We have developed a device with a small meter of size of mobile phone. It just takes few drops of water and give the quantity of chromium in water. It is highly useful for an instant detection of chromium.



CHROMIUM DETECTION: NEED AND DEMAND

- Chromium (Cr) is one of the toxic environmental pollutants released in the environment due to its wide use in industries such as tanning, corrosion control, plating, pigment manufacture and nuclear weapon production.
- Nearby people and workers are mostly prone to Cr contamination.
- Increased rate of contaminations could leads to national burden of decease & global burden of decease.
- Can decrease other complications due to high cost method of detection.

PRODUCT FEATURES AND CHARACTERISTICS

- Therefore, we have developed a newer electronics with simple algorithms capable of calculating concentration of chromium in liquid medium.

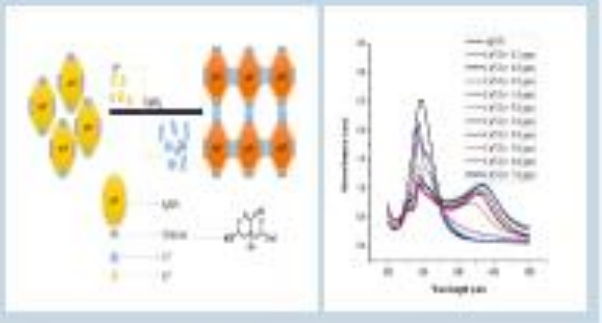
Novelty of the device

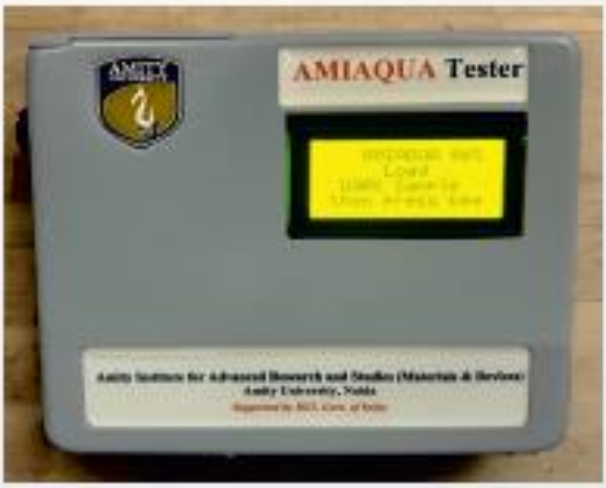
- The limit of detection of this device is 0.02 ppm (mg/L)
- Easy to handle & pocket friendly
- Cost effective
- Give both quantitative and qualitative results

FUTURE DEVELOPMENTS

- It can be connect with mobile phone for real time detection and data interpretation.
- Battery can be connect with solar panel to charge anywhere, where light source is available.
- Different type of LED can be used in a single device for many other heavy metal detection.
- It can be calibrated to be used with different type of sample like urine, blood etc.

WORKING PRINCIPAL & CHARACTERIZATION





Unique innovative waste water to drinkable water system by Amity Scientists

SELF-SUSTAINED SYSTEM TO CLEAN INDUSTRIAL WASTEWATER AND GENERATE ELECTRICITY SIMULTANEOUSLY WITHOUT ANY EXTERNAL SOURCE

Purify waste-water by using its own Generated Electricity

Electricity & Water are basic requirements of living beings. Our planet is mostly covered by water but drinking water is only 2.5%

- A novel system in which two specially designed electrodes of a particular material are dipped in wastewater.
- This generates electricity. Utilising this generated electricity, the developed system cleans wastewater.
- This is a self-sustained system.

There are two basic needs for all: • Electricity • Clean Water

Developed a unique method where just especially designed two electrode of particular materials are dipped in the waste water. It generates electricity and cleaned the waste water simultaneously by its own electricity without using any power source or any chemical from outside. This is a self-sustained system.

CLEAN WATER IN TWO STEPS

- Provides semi-cleaned water in 1st step- used for irrigation, gardening, toilet, etc.
- By using its own generated electricity, the RO system can be powered to produce drinkable water.

The developed system can be scaled up for industrial use. The electrode's life is long and can be reused after it with clean water.

WEARABLE ELECTRO-OPTICAL NO_2 GAS SENSOR



PRODUCT FEATURES AND CHARACTERISTICS

Nox are Green-House Gas (GHG) and influence global warming

Nitrogen oxides (NOx) generate from stationary combustion chamber or engines cause numerous undesirable environmental effects. These include negative influences on human and animal health.

To overcome this issue, our system has been designed at Amity University to detect the presence of toxic NO_2 gas in the environment.

The existing NO_2 sensors which are Electro-Chemical or oxide based are very expensive. However, Amity's electro optical based system is cost effective, highly sensitive and reproducible.

The principle of gas detection is based on the absorption of the wavelength by the gas and detection change in resistance accordingly.

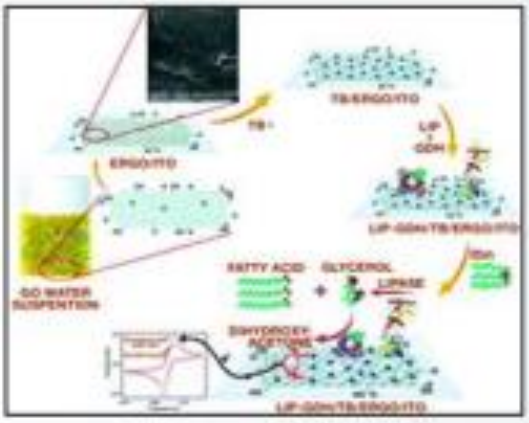
SALIENT FEATURES :

- Wearable Sensing Device
- Rechargeable battery
- Low Cost & Reliable
- Fast response time
- No interference of humidity and temperature changes
- Works at room temperature

BIENZYMATIC REUSABLE REDUCED GO-BASED BIOSENSORS FOR ELECTROCHEMICAL SENSING OF CHOLESTEROL AND TRIGLYCERIDE

Product Features and Characteristics

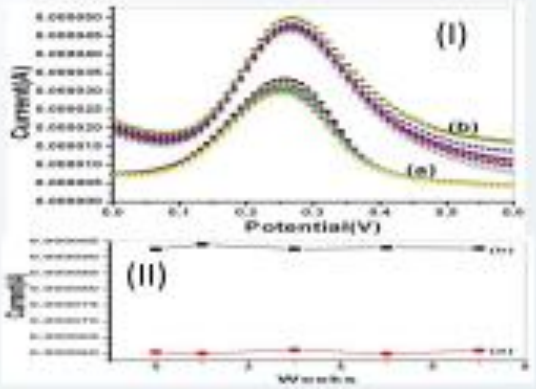
- Novel ERGO platform has been explored to fabricate a triglyceride (TG) biosensor via co- immobilizing of lipase (LIP) and glycerol dehydrogenase
- Detect tributyrin in the range of 50–400 mg dL^{-1}, high sensitivity of 29 pA mg^{-1} dL, low response time of 12 sec, tested with serum samples
- Novel amperometric cholesterol biosensor based on bienzyme system such as cholesterol oxidase (ChOx) and horseradish peroxidase
- Offer wider linearity (35 to 500 mg/dl), higher sensitivity (4.22 $\mu A m M^{-1}$), high shelf life (8 weeks), low response time (19s)



Schematic presentation of formation of LIP-GDH/TB/ERGO/ITO electrode for Triglyceride sensing

Need and Demand

- Level of cholesterol and triglyceride in serum are important parameter in the diagnosis and prevention of heart diseases
- The risk of CAD and hyperlipidemia necessitates estimating the amount of triacylglycerols in blood
- Existing cholesterol biosensors suffer from low reliability, poor shelf life and low sensitivity and interference from other oxidisable species such as ascorbic acid (AA), uric acid (UA), and acetaminophen
- Developed sensor offers smart, simple, sensitive, rapid response and online monitoring strategy for common man usage



(I) DPV curves for reusability testing for Cholesterol biosensor (current vs. potential plot with 100 mg/dl analyte for 8 times)

(II) Shelf life measurement for 8 weeks

ELECTROCHEMICAL DEVICE FOR SENSING OF AFLATOXIN B1 IN GROUNDNUT EXTRACT

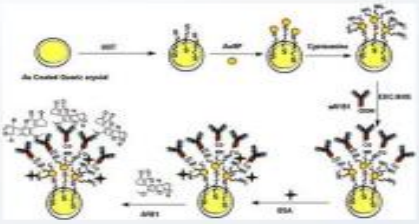
Product Features and Characteristics

- Handheld electrochemical sensor for rapid detection of Aflatoxin B1 with a linear range of 15 to 60 ppb and a sensitivity of 7.853 count ppb^{-1} cm^{-2}
- Validated by LC-MS/MS by IARI, Accuracy level +/- 12% with LC-MS/MS
- Based on a novel self-readable smart sensing Aflatoxin B1 immunoprobe

Hand-held electrochemical device connected to self readable immunoprobe

Need and Demand

- Aflatoxin B1 is identified as group 1 carcinogenic(IARC) and also causes immune weakness, reproduction deficiency, malnutrition, and growth impairment
- Indian Council of Medical Research (ICMR)-Lucknow stated 21% of groundnut in India is unfit for human consumption due to aflatoxin
- Rapid detection and affordable sensor for detection of AflatoxinB1 in ground nut extract is highly needed from socio-economic point
- Argentina ($875M), United States ($594M), Brazil ($320M), and Sudan are also huge exporters of groundnut, developed device projects huge demand in these countries



Schematic illustration of immunoelectrode antigen and antibody interaction

Unique Selling Points (USPs)

- Rapid detection and affordable sensor
- Total detection time 30 min including ground nut extract

MOBILE APP INTEGRATED HAND-HELD ORGANOPHOSPHATE PESTICIDE (OP) SENSOR

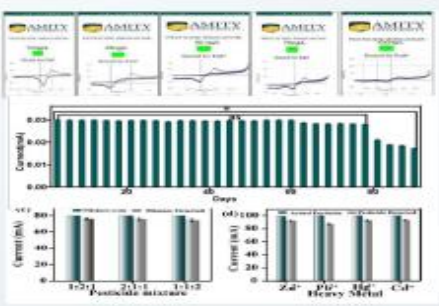
Product Features and Characteristics

- Rapid hand-held, mobile app interfaced Electrochemical sensor for quantitative detection of Organophosphate pesticide in vegetable extract
- Operates over a sweeping potential for detection of OP (upto 9.8 ng L^{-1}) ,mixtures of OP and spiked sample vegetable extract (deviation < 15%) over linear range (10–100 ng L^{-1}) with high sensitivity (6.39 μA ng^{-1} Lcm^{2}), short detection time (10 min)
- Validated with standard potentiostat, and possess remarkable stability for 3 months

OP detection Hand-held sensor with plugged in OP probe and connected to mobile phone by BLE

Need and Demand

- OP is neurotoxin and banned by Environmental Protection Agency (EPA)
- Despite of the fact, high efficacy, low cost, and easy availability, global market consumption of OP pesticide is predicted to reach 94.76 million by the end of 2027
- Existing commercially available sensors are qualitative, while OP tends to accumulate so their precise level (quantitative) detection is mandatory
- Boon for on-site detection of OP by farmers, safety regulators, supply chain retailers and even common man through a mobile app

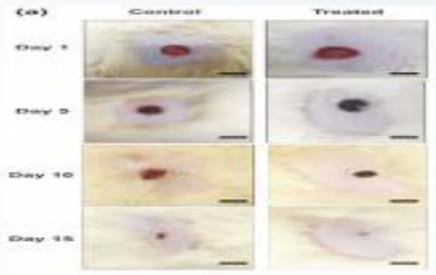


(a) Detection of different concentration of OP pesticide (b) stability of OP probe (c)Detection of OP mixture(d) Study of interference of heavy metal ions

N-DOPED CARBON NANO SHEET BASED HYDROGEL COMPOSITE FOR WOUND HEALING

Product Features and Characteristics

- Hydrogel nanocomposite for biomedical and/or pharmaceutical applications of non-biodegradable polymeric hydrogels containing antimicrobial two dimensional (2D) carbon nanosheets (CNS) as fillers.
- Provide pH-responsive composite composition of material in which nanosized 2D carbon sheets are uniformly dispersed in polymer matrix
- The composite may be used as carrier for therapeutic agent for long duration and as a dressing for topical wounds, cuts, etc. on human body and, Accelerates diabetic wound healing.
- Increased mechanical strength, good viscoelastic properties and could slowly release the therapeutic payload at a particular pH in a controlled fashion.
- Can control wound moisture,absorb inflammatory cytokines and dead cells from the wound and form a barrier to the microbes.
- Facilitate quicker proliferation and migration of epithelial cells, fibroblast and keratinocytes to the wound bed leading to faster wound healing.



(a) In vivo study depicting control and hydrogel nanocomposite treated photograph of Wistar rat wounds at days 1, 5, 10, 15. Control (Panel I) Treated (Panel II). Scale bar 10 mm.

Unique Selling Points (USPs)

- Medicament to treat diabetic wound leading to improved patient condition.
- Can decrease chances of amputation and other complications.

Synthesised hydrogel nanocomposite

VEGETARIAN HARD CAPSULE COMPRISING THE PALATABLE POLYMERS AND COMPLETELY DEVOID OF GELATINE. GRANTED PATENT AND AVAILABLE FOR TRANSFER TO THE INTERESTED ENTITIES

Product Features and Characteristics

- Vegetarian capsules comprising of palatable polymers and completely devoid of gelatin.
- Capsule possesses multilayer forming ability, so their thickness, tensile strength, and drug release profile can be easily customized based upon the need.
- Already granted patent and ready technology for transfer at commercial scale.

Disintegration Test

pH Time	(minutes)
1.2	10
7.4	20
9.0	30

Unique Selling Points (USPs)

- ☑ Safe & Non- Toxic
- ☑ Multimolecular polymeric film can control drug release

Effect of Temperature and Time

30 Days | 90 Days | 120 Days | 180 Days

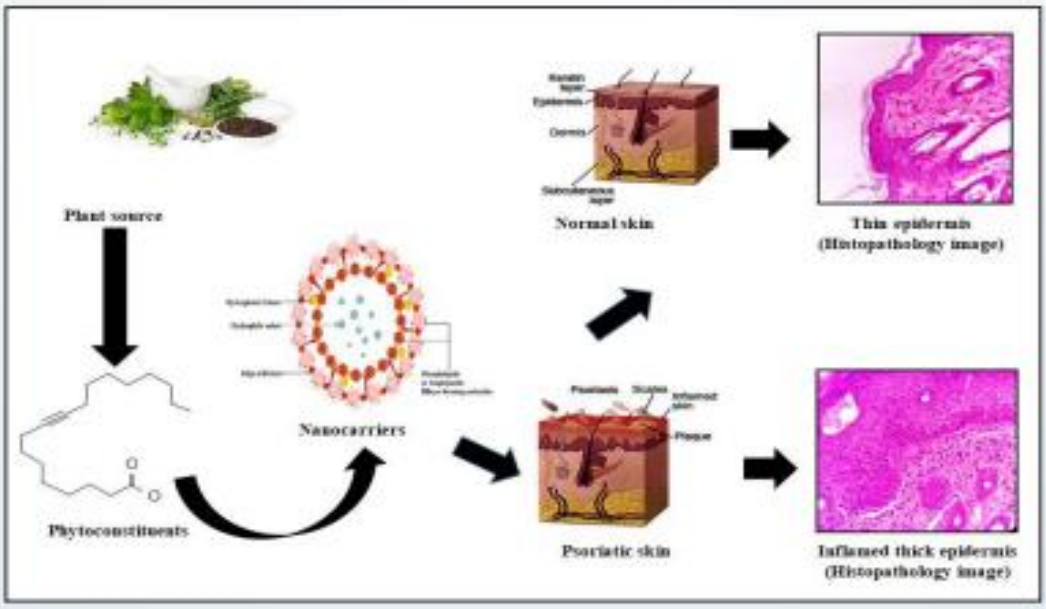
HERBAL REMEDY FOR PSORIASIS

Product Feature and Characteristics

- Herbal product for the treatment of psoriasis which is a chronic inflammatory, multi-system disease associated with considerable morbidity and co-morbidity.
- Majority of patients prefer the topical treatment for psoriasis. The biggest challenge posed by topical treatment is highly resistant stratum corneum which makes conventional creams and ointments reaching deeper layers of skin difficult. Nano formulation is capable of penetrating into deeper layers of skin.

Unique Selling Points (USPs)

- Novel nano delivery system bearing phytoconstituent
- Improved permeation into rigidized psoriatic skin
- Dermatologically tested
- Overcome the limitations associated with conventional formulation available in the market



Human Thermal Comfort in Helmets using Phase Change Material at Extreme Hot Conditions

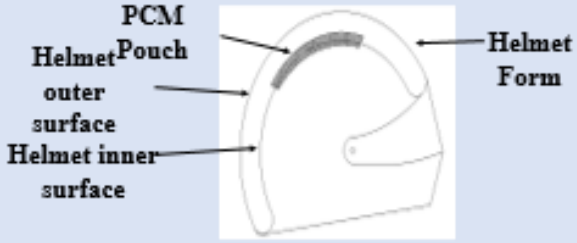
Amity Institute for Advanced Research and Studies (Materials & Devices)
Amity University Uttar Pradesh, Noida
Neeraj Gupta, Vivek Kumar, Abhishek Verma, Nitin Bharadwaj and V. K. Jain

Thermal Discomfort to the Wearer's Head due to Extreme Hot Conditions Leads to

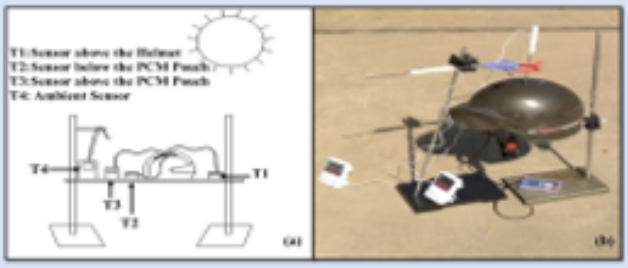
- Hypothermia
- Deadening of senses
- Inability to concentrate during riding



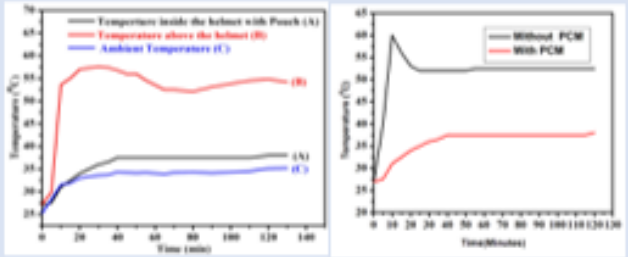
PCM (Novel Cooling Unit) based Pouch Placed Inside the Helmet



Real-Time Analysis

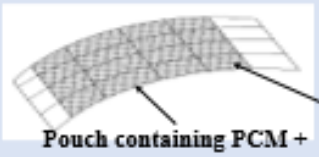


Systematic set up for the study novel cooling unit

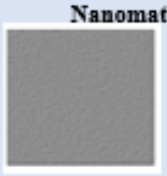


Shows temperature vs time graph with and without PCM nanocomposite

Design and Development of Novel Cooling Unit (PCM-based Pouch) for Thermal Comfort in Helmet a



PCM Pouch Design



Thin and flexible Aluminum foil used for making pouch

PCM Pouch

Characterization of PCM materials using SEM

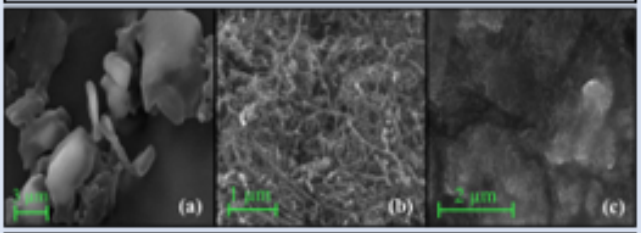


Fig. SEM micrographs of (a) pristine PCM (Eicosane), (b) MWCNTs, and (c) PCM- MWCNTs nanocomposites


PCM-Nanocomposite based Pouch (Novel Cooling Unit) provides Thermal Comfort for around 2 hrs.

Salient Features:

- During sunny days (hot conditions), the helmet's outer surface temperature crosses 40-45 °C
- A novel, reusable cooling unit (PCM-based pouch) placed inside the helmet maintained human thermal comfort at a temperature of 37 °C and remained constant for almost 2 hours.
- After 2 hours, pouch can be re-set by keeping it in shade.
- Specially designed for two-wheelers, desert workers, and miners.

INDIGENOUS PORTABLE AND LOW-COST SOLAR OPERATED ATMOSPHERIC WATER GENERATOR

INTRODUCTION

- The volume of water in the earth's atmosphere as a vapor is evaluated to be about 12900 km3 and Atmospheric water Generator (AWG) is a pragmatic and scalable method for solving potable water scarcity in hot and humid areas.
- The present invention is Atmospheric water Generator (AWG) which produces potable water from the surrounding air up to RH= 45%
- In this device, cooling is Peltier solar based and condensing surfaces are superhydrophobic Aluminium. Heat piped based convective cooling method is developed to extract heat from the 250 Heat from the Peltier system.
- The super-hydrophobic with low contact angle hysteresis Condensing surfaces of 120mm×120mm are fabricated by chemical etching followed by plasma etching.
- The contact angle of water droplets on this condensing surface is 153±5o and the contact angle of hysteresis is ≤8o
- The device has capability to produce water 2 L/hr at cost of Rs 2L/Hr in month of July-September in NOIDA India.

BENEFITS OF ATMOSPHERIC WATER GENERATOR

- AWG creates water from the humidity in air present in ambient atmosphere. Thereby, no depletion of ground water or any other available water resources, Machine's optimum performance ideally requires a minimum humidity level of approximately 40% & above.
- It provides fresh, bacteria free, clean and pure drinking water conforming to all the international water safety standards, AWG create water from air using a patented process.
- The AWG features a superior filter system which ensures that the dispensed water is filtered through a five-stage filter, comprising of Pre-carbon Filter, Sediment Filter, Ultra Filtration, TCR Filter and Ozonation, which removes all unwanted particles, viruses and bacteria and delivers pure drinking water with higher Oxygen levels.
- The AWG dew point also work as a dehumidifier and air filter, thereby performs two tasks at the same time and cost and make home of user less hospitable to allergens such as dust mites, mold and mildew.
- There is no wastage of available water resource, as it does not require water as input. It directly creates water from air. Further, in case of RO, there is lot of wastage of water. However, in case of AWG there is no wastage of water.
- Most importantly, it is affordable, cost effective, easy to install, environment friendly.

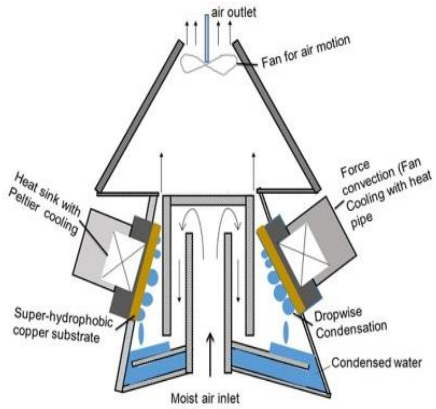


Figure 1: Schematic diagram of proposed atmospheric water generator

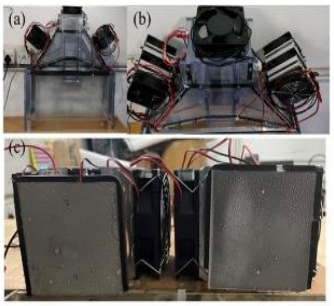


Figure 2: Photographs of the setup (a) Front view of the setup, (b) isometric view and (c) moist air condensation pattern on superhydrophobic surfaces

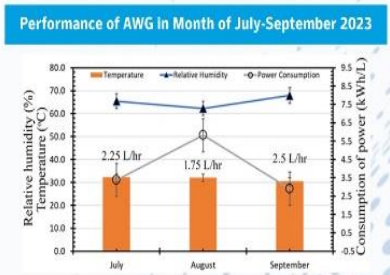
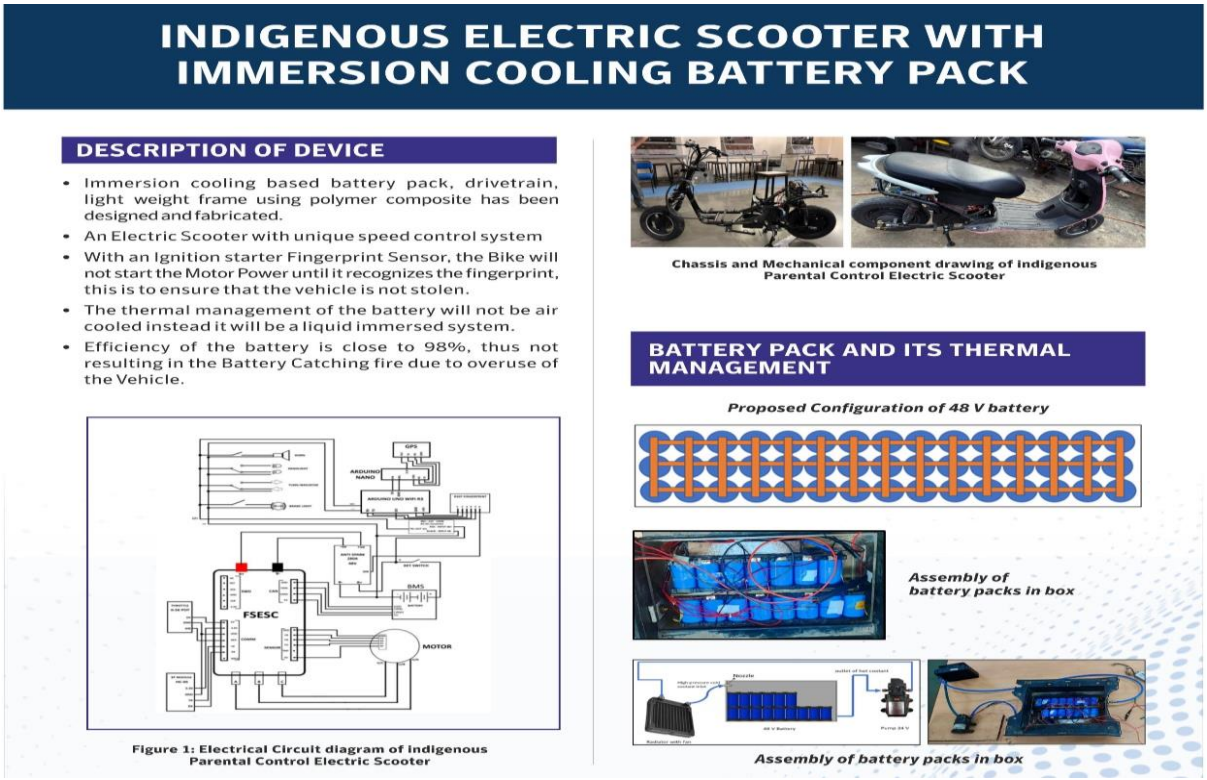


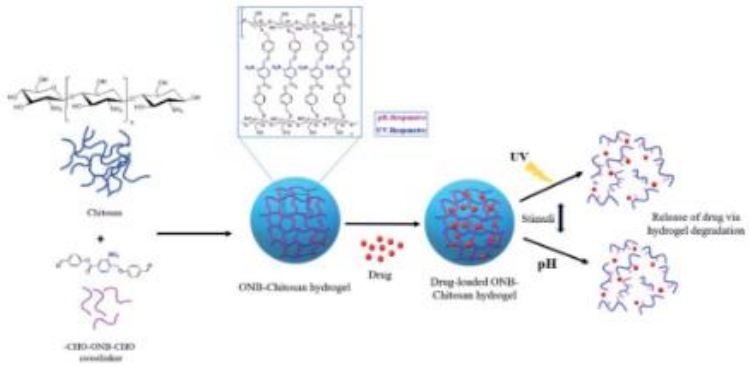
Figure 3: Capacity of water production and Power consumption at various conditions in month of July-September 2023



Stimulus Responsive Hydrogels for Controlled Drug Delivery:

Hydrogels have been studied for decades for their outstanding properties, making them excellent candidates for drug delivery applications. The controlled delivery of therapeutic payloads in a disease-, time and site-specific manner across the physiological pathways remains an unsettled challenge.

We are working on development of stimulus responsive crosslinkers, such as 4-formylphenyl 4-((4-formylphenoxy) methyl)-3-nitrobenzoate (CHO–ONB–CHO) and its joining with amine-based polysaccharides, viz. chitosan, resulting in the formation of a dual stimuli-responsive (ONB–chitosan) hydrogel having UV and pH-responsive sites for targeted drug delivery.

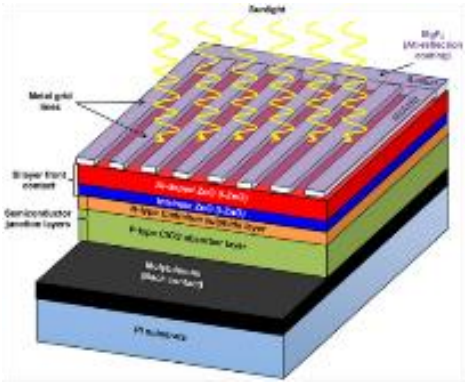


a) Materials for sensing applications:

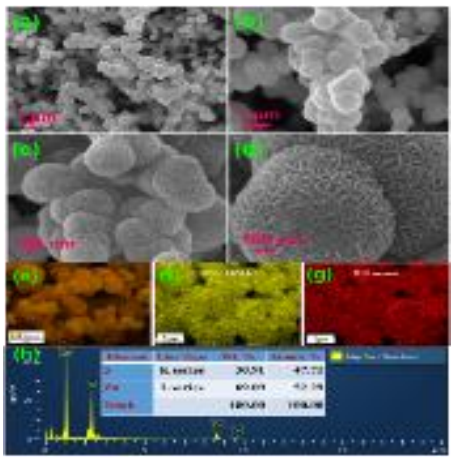
Sensors and biosensors opened up a new horizon in fast, sensitive and selective detection of the disease, reducing interval time between sampling and diagnostic result. In this context, smart nanomaterials have recently become important as materials that provide an effective surface for biomolecule immobilization with desired orientation, better conformation and high biological activity resulting in enhanced sensing characteristics.

We are working on development of 2-D nanocomposite/ polymer nanocomposite/ organic-inorganic nanocomposites for detection of LDL, BPA -endocrine disruption compounds and other hazardous materials for their sensitive, specific and selective detection.

Semiconducting thin films for photovoltaic applications



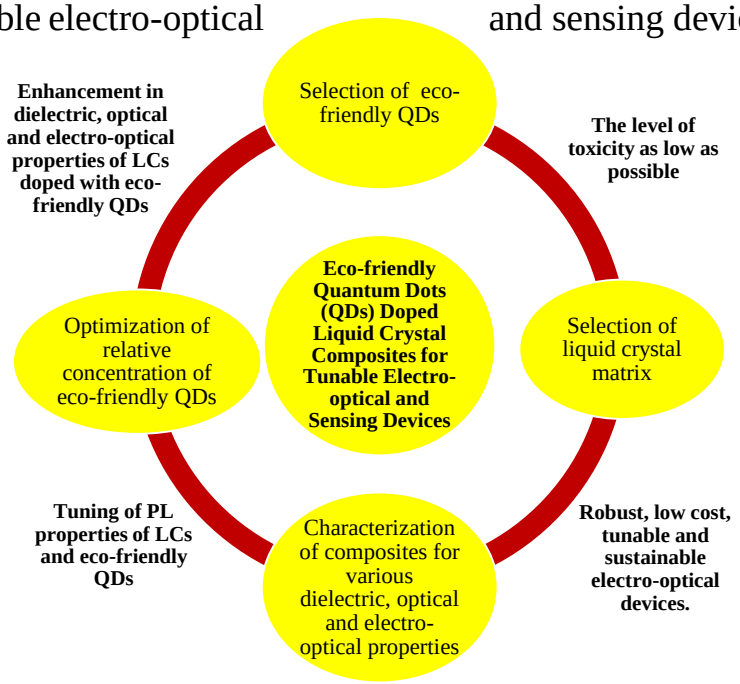
Fabrication of low-cost Visible/ultraviolet sensor using heterojunction grown



b) Eco-friendly Quantum Dots Doped Liquid Crystal Composites for Tunable Electro-optical and Sensing Devices

Liquid crystals (LCs) are widely used in liquid crystal displays, tunable lenses, lasers, sensors, etc. However, improvement in the performance of LCs based devices are still much required. The eco-friendly quantum dots (QDs) instead of Cd based are found to be a good dopant for LCs in order to tune their properties.

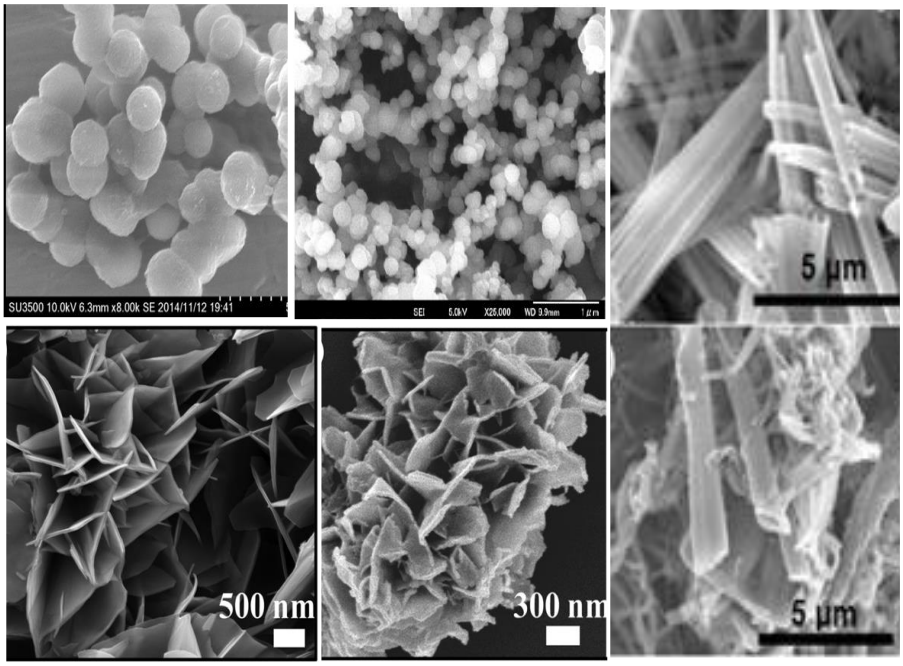
We are working on eco-friendly QDs (ex. Carbon dots, Graphene QDs, etc.) doped LCs (ex. 5CB) composites to improve alignment, dielectric anisotropy, threshold voltage, switching speed, optical contrast, photoluminescence, etc. of LCs, to fabricate the tunable electro-optical and sensing devices.



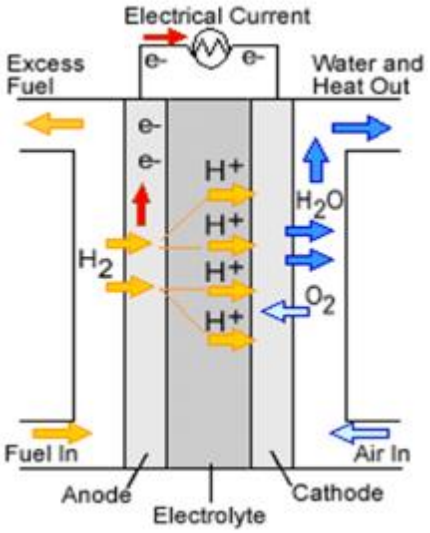
c) *Development of advanced hybrid materials for enhanced photocatalytic water-splitting*

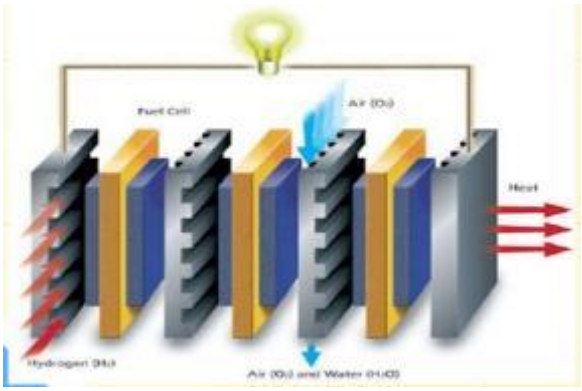
Hydrogen, as an energy carrier, is a zero-emission fuel. Being green and clean, it is considered to play an important role in energy and environmental issues. Photocatalytic water splitting is a process used to generate hydrogen from the dissociation of water. Hybrid materials, such as, TiO_2-Metal NPs hybrid, charcoal/BiOCl composite, $BiOCl_{0.5}Br_{0.5}$-Q etc Our research focus is on the development of efficient green photocatalytic material [viz. BiOX (X=F, Cl, Br, I,), Bismuth tungstate, Bismuth molybdate, Bismuth Ferrite, Bismuth titanate and their composites] using natural sensitizers to increase the efficiency of material and immobilization on suitable substrate (viz. activated carbon block, ceramic fiber and Luffa) for easy recovery from

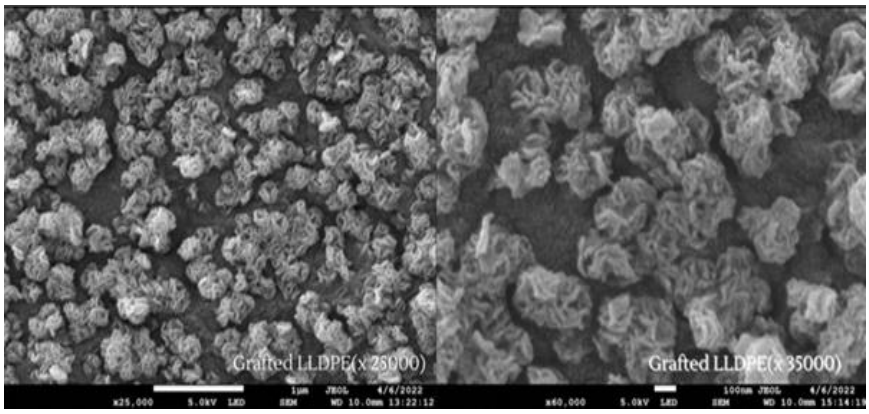
aqueous media. The sensitizers solve the major issue of recombination of photoinduced charges and help in tuning band-gap, surface area, arrangement of layers, and size of the nanoparticles to enhance the photocatalytic activity.



d) Anion Exchange Membrane (AEMs) through Radiation Induced Grafting of Polymers for Fuel Cell Applications : Towards Cleaner Energy & Environment







e) Carbon nanostructures-based polymer nanocomposites for multifunctional applications

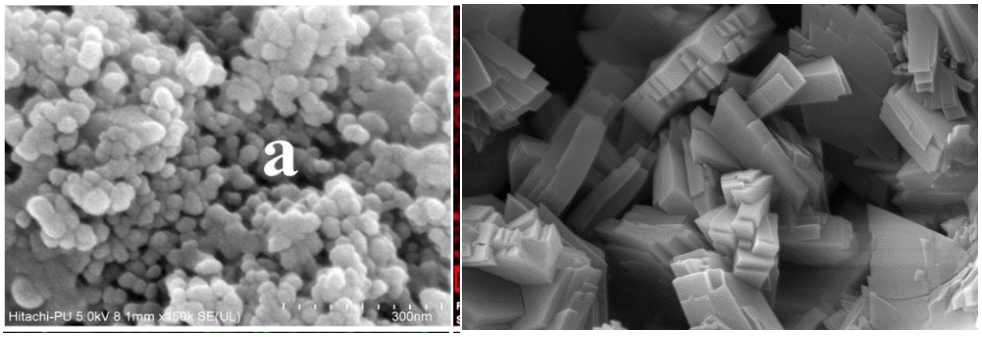
Due to their remarkable properties, such as outstanding mechanical, thermal, and electrical properties, carbon nanostructures like carbon nanotubes and graphene have been used in a variety of applications for the past three decades, including water purification, EMI shielding, strain sensing, biomedical applications, defense and automobile industries, energy applications, and gas and pipeline industries. Researchers continue to face significant problems related to dispersion, alignment, and interfacial interaction between carbon nanostructures and polymer assembly. Our department will focus on the synthesis and surface modifications of carbon nanotubes and graphene, and preparation of polymer-based nanocomposites for human and structural health monitoring, EMI shielding, biomedical applications and UV photodetection.

f) Smart Materials for Rapid and Sustainable Water Treatment

Zeolite based functional materials, where zeolite surface is modified using nano metal oxide particles will be synthesized for water treatment applications. The functionalized zeolite materials are capable of removing organic, inorganic and bacterial impurities in one cycle. The material so prepared is easy to remove and are reusable. Synthesis of composite functional materials will be carried out for removal of toxic contaminants from water. We will focus our research on the following topics related to water technology;

1. Removal of toxic metal ions from water
2. Removal of organic contaminates from waste water.
3. Production of clean water.

Faculty members at the department are working in the field of sensors, advanced materials, analytical chemistry, biochemistry, polymers, organometallics, solid state & materials chemistry, nanomaterials. Concerted efforts are being made to develop these materials/technologies indigenously and transferring the same to the industry/user, thus contributing to the **Make in India and Start-up India** programs. Faculty members are also actively engaged in **"SWACHH BHARAT"** expedition through its well accomplished research efforts in water technology, sensing materials and green fuel on a long term as well as on short term basis.

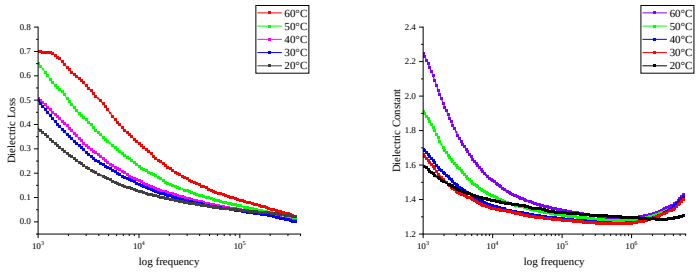


g) Materials for quality assessment and real time monitoring application:

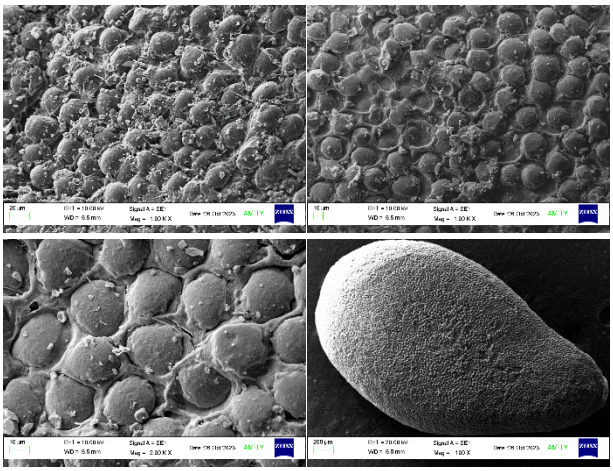
People are interested in the electrical properties of agricultural food crops like- oils & seeds important for mankind and they need safer and healthier food materials for energy. Since dielectric properties of materials are closely corelated with moisture content and therefore, researchers properly designed and calibrated electrical instruments, which can directly be used to determine the moisture content of grains, seeds and food items accurately. The electrical nature of these materials can be described by their dielectric properties, which influence the distribution of electromagnetic fields and currents in the region occupied by the materials, and which determine the behavior of the materials in electric fields.

We are working to find the optical and dielectric characterization of different types and varieties of agricultural materials which is beneficial for quality assessment of dielectric materials based on various parameters and also helpful in development of sensing and real time monitoring techniques of food materials.

Dielectric permittivity plots of dielectric material (sesame oilseed)



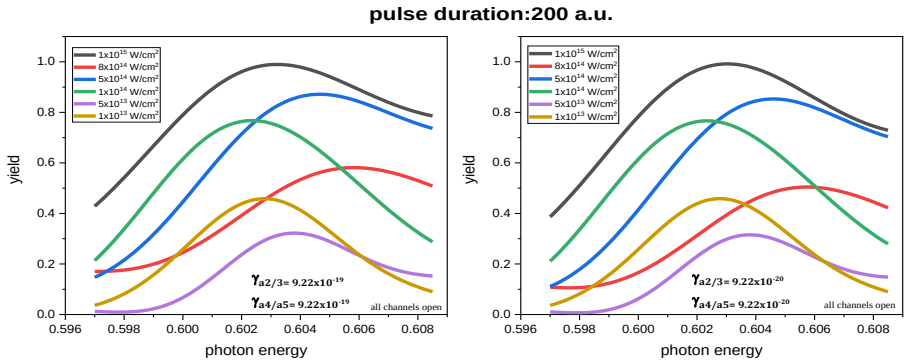
SEM-Images of dielectric material (sesame oilseed)



h) Resonant Interatomic Coulombic decay (ICD):

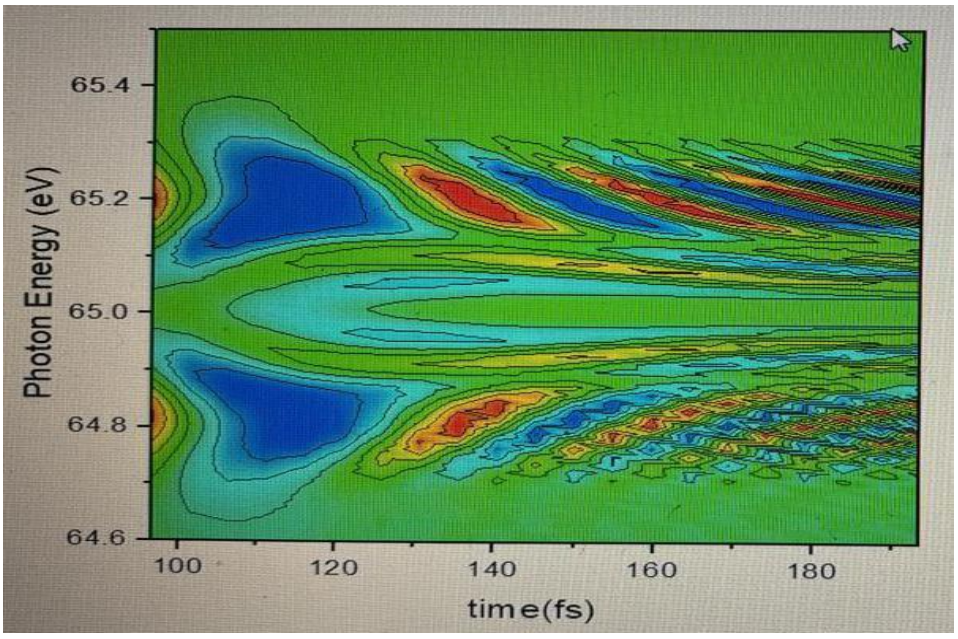
The main objective of our work is to investigate the time-dependent dynamics of a two-photon ICD process of the neon dimer, in presence of several competing photoionization processes. The exposure of neon dimer to an intense XUV laser can trigger additional processes, apart from ICD. We investigate the effects of these additional processes on the two photon ICD dynamics and possible competitions between different channels by proper variation of laser parameters. Our results demonstrate the effects of photon energy on the total yield of the doubly excited states, at different peak intensities. We also calculated the electron spectra and thoroughly

investigated the effects of different competing processes on the line shape of the spectra.



i) Theoretical exploration of nonlinear Quantum optical interactions in the attosecond pulse regime:

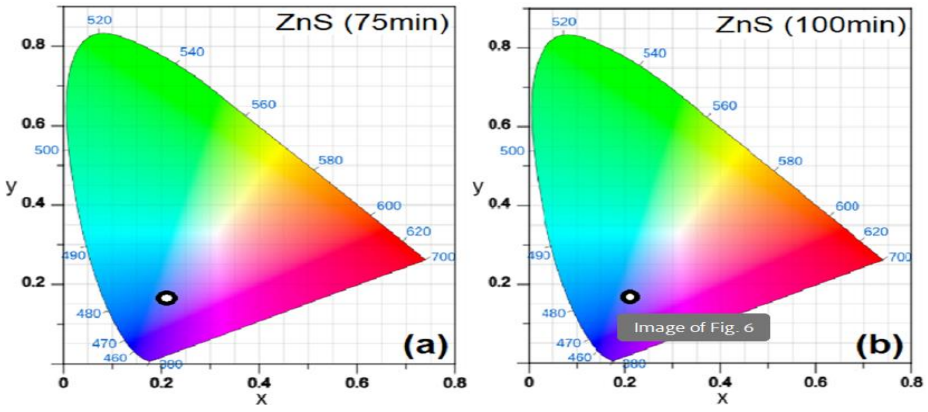
We are working on nonlinear optical interactions that may be initiated on exposure of an atom to intense attosecond laser pulse. One such interaction is Electromagnetically induced transparency on exposure of Xenon atom to an attosecond laser. We find periodic transparency and absorption that depends on photon energy and other laser parameters.



j) Fabrication of high-performance Ultraviolet/Visible photodetectors based on thin films hetero junction

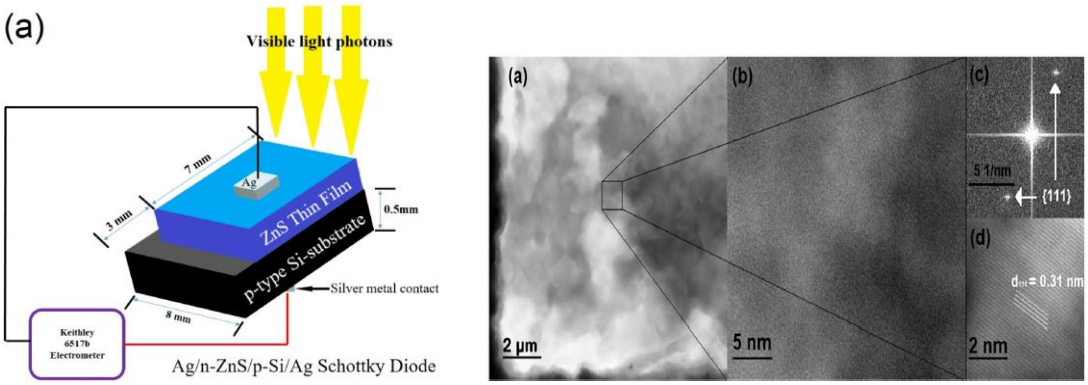
a) Fabrication of Schottky diodes & Ultraviolet/Visible photodetectors using the ZnS/p-Si heterostructure:

We are working on fabrication of Ag/ZnS/p-Si/Ag heterojunction device. Photodetection properties of the fabricated heterojunction device will be investigated under the visible light illumination. Before the fabrication of heterojunction device, all the essential characterization tools such as GIXRD, UV-VIS, PL, CIE, XPS, SEM, STEM etc. will be performed to explore the structural, optical and morphological properties of deposited ZnS thin film structures. A few important results of the deposited structures are as follows.



(iii)

CIE 1931 chromaticity diagram of the ZnS thin films



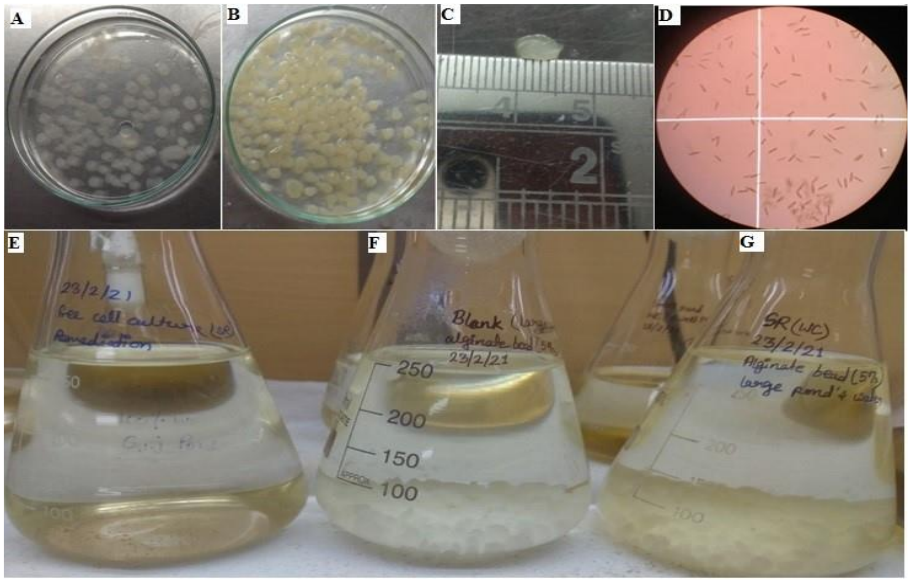
(i) (ii)

(a) Schematic illustration of the fabricated Ag/ZnS/p-Si/Ag heterojunction device (ii) (a-b) STEM micrograph (c) FFT and (d) IFFT image of the prepared ZnS samples.

ASEAN project:

- We have successfully immobilized different diatom isolates in natural polymers i.e. sodium alginate (Ca-alginate beads) which could be useful as live feed for aquaculture farming. We have optimized the bead stability under different conditions. Cell viability, non-toxicity, and biocompatible nature of the beads were studied.
- The live feed added to the aquaculture pond and preliminary results suggest a significant improvement in metabolic profiling of fish when feeds with novel aquafeed.

Bioremediation of aquaculture wastewater with diatom entrapped Ca -alginate hydrogel beads



Immobilization of diatoms is an **innovative strategy** to remediate aquaculture water.

N. palea immobilized in Ca-alginate bead was stable for a **longer duration**.

Remediation of nitrate, phosphate, ammonia removal ranged from **63%–87%.**

A) Ca-alginate hydrogel beads. B) Diatom entrapped Ca-alginate hydrogel beads. C) Measurement of bead size. D) A microscope image (entrapped *Nitzschia palea*) observed with an inverted microscope. E) Free cell culture (only cell and no bead). F) Blank sample (Ca-alginate hydrogel beads). G) Test sample (Diatom entrapped Ca-alginate hydrogel beads).

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Herbal Sunscreen Cream:

Technology Advantages:

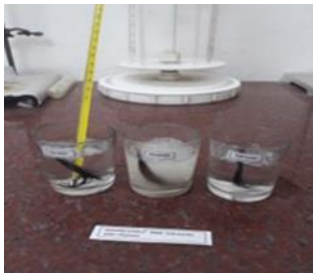
- Suitable for all Skin Types
- SPF value 25-30
- 3 years of shelf life
- 40-45 Rs/Kg

Vegetarian Hard Capsules:

- Vegetarian capsules comprise of palatable polymers and completely devoid of gelatin.
- Capsules possess multilayer forming ability, so their thickness, tensile strength, and drug release profile can be easily customized based upon need.
- Already granted patent and ready technology for transfer at commercial scale.
- Safe & Non-Toxic
- Multimolecular polymeric film can control drug release

Hair Dye:

The invention provides a natural hair dye composition consisting different parts of selected herbs/medicinal plants along with novel fixating agents. The dye composition not only colours the hair but also nourishes hair and the medicinal property of the dye prevents any fungal infection. It also has a long shelf life.



- There were different shades of herbal hair dye developed.
- All of the hair samples retained the colour consistency after cold and hot wash.
- Colour have shown more that 1.5 years of shelf life.
- There is no damage seen on hair structure after application of the dyes.
- There is less than 5% loss of colour.

1. **Innovation: <u>Pulse-Powered Nutrition: Redefining Functional Foods with Horsegram Protein Hydrolysates</u>**

The growing demand for plant-based, protein-rich food products has spurred innovative research into the utilization of underutilized pulses. This study highlights the successful application of protein hydrolysates derived from

horsegram (*Macrotyloma uniflorum*) in the development of three unique food products: Vegan Mayonnaise, Protein-Enriched Fruit Concentrate, Protein-Enriched Spice Mix and Protein enriched cookies. These innovations address the dual challenge of enhancing the protein content of everyday consumables while maintaining their sensory and functional quality.

Global Protein Needs and Food Security: With the global population projected to reach 9.7 billion by 2050, the demand for protein is estimated to increase significantly. Current protein sources, primarily derived from livestock, are resource-intensive and contribute to environmental degradation. Plant-based proteins offer a sustainable alternative to meet the growing nutritional demands while addressing food security. Underutilized crops like horsegram (Figure 1), rich in protein and essential amino acids, hold great potential in bridging the protein gap and contributing to a sustainable food system. Moreover, protein-energy malnutrition affects nearly 45 million children under five, highlighting the urgent need for innovative, nutrient-dense food solutions.

Vegan Mayonnaise: Horsegram protein hydrolysates were utilized as an emulsifying agent to create a plant-based alternative to traditional mayonnaise. The hydrolysates' excellent emulsification properties contributed to a stable emulsion, ensuring a creamy texture and appealing mouthfeel. This product caters to vegan consumers and those seeking cholesterol-free, protein-enriched condiments. Sensory evaluation confirmed the acceptance of this formulation, with no compromise on taste or texture.

1. **Protein-Enriched Fruit Concentrate:** Protein fortification of fruit concentrates was achieved by incorporating horsegram protein hydrolysates. This innovation resulted in a nutritionally superior product with enhanced protein content, suitable for health-conscious individuals. The hydrolysates' solubility ensured uniform distribution in the concentrate, and sensory trials indicated high consumer acceptance, with the fruity flavors remaining intact.
2. **Protein-Enriched Spice Mix:** Horsegram protein hydrolysates were added to traditional spice mixes to enhance their protein profile. This innovation offers a simple way to incorporate additional protein into daily diets without altering traditional cooking practices. The hydrolysates' functional properties, including their ability to blend seamlessly with powdered spices, ensured consistent product quality. Sensory analysis demonstrated the product's suitability in various culinary applications, with no compromise on flavor or aroma.
3. **Protein-Enriched Cookies:** Horsegram protein hydrolysates were incorporated into cookie formulations to develop protein-enriched snacks. This innovation provides a convenient and tasty way to boost daily protein intake, catering to consumers seeking nutritious snack options. The

hydrolysates contributed to improved texture and nutritional quality without compromising the cookies' flavour or overall appeal. Sensory evaluations confirmed high acceptance rates among consumers.

Macrotyloma uniflourm (Horsegram) seeds

Vegan protein enriched mayonnaise

Protein enriched fruit concentrate (Orange Flavour)

Protein enriched spice mix

2.Innovation: <u>Gum Innovate: Harnessing the Nutritional and Functional Attributes of cordia gum in various food products</u>

This research highlights the innovative utilization of *Cordia dichotoma G. Forst*, a versatile tree species known for its nutrient-rich gum, in the development of groundbreaking food products and functional applications. Cordia gum, a natural polysaccharide, exhibits remarkable antioxidant, antimicrobial, and anti-inflammatory properties, making it an invaluable ingredient for health-promoting and culinary innovations. Rich in dietary fiber and proteins, the gum enhances digestion, supports cholesterol regulation, and serves as an emulsifier, binder, and stabilizer in food and pharmaceutical applications. Its neutral taste and odour offer flexibility for diverse formulations, driving its adoption in modern product development.

The innovative Triple G-Mix, a ginger garlic paste fortified with Cordia gum, demonstrates superior health benefits, including antioxidant activity and antimicrobial efficacy ensuring an extended shelf life of over six months. Similarly, the Spice Fusion Cordia blend harnesses bioactive compounds like palmitic acid, oleic acid, and γ-sitosterol to deliver flavor enhancement, nutritional benefits, and potential therapeutic effects, catering to the growing demand for functional seasonings.

Cordia Chews, a novel gummy product infused with organic fruit juices and Cordia gum, exemplifies the fusion of taste and health benefits, addressing consumer preferences for natural, health-conscious snacks. Additionally, Gumdrop Popcorn Bliss integrates Cordia gum with popcorn and jaggery, creating a fiber-rich, antioxidant-packed, gluten-free snack that supports digestive health and energy regulation. And lastly, Pineapple Squash enriched with cordia gum is a tropical fusion of pineapple's zest and Cordia gum's wholesome goodness, crafted to elevate your refreshment experience, enhance viscosity, texture and also enhances the shelf life of the product.

These pioneering applications underscore the multifaceted potential of Cordia gum as a sustainable, health-enhancing ingredient, paving the way for innovative solutions in food technology and nutraceuticals while meeting market demand for natural, functional, and eco-friendly products.

Figure 1: (A) Triple G-Mix, (B) Orange Cordia Chews, (C) Apple and Mango Cordia Chews, (D) Gumdrop Popcorn Bliss, (E) Spice Fusion Cordia blend, (F) PineCord Delight

3. Edible coating of fruits using lima bean and soyabean starch from seeds and pod coat

Fruits and vegetables have always been a major part of the human diet. Their consumption is known to decrease the incidence of health problems as they are rich in essential nutrients, phenolics, anthocyanins, antioxidants and vitamins. Every year India loses a significant portion of its farm produce due post-harvest losses which has been a matter of grave concern, therefore adequate coating of fruits is needed to increase its shelf life. *Achras sapota Linn* commonly referred to as sapota

or sapodilla is one of the tropical fruits which is an abundant reservoir of proteins, sugars, vitamin C, minerals. Plums, (*Prunus domestica*), are stone fruits a good source of anthocyanins, vitamin C, polyphenols and carotenoids. The anthocyanins and phenolic compounds in the plum act as antioxidants balancing inflammatory actions, thereby promoting health by reducing neurological disorders

Amity Institute of food technology has developed a novel edible coating base material to extend the shelf life of fruits. The coating base prepared from seed and pod coat starch, which is easily soluble in water and can be easily removed from the surface of the fruits thereby reducing the waste generated from the packaging.

Coating of sapota and plum fruits were conducted using three different coating techniques such as spraying, dipping, and brushing. The objective was to assess the efficacy of these coating methods and identify the most efficient coating method. The lima bean and soyabean starch coated and control sapota fruits were kept under observation at ambient and refrigerated storage conditions for a period of 20 days. The fruits that had been coated with the extracted lima bean and soybean starch displayed reduced weight loss and exhibited lower values for total soluble solids (TSS), ripeness index and decay incidence in comparison to the control fruits. Furthermore, the vitamin C content, firmness, colour attributes and water activity were better maintained in the coated fruits than the control fruits regardless of the storage condition. The degradation kinetics followed first order reaction in all the fruit samples. The sensory evaluation resulted in higher scores for the coated fruits as compared to the control fruits in both the storage conditions. Overall, the findings suggest that extracted lima bean and soybean starches could serve as a potential coating materials for plum and sapota fruit preservation. However, the lima bean starch was more effective in increasing the shelf-life of plum and sapota fruits as compared to the lima bean starch

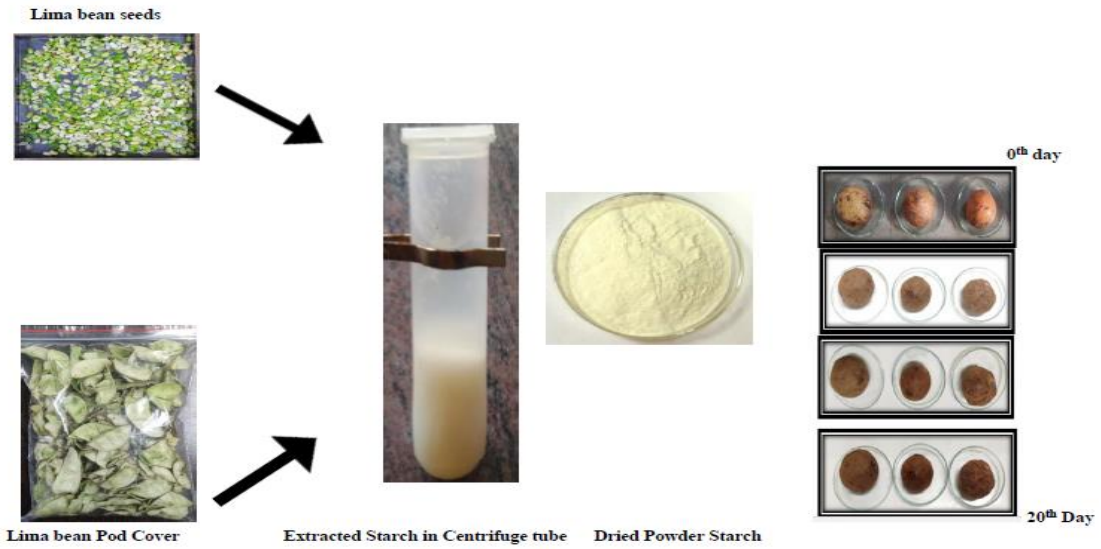


Figure:Edible coating of sapota and plum fruits with extracted lima bean and soyabean starch from seeds and pod coat

- **Carbon quantum dot-nanocomposite hydrogel as Denovo Nexus in rapid chondrogenesis,**

The incapability of cartilage to naturally regenerate and repair chronic muscular injuries urges the development of competent bionic rostrums. There is a need to explore faster strategies for chondrogenic engineering using mesenchymal stem cells (MSCs). Along these lines, rapid chondrocyte differentiation would benefit the transplantation demand affecting osteoarthritis (OA) and rheumatoid arthritis (RA) patients. In this report, a de novo nanocomposite was constructed by integrating biogenic carbon quantum dot (CQD) filler into synthetic hydrogel prepared from dimethylaminoethyl methacrylate (DMAEMA) and acrylic acid (AAc). The dominant structural integrity of synthetic hydrogel along with the chondrogenic differentiation potential of garlic peel derived CQDs led to faster chondrogenesis within 14 days. By means of extensive chemical and morphological characterization techniques, we illustrate that the hydrogel nanocomposite possesses lucrative features to influence rapid chondrogenesis. These results were further corroborated by bright field imaging, Alcian blue staining and Masson trichome staining. Thus, this stratagem of chondrogenic engineering conceptualizes to be a paragon in clinical wound care for the rapid manufacturing of chondrocytes.

- **Sodium Niobate Nanowires Embedded PVA-Hydrogel-Based Triboelectric Nanogenerator for Versatile Energy Harvesting and Self-Powered CO Gas Sensor**

The surging demand for sustainable energy solutions and adaptable electronic devices has led to the exploration of alternative and advanced power sources. Triboelectric Nanogenerators (TENGs) stand out as a promising technology for efficient energy harvesting, but research on fully flexible and environmental friendly TENGs still remains limited. In this study, an innovative approach is introduced utilizing an ionic-solution modified conductive hydrogel embedded with piezoelectric sodium niobate nanowires-based Triboelectric Nanogenerator (NW-TENG), offering intrinsic advantages to healthcare and wearable devices. The synthesized NW-TENG, with a 12.5 cm^2 surface area, achieves peak output performance, producing ≈840 V of voltage and 2.3 μC of charge transfer, respectively. The rectified energy powers up 30 LEDs and a

stopwatch; while the NW-TENG efficiently charges capacitors from 1µF to 100 µF, reaching 1 V within 4 to 65 s at 6 Hz. Integration with prototype carbon monoxide (CO) gas sensor transform the device into a self-powered gas sensory technology. This study provides a comprehensive understanding of nanowire effects on TENG performance, offering insights for designing highly flexible and environmentally friendly TENGs, and extending applications to portable self-powered gas sensors and wearable devices.

- **Synthesis and growth mechanism of vertically aligned graphene sheets with precise control over the number of layers for lithium-oxygen batteries,**

Engineering carbon nanowall (CNW) nanostructures is a daunting task as the synthesis of vertical few-layer graphene (FLGs) nanostructures with precise control over the layers remains elusive. The underlying reason is that the CNW growth mechanism is not yet fully understood, and the huge feature space in the characterization datasets cannot be analyzed with conventional techniques. In the present work, we endeavor to engineer FLG nanostructures via plasma-enhanced chemical vapor deposition, where the number of graphene layers in the FLGs was especially controlled. The aim was to decipher the growth mechanism of the FLG and CNW nanostructures. Machine learning (ML) techniques were employed to decode the feature space of plasma optical spectra. ML techniques extract crucial information, identify the vital factors that govern the transition from CNWs to FLG nanostructures and provide invaluable insights into the growth mechanism. We report a new hybrid FLG/CNW nanostructure that does not exist thus far: FLGs at the bottom and CNWs on top. Furthermore, we develop an ultrafast and commercially viable carbon nano-coating technique that applies to a wide variety of specimens with CNWs. The efficacy of the process is demonstrated by fabricating a cathode for a Li–O2 battery for nano-energy applications. The nano-carbon-coated electrode is composed of a 3D network of hierarchically interconnected porous graphene sheets (3D-HPG). We demonstrate that the specific capacity of 3D-HPG-based electrodes in Li–O2 batteries (without any binder and catalyst) can be as high as 12 400 mA h g−1. As it is an inexpensive, efficient, and highly reproducible process, we believe that the current approach opens up a new avenue for Li–air battery research.

Dropwise Condensation of Vapor from Moist Air on Mesh-Like Surfaces

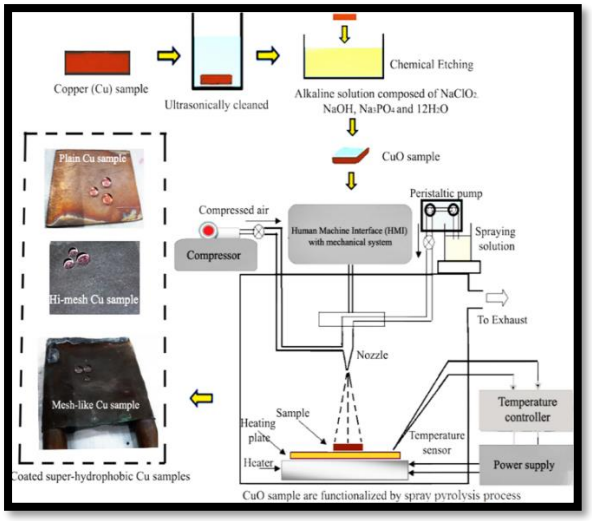


Fig: Schematic diagram for fabrication of various type super-hydrophobic surfaces; (a) plain copper, Hi-mesh surface, and mesh-like surfaces

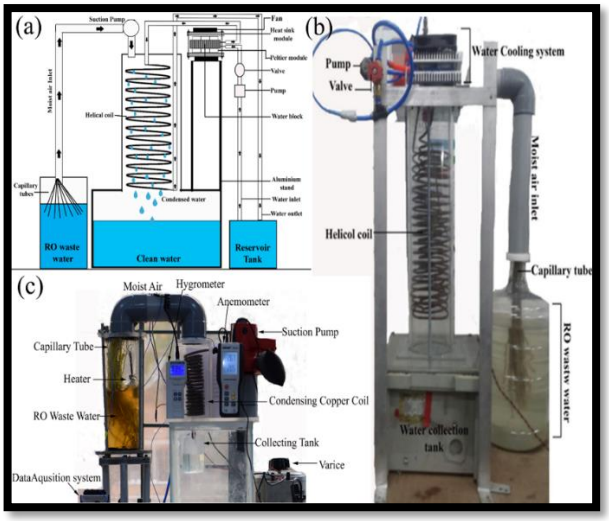


Fig. A device for water recovery from wastewater of household RO systems. (a) Schematic representation of the experimental facility, (b) Photograph of the proposed device and (c) Photograph of the experimental setup for optimizing the parameters of the water recovery device

Highlights:

- The potable water crisis emerges as a challenge and it needs immediate attention.
- Atmospheric air has a sufficient amount of water, but it spreads and its condensation rate is very slow.
- Fabricate favorable morphology of metallic surface for moist air condensation in form of droplets.
- Optimize the various cooling techniques for moist air condensation.
- Design and fabricate a low-cost, Solar based atmospheric water generator (AWG) for hot and humid regional conditions

Accurate Disease Diagnosis In Just One Click!

About Us
Diagno Plus is a cutting-edge healthcare technology specializing in AI-driven disease diagnosis. Our dedicated portal offers lightning-fast results, backed by our passion for advancing healthcare accessibility and accuracy.

Our Mission
Our mission is to revolutionize healthcare by harnessing the power of AI to deliver accurate and swift disease diagnoses. We are committed to providing accessible, reliable, and timely results through our dedicated portal.

Nutrijam
100% NATURAL

NutriJam is a natural amla-based jam, sweetened with jaggery, and enriched with nutrient-packed superseeds and raisins. It offers a healthy, preservative-free alternative of unhealthy spreads and jams in market, rich in antioxidants, vitamins, and minerals.

OTHER PRODUCTS	NUTRIJAM
Preservatives Added	No Preservatives Added
No Fiber Content	High Fiber Content
Low Protein Content	High Protein Content
High Sugar Content	Low Sugar Content
Synthetic Food Colour and Flavouring Substance Present	Synthetic Food Colour and Flavouring Substance Absent

Health benefits:
- Rich in Vitamin C: Boosts immune function and skin health.
- Digestive Health: Aids digestion and supports a healthy gut.
- Anti-inflammatory: Reduces inflammation and supports overall health.
- Heart Health: Omega-3s and antioxidants from superseeds support cardiovascular health.
- Bone Health: Calcium and magnesium from superseeds and jaggery promote strong bones.
- Natural Sweetener: Jaggery provides essential minerals without refined sugar.
- Blood Health: Raisins are rich in iron, which helps combat anemia.

Ingredients of NutriJam:
Base of Jam:
1. Amla – Emblica of icinalis
2. Jaggery – Saccharum barberi
3. Raisins – Vitis vinifera

SmartSens

AI-Enhanced Portable Electrochemical Device

AI Powered Noise Reduction
Achieve unparalleled signal clarity with our advanced AI algorithms

High Portability
Compact design allows for easy transport and field use

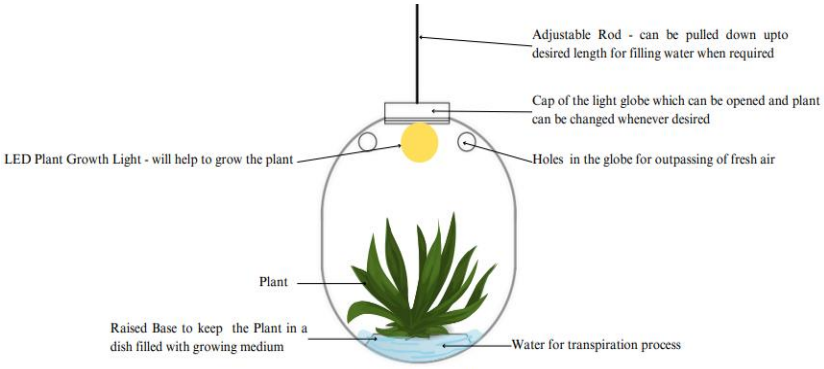
User-Friendly Interface
Smartphone app with Intuitive controls, real-time data visualization and data storage

Versatile Applications
Ideal for healthcare diagnostics, environmental monitoring, and more

Amity University Uttar Pradesh, Lucknow

- **Biophilic Light: A Fusion of Nature and Modernity**

The Biophilic Light is an innovative lighting concept that merges nature with modern design. It features a transparent globe containing a miniature ecosystem with air-purifying plants, such as spider plants and peace lilies, integrated into the fixture. This design uses eco-friendly materials, energy-efficient LED lights, and a system that supports plant health while promoting photosynthesis. The adjustable lighting and plant care features make it an adaptable and sustainable addition to both residential and commercial spaces. This fusion of functionality, aesthetics, and sustainability offers a calming and wellness-focused solution for modern living environments.



BIOPHILIC LIGHT
REPRESENTATIVE DIAGRAM

- **Berberine Chloride Dihydrate Loaded Ethosomal Gel for Dermatological Disorders**

This is a novel herbal formulation for the treatment of psoriasis, leveraging a nano gel system to improve skin penetration and enhance bioavailability. The formulation incorporates berberine chloride dihydrate, which is more effective than conventional treatments due to its ability to penetrate deeper skin layers. The formulation, based on pure herbal compounds, offers a more efficient and prolonged therapeutic effect. Currently under negotiation with pharmaceutical companies for commercialization, the technology aims to collaborate with hospitals for clinical studies to meet industry requirements. This innovative treatment addresses the challenges of topical psoriasis management with a more effective delivery system.

Amity University Haryana

NASA-AUH COLLABORATIVE RESEARCH PROGRAMS

In a long-term collaborative research effort, a global network station of NASA-AERONET (AErosol RObotic NETwork) site has been successfully established in May 2017 on the roof-top of Academic Block-A of Amity University Haryana, Panchgaon-Manesar-Gurugram for regional air quality and climate research (Fig. 1). Recently, this bi-lateral research project has been extended up to 2032. The valuable data sets (column-integrated aerosol optical depth, size distribution, refractive index, single scattering albedo, phase function, asymmetry parameter, water vapor, fine- coarse-mode fractions, current satellite and long-range transport model trajectories) from this real-time sun-sky radiometer provides almost complete characterization of aerosols over different environments. These datasets are valuable also for developing models for forecast purpose and for calibrating/validating the satellite sensors. Further, this instrument provides the air-health chain monitoring.

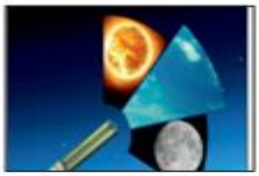


Fig. 1: NASA-AERONET


Fig. 2: MAIA Satellite Mission


Fig. 3: MAIA AMOD


Fig. 4: SAMOSA

The ACOAST-AUH has been selected as one of the sites in this global network. The IIT-D is coordinating these installations in India. Recently, a MAIA AMOD sampler has been installed (Figs.2 & 3), co-located with the existing NASA-AERONET instrument, which has been operating for the past more than 4 years on the terrace of Academic Block-A of AUH. The data from MAIA AMOD would improve our understanding of how aerosols affect local air quality, visibility, and human health through the connections between AOD and fine particulate matter of PM2.5. As a part of the CAL-VAL Program of NASA's satellites(Fig. 4), a Network of Citizen-Enabled Aerosol Measurements for Satellites shows the adequate ground-based measurements of air quality do not exist in most of the country.

BLACK CARBON AEROSOL TRENDS OVER PANCHGAON, HARYANA

A photograph (Fig. 1) depicting [A] Geography around the Amity University Haryana (AUH), [B] Areal view of the University Complex, [C] Four-storey Academic Block 'A' and its terrace where a suit of sensing instruments is installed, and [D] Multi-wavelength Aethalometer used for measurements of simultaneous BC mass concentration (ng/m3) and Biomass Burning (%).
Fig. 2 portrays the operation of the Aethalometer by the student, Saurabh Yadav (M.Sc. Project work). Fig. 3 displays the temporal variation of BC mass concentration observed during the study period.
The results suggest that the aethalometer-derived black carbon (BC) aerosol measurements, carried out over a rural (pristine) site, Panchgaon, Haryana State, India during the winter months of 2021–2022 and 2022–2023 indicated the following:

- Good agreement with collocated and concurrent observations from the Air Quality Monitoring Station (AQMS).
- Secular variations in BC mass concentration showed good correlation with those in surface meteorological parameters.
- The biomass burning fire count retrievals from NASA-NOAA VIIRS satellite, and backward airmass trajectories from NOAA-ERL HYSPLIT Model analysis have also been utilized to explain the findings. They reveal that the north-west Indian region contributes maximum to the BC mass concentration over the study site during the study period.
- The observed BC mass concentrations corroborate the synchronous fire count. This information in conjunction with the primary and secondary pollutant concentrations were found to aid the development of mitigation methods to achieve a sustainable climate system.


Fig 1


Fig.2

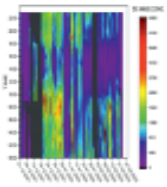


Fig.3

Acknowledgment: The ACOAST and ACESH gratefully acknowledge the constant support and encouragement from Hon'ble Founder President; Hon'ble Chancellor; President, ASTIF; Vice Chancellor and Pro-Vice Chancellor, AUH. Thanks, are also due to B.N. Holben, M.D. Giles, K. Jason, M.S. Amy of NASA, USA; and N. Athauda, L.Yang, H. Rose, S. Jeremy, C. Sabrina, O. Margaret of Emory University and Prof. Sagnik Dey is Institute Chair Professor at the Centre for Atmospheric Sciences, IIT Delhi.

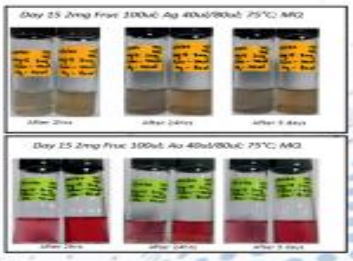
DEVELOPMENT OF NANO-SENSOR FOR THE DETECTION OF ADVANCED GLYCATION END-PRODUCTS

INTRODUCTION TO ADVANCED GLYCATION ENDPRODUCTS

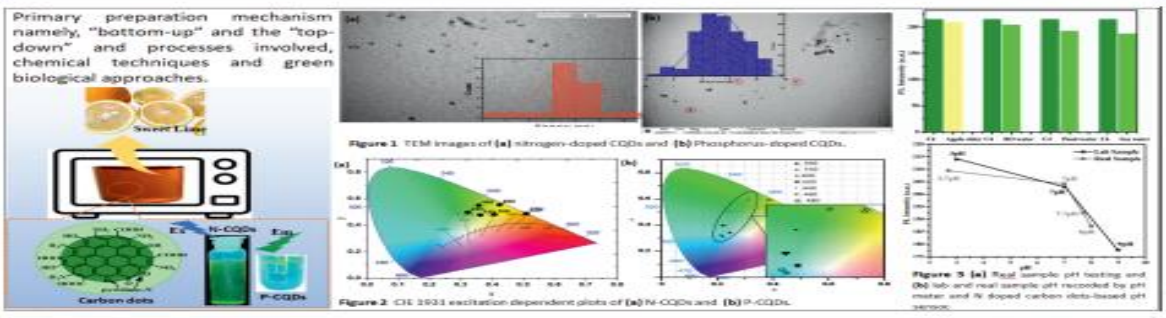
- In India, up to 12% of adults are thought to have diabetes, making it the country with the largest prevalence of the condition worldwide according to the estimates, and by 2045, it is anticipated to reach more.
- In diabetic patients, glucose builds up in the blood since it is not used by the cells for energy.
- When proteins or lipids in the body interact with sugars (like glucose), a cascade of chemical reaction starts that leads to formation of a variety of heterogeneous compounds called advanced glycation end products (AGEs).
- AGEs change intracellular signalling, gene expression, the release of pro-inflammatory chemicals, and the production of free radicals by interacting with plasma membrane localised receptors (RAGE, receptors for AGE) and it creates intra- and extracellular cross-links with lipids, nucleic acids, and other endogenous important molecules in addition to proteins.
- The long term effect of diabetes is associated with CVD, kidney failure, diabetic retinopathy, neurological disorders including rheumatoid arthritis, osteoporosis, ageing, all are linked to AGEs.

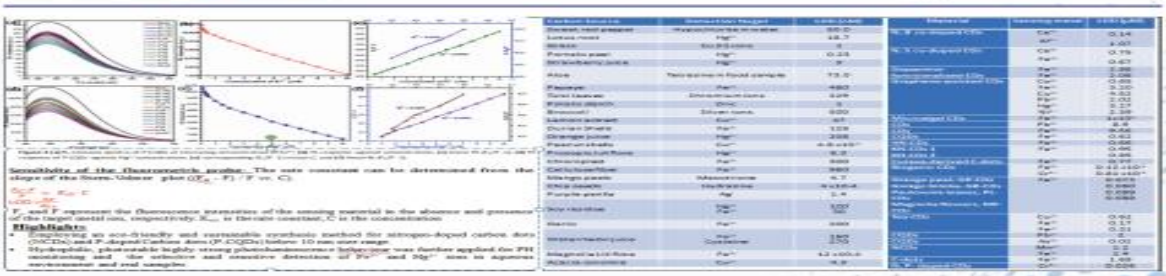
DETECTION OF ADVANCED GLYCATION ENDPRODUCTS

- Heterogeneity and limited information made Advanced Glycation Endproducts detection difficult.
- High-end instrument and experts are required to detect Advanced Glycation Endproducts.
- Our aim is to develop metal nanoparticle based colorimetric sensor for detection of Advanced Glycation Endproducts which is user friendly, easy to identify by naked eye and inexpensive.



CARBON QUANTUM DOTS BASED FLUOROMETRIC SENSOR FOR HEAVY METAL IONS - AN APPROACH FOR SUSTAINABLE ENVIRONMENTAL AND WATER



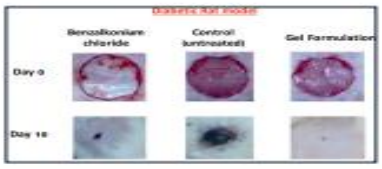


NANOTECHNOLOGY'S "NANO-MARVELS: TRANSFORMING HUMAN HEALTH AND WELLNESS"

nanoBreath – N95 PM 2.5 Antimicrobial Face Mask

Scientifically validated eliminating more than 99.99% of pathogens
FDA registered material and EU Compliant

"Nano Breath N95: Breath clean, Breath safe- Your shield against the unseen"



SMART-SKIN CONSTRUCT

A first of its kind, indigenous and cost-effective, bio-synthetic, silica enriched, smart skin construct has been developed for scar-free burn wound healing.
Further studies to establish its efficacy as underway.
A patent has also been filed for the same.
The project is funded by ICMR (File no. 17X(3)/Adhoc/87/2022-ITR.

Rejuvenation of Bilaspur Pond

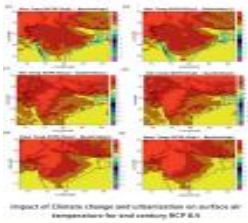
A high societal project to rejuvenate a waste- water pond at nearby village named Bilaspur in Haryana.
Firstly, the cleaning of pond was done with 100 KLD MBBR (Moving bed biofilm reactor) technique along with Ferrite based nanoparticles as heavy metal adsorbents.
Project aimed to enhance the ecosystem of the area.

AMITY SCHOOL OF APPLIED SCIENCES: DST-SERB SPONSORED PROJECTS

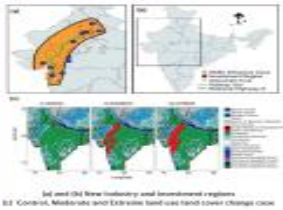
Development of high - resolution future climate scenarios for the NCR region under climate change and urbanization - PI: Dr Sarika Jain

- Recent decades have seen NCR's expansion, encouraging increased urbanization and industrial activity.
- NCR faces a dual challenge as climate change. Global studies indicate that LULC changes influence regional temperatures, impacting both maximum and minimum values.

	Year
Base Line	1986-2005 (Historic)
Mid century	RCP4.5(2050-59)
Mid Century	RCP8.5(2050-59)
End Century	RCP4.5(2090-99)
End Century	RCP8.5(2090-99)



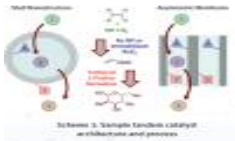
- Study the impact of urbanization on Delhi NCR.
- Study the impact of climate change for future scenarios (RCP 4.5, RCP 6.0 and RCP 8.5) considering all seasons.
- Study the combined impact of urbanization and climate change.



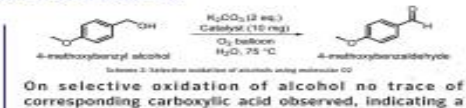
- The minimum temperature shows an increase of 4°C to 7 ° C with a maximum warming of 7.1 ° C at the end of the century for the extreme urbanization case under the RCP8.5 climate scenario.
- The maximum temperatures also show an increase in the 1.5 ° C to 3.5 ° C range.
- The increase in temperature is due to decrease in latent heat and increase in sensible heat flux..

References: Modeling Earth Systems and Environment, 7: 1309-1319. ISSN No: 2363-6211.
- The International Journal of Climate Change: Impacts and Responses, 13(2): 39-60.

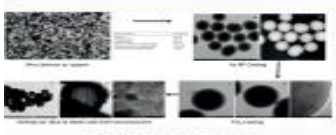
Novel nanostructures for selective multistep catalysis - PI: Dr Anirban Das



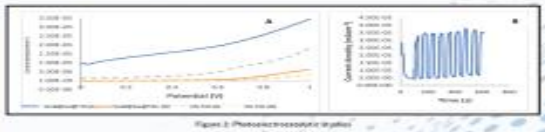
- Architectures with multiple catalysts on single support may lead to greener catalytic processes (e.g. Scheme 1)
- Need to purify intermediates would be eliminated.
- We report nano-architectures having hollow titania shells enclosing sub 2 nm Au nanoparticles.



On selective oxidation of alcohol no trace of corresponding carboxylic acid observed, indicating a controlled oxidative pathway (Scheme 2).



- SiO_2 nanospheres templates synthesized & functionalized with presynthesized Au NPs.
- TiO_2 coating followed by etching out SiO_2 core lead to Void@Au@TiO_2 architectures (Figure 1).



- Photoelectrocatalytic studies indicated stable photo-response (Figure 2).
- The developed architectures would be evaluated for tandem catalysis reactions after tethering an additional catalyst.

Reference: Journal of Solid State Chemistry, 2024, 330, 124484.
Acknowledgement: DST-SERB Grant: TAR/2020/000289

ANALYSIS OF PHOTOSYNTHETICALLY ACTIVE SOLAR RADIATION FOR AGRI-VOLTAIC PLANT

INTRODUCTION

Agri-voltaic is defined as the dual use of the same land area for solar electricity and plant cultivation including aquaculture.

There are three different layouts of the AVPs (Pulipaka et al. 2021):

- Interspace farming wherein crops are grown in the space between two rows of solar arrays.
- Farming below the panels which are installed with a tilt angle equal to the latitude and no special arrangement is made for growing crops underneath these panels. Manual cultivation is only possible under these panels.
- Farming below elevated structures which are around 3m high (Casares de la Torre et. al 2022).

Photosynthetically Active Radiation (PAR)

Plants use solar radiation in the wavelength of 400-700 nm for photosynthesis – photosynthetically active radiation (PAR). Quantum sensors are utilised for measuring PAR at any site.

Availability of solar radiation underneath the solar panels is a major challenge while growing crops in agri-voltaic plant.

Mathematical relations were derived to calculate the fraction of light that reach the ground under the collector field when collectors are mounted 2m above the ground with row spacing equal to three times the height of the collectors (Goetzberger et al. 1982).

But it is difficult to have a ground measured PAR data for all sites which can be utilized for decision making for the selection of plants that can be grown in the given site.

Objective is to develop a model to estimate the photosynthetically active radiation (PAR) under an agrivoltaic plant at AUH.

AGRI-VOLTAIC PLANT AT AMITY UNIVERSITY HARYANA

Agri voltaic plant under an 185kWp conventional grid connected solar photovoltaic power plant which is in Amity University Haryana which is surrounded by the Aravalli Mountain range from one side.

Fifteen different variety of plants were grown to study the impact of radiation on the plant's growth and identify the plants which grow best under the given radiation conditions. Solar radiation availability were also studied underneath the panels.

CONCLUSIONS

- The proposed model can be utilized to estimate the photosynthetically active solar radiation under a solar photovoltaic power plant for any location.
- The model is simple and utilizes only the location, date and time of the day for computing the PAR values.
- The model can be utilized to estimate PAR at a given location and can be utilized to select the variety of plant that can be grown under the solar PV power plant.

MODEL TO ESTIMATE PHOTOSYNTHETICALLY ACTIVE RADIATION

The monthly average hourly PAR on a horizontal surface (PAR_H) can be calculated using the following relation:

$$PAR_{H,i} = 0.389f \times I_{sf} \; ; f = 1, 2 \quad (1)$$

Where

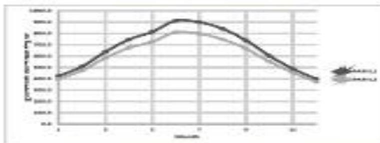
$$I_{s1} = \frac{12\times3600}{\pi} G_{sc}\left[1 + 0.033\cos\left(\frac{360n}{365}\right)\right] \times \left[\cos\varphi\cos\delta(\sin\omega_2 - \sin\omega_1) + \frac{\pi(\omega_2-\omega_1)}{180}\sin\varphi\sin\delta\right] \quad (2)$$

$$I_{s2} = G_{sc}\left[1 + 0.033\cos\left(\frac{360n}{365}\right)\right](\sin\varphi\sin\delta + \cos\varphi\cos\delta\cos\omega) \quad (3)$$

And f= fraction of extra-terrestrial radiation that reaches the earth surface on completely clear and overcast day at an altitude of up to 300 m is equal to a + b where the parameters a and b depends on altitude of the place and month of the year [illegible]

For altitude up to 300 m	[illegible]	[illegible]	[illegible]	[illegible]
a	0.18	0.21	0.25	0.25
b	0.51	0.49	0.51	0.51

RESULT AND DISCUSSIONS



It is observed that mean $PAR_{H,1}$ = 687±175 kJ/m²h, having a range of 397- 912 kJ/m²h for the entire year using eq (2).

- Mean $PAR_{H,2}$ = 604±147 kJ/m²h having a range of 372- 810 kJ/m²h for the entire year using eq (3).
- There is a 8.8% difference in the value of PAR_H computed using eq. (2 & 3).

VALIDATION

Comparison of results for peak value of PAR, using Proposed model with measured values reported by Ghayas et al. 2022

Peak PAR								
Min., W/m²	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Max., W/m²	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]		[illegible]		[illegible]		[illegible]
[illegible]		[illegible]		[illegible]		[illegible]		[illegible]

REFERENCES

Casares de la Torre F.J., Varo M., Lopez-Luque R., Ramirez-Faza J., Fernández-Ahumada L.M. (2022). Design and analysis of a tracking / backtracking strategy for PV plants with horizontal trackers after their conversion to agrivoltaic plants. Renewable Energy 187, 537-550.

Ghayas H., Radhakrishnan S.R., Sehgal V. K. et.al (2022). Measurement and comparison of photosynthetically active radiation by different methods at Delhi. Theoretical and Applied Climatology, 150 (3-4):1-13.

AMISOLAR-LIFETIME AND DIFFUSION LENGTH MEASUREMENT UNIT

FOR MINORITY CHARGE CARRIERS IN SILICON SOLAR CELLS AND WAFERS

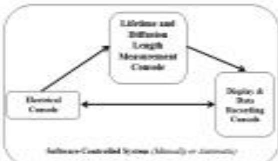
Amisolar is an instrument/system which can measure the Lifetime and Diffusion Length for minority charge carriers in Silicon Solar Cells.

Amisolar can be utilized from any size and shape of solar cells to the latest technology of solar cells with 8" wafer size. Amisolar can build a positive benchmark for all the PV industries and even the electronic component fabricating industries. It will provide a cost-effective solar cell testing tool, which is the most required instrument in all the solar cell manufacturing industries. This too supports researchers and scientists, working in academic or other laboratory organizations.

Technically, when sunlight/photons are falling on solar cell, it produces electron and hole pairs, which should be well collected before they recombine. Therefore, we must measure how much an average time they can take without recombining. More the average time, better will be the collection rate, which will give more output power and so the better efficiency of the cell. One has to measure many times in the fabrication process line of the solar cells; thus, such equipment will be required by all solar cell manufacturing industries.

In academics too, at university, institutes or R&D labs every time the efforts were made to measure this factor, whenever, we are doing any changes in the material or change in design of solar cells or adding some more materials to modify the base or top surface of the solar cells. All research scholars working in the field of solar cell technology need this equipment at R&D labs or universities.

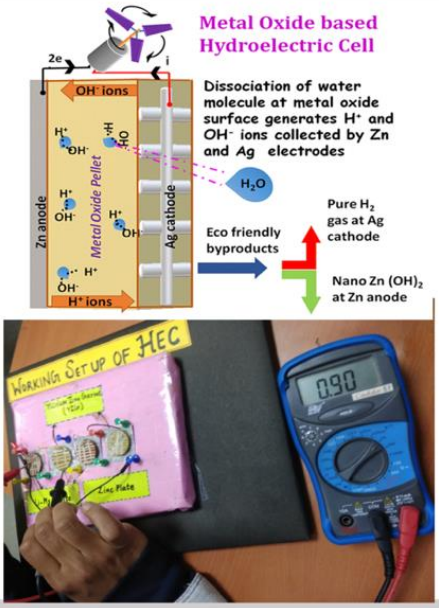
The present equipment has been developed with great efforts by the team including Dr. Abhishek Verma, Dr. Devinder Madhwal, Dr. Vivek Kumar and a few others, under the leadership of Prof. V. K. Jain. The basis of the equipment is completely based on Dr. V. K. Jain's own theory, which was published long back in 1987, in a top journal of USA, when he was in DRDO. Now this equipment is designed and developed as a commercial model at Amity University, Noida, under an important project with financial support provided by DST, Govt. of India, with the Industrial support from M/s Glorisa Technovation India Pvt. Ltd.

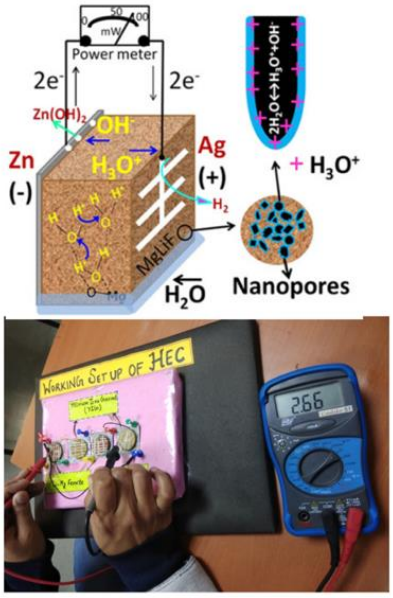


ACKNOWLEDGMENTS:
We wish to express our gratitude to the Founder President of Amity University, Dr. Ashok K. Chauhan for his encouragement and guidance and Department of Science and Technology for the financial support.

Hydroelectric cell

Amity Centre of Nanotechnology





Sensing electrodes

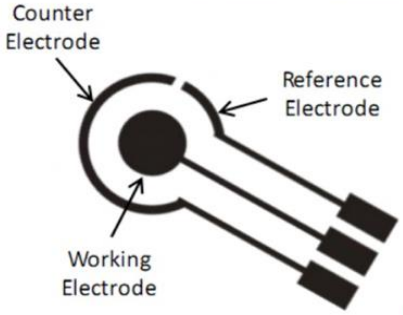
Amity Centre of Nanotechnology

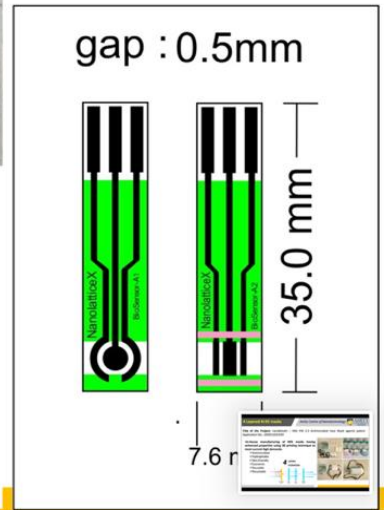
Benefits to the Society

Electrochemical devices having the advantages of low price, miniaturization, and obtaining real-time data using graphene nanoparticles with the different base substrates, fr4, and mylar.

Advantages

- Impedance
- Biosensor applications
- I-V curve
- Adulterations
- Electrochemical properties





Hydrogen gas sensor

Amity Centre of Nanotechnology

AMITY UNIVERSITY GURUGRAM

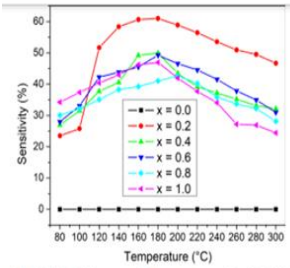


Fig. 5. Sensitivity (%) the sensors with the temperature range from 80 to 300 °C at 1000 ppm of H_2concentration.

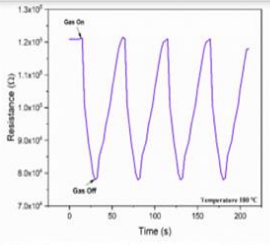


Fig. 7. The change in resistance with time at a temperature of 180 °C in the presence of 1000 ppm hydrogen gas.

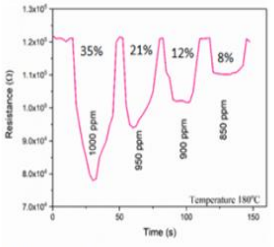


Fig. 6. The response of the sensor with tungsten (x = 0.2) at an optimum temperature of 180 °C for a concentration 850, 900, 950 and 1000 ppm of hydrogen gas.

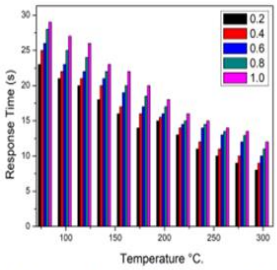


Fig. 8. The response time for all sensors at temperature range from 80 to 300 °C in a step of 20 °C.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journal homepage: www.elsevier.com/locate/rinp

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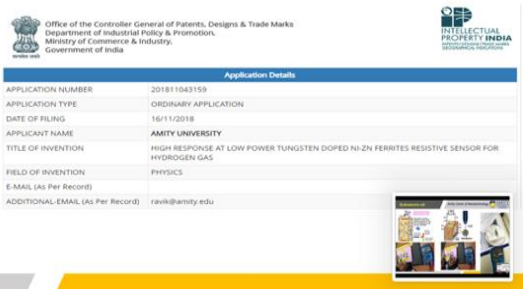
Development of tungsten doped Ni-Zn nano-ferrites with fast response and recovery time for hydrogen gas sensing application

Abhilash Pathania[a], Preeti Thakur[b], Alex V. Trukhanov[c,d], Sergei V. Trukhanov[c,d], Larissa V. Panina[e], Ulrike Lüders[f], Atul Thakur[a]

[a] Shoolini University of Biotechnology and Management Sciences, Post Box 9, Solan, HP 173 212, India
[b] Department of Physics, Amity School of Applied Sciences, Amity University Haryana, Gurgaon 122413, India
[c] National University of Science and Technology, MISiS, Moscow 119991, Russia
[d] SSPA "Scientific and Practical Materials Research Centre of NAS of Belarus", 220072, Minsk, P. Brovki str., 19, Belarus
[e] Laboratoire de Cristallographie et Sciences des Matériaux CRISMAT, Caen, France
[f] Centre of Nanotechnology, Amity University Haryana, Gurgaon 122413, India


Office of the Controller General of Patents, Designs & Trade Marks
Department of Industrial Policy & Promotion,
Ministry of Commerce & Industry,
Government of India

INTELLECTUAL PROPERTY INDIA

Application Details

APPLICATION NUMBER	201811043159
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	16/11/2018
APPLICANT NAME	AMITY UNIVERSITY
TITLE OF INVENTION	HIGH RESPONSE AT LOW POWER TUNGSTEN DOPED NI-ZN FERRITES RESISTIVE SENSOR FOR HYDROGEN GAS
FIELD OF INVENTION	PHYSICS
E-MAIL (As Per Record)	
ADDITIONAL-EMAIL (As Per Record)	ravik@amity.edu

Agricultural applications

Amity Centre of Nanotechnology

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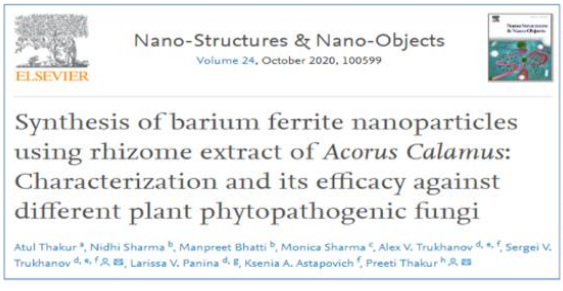
FULL PAPER
Nanoferrite-Fungicide

Global Challenges
www.global-challenges.com

Nanomaterial Fungicides: In Vitro and In Vivo Antimycotic Activity of Cobalt and Nickel Nanoferrites on Phytopathogenic Fungi


ELSEVIER

Nano-Structures & Nano-Objects
Volume 24, October 2020, 100599

Synthesis of barium ferrite nanoparticles using rhizome extract of *Acorus Calamus*: Characterization and its efficacy against different plant phytopathogenic fungi

Atul Thakur [a], Nidhi Sharma [b], Manpreet Bhatti [b], Monica Sharma [c], Alex V. Trukhanov [d, e, f], Sergei V. Trukhanov [d, e, f], Larissa V. Panina [d, g], Ksenia A. Astapovich [f], Preeti Thakur [h]

Effect of (a) $CoFe_2O_4$ and (b) $NiFe_2O_4$ ferrite nanoparticles against *Fusarium* wilt of capsicum under pot culture conditions compared to (c) control.

HYDROGEN GENERATION TECHNOLOGY WITH AI SUPPORTED SOLAR PHOTOVOLTAIC SYSTEM FOR GREEN ENERGY

MOTIVATION:

Demand of clean and green energy and ubiquitous access to electricity are the key factors which can be anticipated as constraints of economic development and human growth prospects.

The need for energy conservation, especially electricity, is of crucial importance as it is an economic solution to the problem of energy shortage and atmospheric carbon reduction.

The role of Arti cial intelligence (AI) has also been displayed by researchers in the promotion of energy management. Most of the past literature in the line of energy management strategies proposed various energy management models based on smart grid and smart meter technology, demand side management, home energy management schemes and management based on AI.

CONCLUSION & EXPECTED OUTCOMES:

Amity University Haryana has vast research infrastructure and has already installed 500 kW solar power plant in the campus for ful lling its daily energy requirements.

The proposed system is portable, compact and highly ef cient for ful lling the energy requirements of remote rural areas and transportation, therefore, is bene cial for improving the life standard of society in innovative manner.

The storage of hydrogen fuel is a big challenge which can be addressed by maintaining cryogenic environment for its storage and transportation.

With the availability of resources and competent faculty, this project can be made successful to the expectations of SECI/Govt. of India.

The proposed system is able to commission an ef cient & clean hydrogen generation technology with the help of AI supported SPV system.

AIMS AND OBJECTIVES:

Ef cient and clean hydrogen generation by electrolysis with SPV power systems to achieve sustainable energy demand.

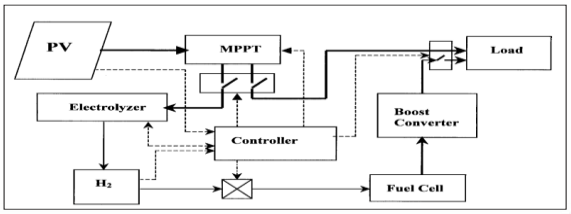
Solar energy forecasting and ef cient capturing of Solar Irradiance with Arti cial Intelligence Techniques.

Optimizing Operational System Cost

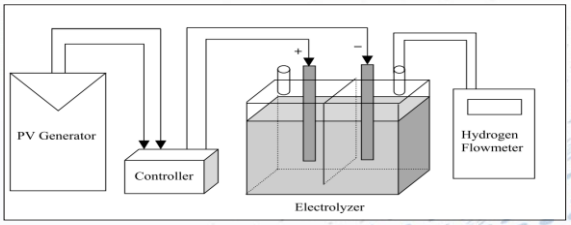
Eliminating RE Barriers and Strengthening Energy Security

Arti cial Intelligence based energy management and sustainable growth management

To procure a compact, portable and highly ef cient hydrogen generation system for remote and rural areas in view of improving the life standard of society in innovative manner



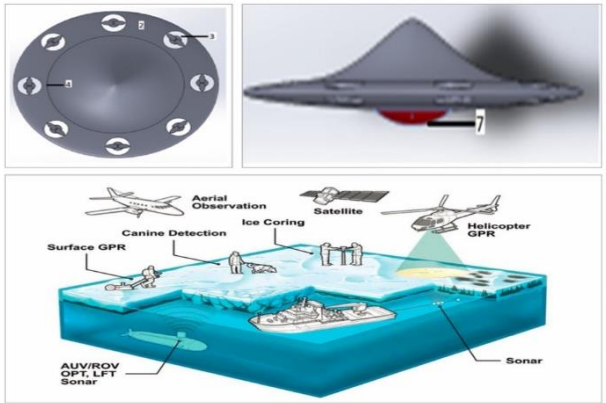
(a)



(b)

Fig. 1 (a) Line diagram of the project and, (b) Electrolysis Process

HAPS FOR SURVEILLANCE & NAVIGATION



High-Altitude Pseudo-Satellite for Agricultural, Military & Other Surveillance & Navigation Applications

The proposed project is a carbon-free cost-effective solution in which the satellite will not be projected to LEO but the Nano Satellite (inbuilt with SAR) would be attached **to High altitude pseudo satellite platform** at the height of 25 to 30 km from the sea level. This is a **hybrid system where solar energy** will be trapped by thin film lightweight high-efficiency solar cells that are placed on the upper area of the dome where inside the dome a **helium balloon** will be placed, the purpose is to reduce the overall weight of the HAPS system. Here are some other unique features of using HAPS for surveillance & navigation applications:

- **Continuous Power Generation**
- **Reduced Maintenance**
- **Reduced Carbon**
- **Greater Efficiency**
- **Easy Deployment**

AMITY UNIVERSITY
GURUGRAM

A SENSITIVE, SPECIFIC AND RAPID LATERAL FLOW STRIP-BASED ASSAY TO VISUALLY DIAGNOSE MYCOBACTERIUM TUBERCULOSIS

UNIQUE FEATURES OF THE TECHNOLOGY

Rapid: Detection in 2 hours.

Sensitive: Due to integration of two techniques.

Specific: Detection depends on identification and cleavage of Mycobacterial RNA only.

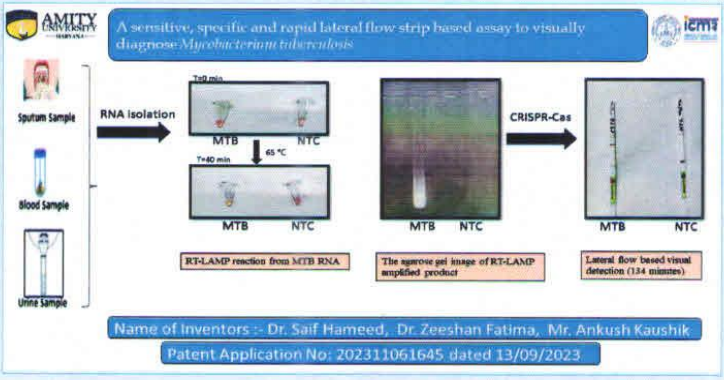
Easy to use: Visual inspection of the results with naked eye.

Adaptability: Developed method can be adjusted for detection of other human pathogens.

PROBLEM IT IS ADDRESSING

Tuberculosis diagnosis is still a challenge in tier 2 & tier 3 cities. As TB is a disease for poor and current culture-based methods are less specific and sensitive while the available molecular methods such as GeneXpert are costly.

RESULTS/SCIENTIFIC DATA IF ANY



Name of Inventors :- Dr. Saif Hameed, Dr. Zeeshan Fatima, Mr. Ankush Kaushik
Patent Application No: 202311061645 dated 13/09/2023

For any further details please contact vcauh@ggn.amity.edu

A BRIEF ABOUT THE TECHNOLOGY

The current scenario of Tuberculosis (TB) caused by Mycobacterium tuberculosis (MTB) has presented an almost insurmountable challenge to hospitals with high patient numbers. Delayed diagnosis of TB is a major hurdle in preventing employment of efficient therapeutics leading to development of drug resistance. There is an urgency to develop simple, faster and highly accurate methods for the rapid identification of MTB infected patients. To address the ongoing challenge, the present study offers a CLAP-TB (CRISPR-Cas coupled RT-LAMP Amplification Protocol for Tuberculosis) assay which will allow us to diagnose TB rapidly and visually. The present invention proposes a new method based on RT-LAMP integrated with CRIPSR technology for the diagnosis of Mycobacterium tuberculosis that is rapid, sensitive and specific. Herein, the visual MTB detection method consists of a method utilizing the patient samples (sputum, urine, serum, CSF) for reverse transcription loop mediated isothermal amplification (RT-LAMP). Together, our CLAP-TB assay offers a rapid, sensitive and specific method with minimum technical expertise requirement for TB diagnosis.

SCIENTIST

Dr. Saif Hameed
Associate Professor
Amity Institute of Biotechnology,
Amity University Haryana

AMITY UNIVERSITY GURUGRAM

DEVELOPMENT OF ADVANCED GLYCATION ENDPRODUCT SENSOR

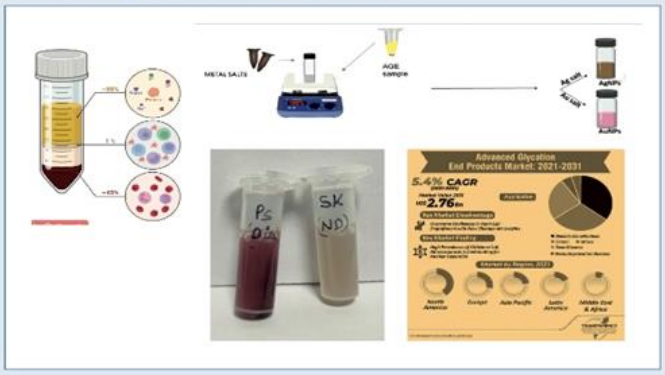
UNIQUE FEATURES OF THE TECHNOLOGY

Our detection technique is simple, easy, bypassing the requirement of high-end instruments and trained personnel and can be developed as a Point-Of-Care device.

PROBLEM IT IS ADDRESSING

Type II diabetes is a complex metabolic disorder where a high rise in the blood sugar level is observed. This elevated blood sugar binds to the protein and leads to the formation of AGE (Advanced Glycation Endproducts) in the body. AGEs contribute to severe pathogenic complications like atherosclerosis, nephritis, retinal damage etc. Heterogeneity and limited information made AGE detection difficult.

RESULTS/SCIENTIFIC DATA IF ANY



A BRIEF ABOUT THE TECHNOLOGY

We established that invitro generated Advanced Glycation Endproducts derived from heamoglobin are capable of synthesizing GNP (Gold NanoParticles) of pink color. Thus, this method can be used as an optical indicator for the quantification of the AGE products. Our current work includes detection of AGEs present in the blood plasma of diabetic patients and estimating the AGE-related damage. Development of this AGE sensor will have commercial applications in future.

SCIENTIST

Dr. Ranjita Ghosh Moulick
Assistant Professor
Amity Institute of Biotechnology,
Amity University Haryana

- **Transformation of peanut and chickpea pollens using magnetic Nano-particle DNA conjugates: A method for developing transgenics bypassing tissue culture**

Objectives:

- Enhancement of photosynthetic activity in chloroplast through core shell nanoparticle (core of gold, silver, titanium dioxide, carbon nanomaterial etc., and silica shell) mediated increase in absorption of light energy with distinct opto-electronic properties of these nanoparticles.
- Evaluation of effect of nanoparticle in different steps of both light dependent and light independent photosynthetic reaction.
- Study of plant primary growth parameter due to the effect of foliar application and root uptake of these nanomaterials.

Outcome:

Silver nanoparticles (AgNPs), and carbon quantum dot (CQD) were tested for their effect on photosynthesis in an isolated chloroplast model system. These two nanoparticles (NPs) exhibited high luminescence properties without further passivation and acted as an electron donor after conjugation with chloroplast. Such excess electrons received by chloroplast (CLP) might have been transported to photosystem II (PS-II) and photosystem I (PS-I) and thereby can increase the availability of total electrons in the photosynthetic electron transport chain. This was also corroborated by the result of biochemical assays, deciphering the effect of these nanoparticles in photosynthetic ETC like Hill reaction, ferricyanide reduction etc. The Hill reaction was measured using DCPIP (dichlorophenol-indophenol), an artificial electron acceptor molecule that intercepts the electron flow from photosystem II to photosystem I. Both these NPs increased photoreduction of DCPIP with respect to control. Electron transport as measured by the reduction of either ferricyanide or NADP has also shown that these two nanomaterials significantly increased the electron transport rate. Moreover, AgNPs and CQDs did not show any toxicity on Arachis hypogaea plants when they were exposed to these NPs.

This is the first experimental proof that the plasmon shift of nanoshells (Ag core and silica shell) and carbon based quantum dots have a stronger enhancement effect within photosynthetic machinery since the absorption wavelength of PS I reaction center (436 nm) overlaps with the SPR of silica coated AgNP. The promising results obtained till now indicate that optically active nanomaterials can

augment photosynthesis. It will be a breakthrough in nanobiotechnology if these nanomaterials can augment the plant yield as well as this will lead to more agricultural produce.

Future benefits to the society:

Immediate
Use of silica shell on the core of photoactive nanomaterials can really revolutionize agri-nanobiotech sector. Similarly optically active carbon quantum dots are shown huge potential in augmenting photosynthesis. Silica is already known to increase the mechanical strength of the plants and in a series of experiments we have already shown that silica NP has excellent entomotoxic property. In this way these core shell nanomaterials will act as plant growth enhancer and at the same time they will give protection to the plants from insect pest infestation. Apart from the advantages of optoelectronic properties of CQDs in photosynthesis and plant growth parameters, these luminescent particles were found very potent for biosensing in plant model system.

Long Term
One of the exciting plausible applications of this study is biomimetic energy production. This concept can be utilized to make efficient photocells where photosynthetic molecules, tagged with optically active NPs will be used as active medium due to their high quantum yield and energy conversion efficiency.

- **Identification of Sphingolipid- and Eicosanoid-based Signatures as Potential Diagnostic, Prognostic, and Therapeutic Targets for Inflammatory Bowel Disease Subtypes**

Objectives:

Objective 1 (Discovery phase, Phase I) aims to identify key sphingolipids in tissue biopsies and plasma that are dysregulated in UC and CD) patients in comparison to non-inflammatory bowel disease (non-IBD) controls, and among UC and CD subtypes. We aim to identify the key signatures in UC/CD active patients at their treatment naïve state and remission stage, and after a follow up of one-year treatment.

In Objective 2 (Discovery phase, Phase I), we propose to identify key eicosanoid lipids dysregulated in UC and CD patients in comparison to non-IBD controls together with the other groups as highlighted in objective 1.

In objective 3 designed as a validation phase (Phase II), we will do a comparative study to see whether key sphingolipid/eicosanoid markers/signatures identifying the different groups in Phase II validates the discovery in Phase I.

Outcome:

Correlation of the key lipids distinguishing non-IBD from IBD subtypes and between the subtypes to patient baseline characteristics, pathological scores, and inflammatory markers that are in current use will be done. Such a platform based on lipidomics studies will provide sphingolipid- and eicosanoid-based biomarkers as diagnostic and prognostic signatures and create a new database for Indian patients that in future can be connected to the global network through clinicopathological correlations.

- **Sugar transporters are new determinants of drug resistance in *Candida auris***

Objectives:

1. Identification and construction of mini disruption library of sugar transporter deletants.
2. Functional expression of select genes in heterologous minimal background host system.
3. Identification of alternative routes by which HGT affects drug resistance.
4. Molecular mechanism of drug import.

Outcome - The canonical drug-resistant mechanisms are unable to explain why Candida auris manifests intrinsic resistance. Studies dealing with the experimental evolution of drug resistance are helping to track down evolutional trajectories adopted by *C.auris* wherein big data analysis of adopted cells are pointing to newer mechanisms operating in a strain.

Future benefits to the society.

The emerging data from our group strongly point to the relevance of drug import and the role of sugar transporters in *C.auris*. We posit that our study will establish the contribution and the role of sugar transporters and drug imports therein in the manifestation of the high level of drug resistance commonly encountered in *C.auris*

1. Cationic nanocarriers: A potential approach for targeting negatively charged cancer cell

Abstract: -

Cancer, a widespread and lethal disease, necessitates precise therapeutic interventions to mitigate its devastating impact. While conventional chemotherapy remains a cornerstone of cancer treatment, its lack of specificity towards cancer cells results in collateral damage to healthy tissues, leading to adverse effects. Thus, the quest for targeted strategies has emerged as a critical focus in cancer research. This review explores the development of innovative targeting methods utilizing novel drug delivery systems tailored to recognize and effectively engage cancer cells. Cancer cells exhibit morphological and metabolic traits, including irregular morphology, unchecked proliferation, metabolic shifts, genetic instability, and a higher negative charge, which serve as effective targeting cues. Central to these strategies is the exploitation of the unique negative charge characteristic of cancer cells, attributed to alterations in phospholipid composition and the Warburg effect. Leveraging this distinct feature, researchers have devised cationic carrier systems capable of enhancing the specificity of therapeutic agents towards cancer cells. The review delineates the underlying causes of the negative charge in cancer cells and elucidates various targeting approaches employing cationic compounds for drug delivery systems. Furthermore, it delves into the methods employed for the preparation of these systems. Beyond cancer treatment, the review also underscores the multifaceted applications of cationic carrier systems, encompassing protein and peptide delivery, imaging, photodynamic therapy, gene delivery, and antimicrobial applications. This comprehensive exploration underscores the potential of cationic carrier systems as versatile tools in the fight against cancer and beyond.

2. Novel Discoveries and Clinical Advancements for Treating Onychomycosis: A Mechanistic Insight

Abstract: Onychomycosis continues to be the most challenging disease condition for pharmaceutical scientists to develop an effective drug delivery system.

Treatment challenges lie in incomplete cure and high relapse rate. Present compilation provides cumulative information on pathophysiology, diagnostic techniques, and conventional treatment strategies to manage onychomycosis. Novel technologies developed for successful delivery of antifungal molecules are also discussed in brief. Multidirectional information offered by this article also unlocks the panoramic view of leading patented technologies and clinical trials. The obtained clinical landscape recommends the use of advanced technology driven approaches, as a promising way-out for treatment of onychomycosis. Collectively, present review warrants the application of novel technologies for the successful management of onychomycosis. This review will assist readers to envision a better understanding about the technologies available for combating onychomycosis. We also trust that these contributions address and certainly will encourage the design and development of nanocarriers-based delivery vehicles for effective management of onychomycosis.

3. A Critical Review on the Role of Probiotics in Lung Cancer Biology and Prognosis

Abstract: Lung cancer remains the leading cause of cancer-related deaths worldwide. According to the American Cancer Society (ACS), it ranks as the second most prevalent type of cancer globally. Recent findings have highlighted bidirectional gut–lung interactions, known as the gut–lung axis, in the pathophysiology of lung cancer. Probiotics are live microorganisms that boost host immunity when consumed adequately. The immunoregulatory mechanisms of probiotics are thought to operate through the generation of various metabolites that impact both the gut and distant organs (e.g., the lungs) through blood. Several randomized controlled trials have highlighted the pivotal role of probiotics in gut health especially for the prevention and treatment of malignancies, with a specific emphasis on lung cancer. Current research indicates that probiotic supplementation positively affects patients, leading to a suppression in cancer symptoms and a shortened disease course. While clinical trials validate the therapeutic benefits of probiotics, their precise mechanism of action remains unclear. This narrative review aims to provide a comprehensive overview of the present landscape of probiotics in the management of lung cancer.

4. **Inulin: Unveiling its potential as a multifaceted biopolymer in prebiotics, drug delivery, and therapeutics**

Abstract: in recent years, inulin has gained much attention as a promising multifunctional natural biopolymer with numerous applications in drug delivery, prebiotics, and therapeutics. It reveals a multifaceted biopolymer with transformative implications by elucidating the intricate interplay between inulin and the host, microbiome, and therapeutic agents. Their flexible structure, exceptional targetability, biocompatibility, inherent ability to control release behavior, tunable degradation kinetics, and protective ability make them outstanding carriers in healthcare and biomedicine. USFDA has approved Inulin as a nutritional dietary supplement for infants. The possible applications of inulin in biomedicine research inspired by nature are presented. The therapeutic potential of inulin goes beyond its role in prebiotics and drug delivery. Recently, significant research efforts have been made towards inulin's anti-inflammatory, antioxidant, and immunomodulatory properties for their potential applications in treating various chronic diseases. Moreover, its ability to reduce inflammation and modulate immune responses opens new avenues for treating conditions such as autoimmune disorders and gastrointestinal ailments. This review will attempt to illustrate the inulin's numerous and interconnected roles, shedding light on its critical contributions to the advancement of healthcare and biomedicine and its recent advancement in therapeutics, and conclude by taking valuable insights into the prospects and opportunities of inulin.

5. **Learning face super-resolution through identity features and distilling facial prior knowledge**

Abstract: Deep learning techniques in electronic surveillance have shown impressive performance for super-resolution (SR) of captured low-quality face images. Most of these techniques adopt facial priors to improve the feature details in the resultant super-resolved images. However, the estimation of facial priors from the captured low-quality images is often inaccurate in real-life situations because of their tiny, noisy, and blurry nature. Thus, the fusion of such priors badly affects the performance of these models. Therefore, this work presents a teacher–student-based face SR framework that efficiently preserves the personal facial structure information in the super-resolved faces. in the proposed framework, the teacher network exploits the facial heatmap-based ground-truth-prior to learn the facial structure that is utilized by the student network. The student network is

trained with the identity feature loss for maintaining the identity and facial structure information in reconstructed high-resolution (HR) face images. The performance of the proposed framework is evaluated by conducting experimental study on standard datasets namely CelebA-HQ and LFW face. The experimental results reveal that the proposed technique conquers the existing methods for the face SR task.

- **"Dual functional Colon- Targeted Tofacitinib and Probiotics Loaded Microparticles for the Treatment of Inflammatory Bowel Disease"**

Summary

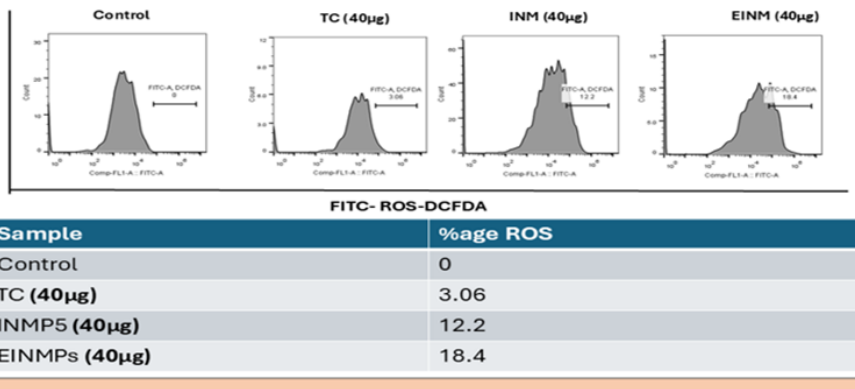
Inflammatory bowel disease (IBD) is a chronic inflammatory condition affecting the gastrointestinal tract, encompassing Crohn's disease, ulcerative colitis (UC), and other related disorders. The introduction of tofacitinib, a Janus kinase (JAK) inhibitor, has revolutionized the treatment landscape for UC. Initially licensed in 2012 in the United States for rheumatoid arthritis, tofacitinib later became the first JAK inhibitor approved for UC. Unlike biologics targeting single cytokines or integrins, tofacitinib inhibits multiple cytokines via the JAK/STAT pathway, providing a broader impact on gastrointestinal inflammation. Specifically, it targets JAK-1 and JAK-3, with additional activity on tyrosine kinase 2 (TYK2) and JAK-2 at higher concentrations. The rapid onset of tofacitinib's effects, with clinical improvement often observed within three days, underscores its potential in managing acute IBD flares. Despite its efficacy, the hepatic first-pass metabolism of tofacitinib and the need for frequent dosing remain significant challenges. To address these issues, the proposed study focused on developing a dual-functional microparticulate system incorporating both tofacitinib citrate and probiotics such as Lactobacillus acidophilus. By leveraging a pH-sensitive and enzyme-dependent delivery mechanism, the formulation aimed to achieve targeted drug release in the colonic region, enhancing therapeutic outcomes while minimizing systemic side effects.

Inulin, a nutraceutical with recognized benefits in managing IBD, served as the primary matrix material for the microparticles. Its favorable safety profile and economic viability make it an attractive adjunct in IBD treatment. The microparticles were further coated with Eudragit S-100, a pH-sensitive polymer, to ensure stability in the acidic gastric environment and selective release in the colon. Critical formulation parameters, including the concentrations of inulin and

Span-80, stirring time, and drug loading, were optimized using a Box-Behnken experimental design to maximize entrapment efficiency, particle size uniformity, and stability.

In vitro studies using cell lines demonstrated that the Eudragit-coated inulin microparticles (EINMPs) effectively delivered tofacitinib citrate and probiotics to the colonic region. The pH-sensitive and enzyme-dependent release mechanism ensured minimal drug degradation in the gastric environment, reducing dosing frequency. Cytotoxicity studies revealed that EINMPs exhibited greater cellular uptake, reduced reactive oxygen species (ROS) generation, and enhanced apoptosis induction compared to uncoated inulin microparticles (INMP5) and free tofacitinib citrate. These findings highlight the potential of EINMPs in managing IBD by providing localized drug delivery, which not only improves therapeutic efficacy but also mitigates systemic side effects. The enhanced cytotoxic potential and selective targeting observed in cell line studies suggest that this innovative delivery system could significantly improve patient outcomes.

Outcome and Future Prospects. The development of dual-functional microparticulate systems represents a promising advancement in IBD management. The incorporation of probiotics and tofacitinib citrate into Eudragit-coated inulin microparticles offers a synergistic approach to modulate inflammation and restore gut homeostasis. with further preclinical and clinical validation, this targeted delivery platform could emerge as a safer and more effective alternative for IBD patients, addressing the limitations of current therapies and improving the quality of life for those affected by this chronic condition.



Sample	%age ROS
Control	0
TC (40µg)	3.06
INMP5 (40µg)	12.2
EINMPs (40µg)	18.4

INMP5 - Inulin microparticle (Selected formulation 5) , EINMPs - Eudragit coated inulin microparticle

Figure: ROS studies of optimized formulations

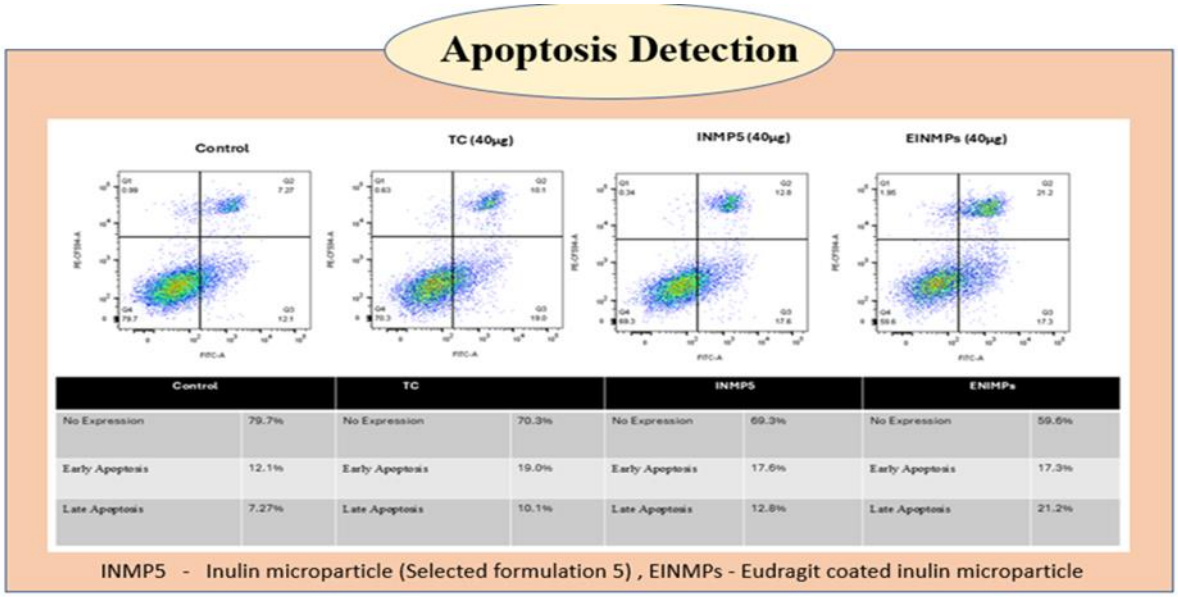


Figure: Apoptotic studies of optimized formulation

- **"Ligand tethered polymer-lipid based self-assembled nanoconstruct(s) for the effective brain targeting against glioma"**

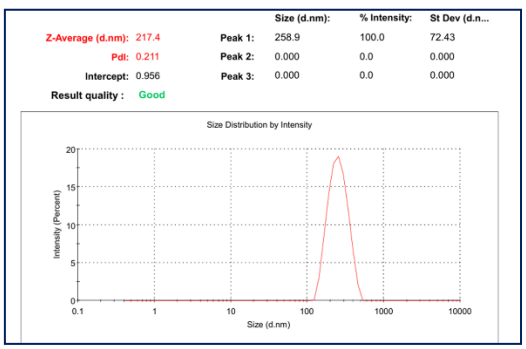
Summary

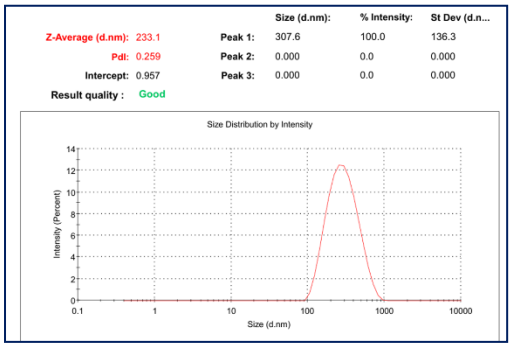
Cancer has one of the highest mortality rates worldwide despite tremendous effort by researchers and industry in this area. Although there have been significant advances in cancer treatment it remains to be almost uniformly fatal, and current therapeutic modalities have yet to significantly improve the dismal prognosis of this disease. The treatment of brain cancer is one of the most difficult challenges in oncology. The failure of chemotherapy is due to the inability of intravenously administered anticancer agents to reach brain parenchyma. An endothelial cell monolayer associated with pericytes and astrocytes, known as the blood– brain barrier (BBB), separates the blood from the cerebral parenchyma and prevents the penetration of drugs into the central nervous system (CNS). Tumor cells overexpress many receptors and biomarkers, which can be used as targets to deliver cytotoxic agents into tumors. in general, a tumor-targeting drug delivery system consists of a tumor recognition moiety and a cytotoxic warhead connected directly or through a suitable linker to form a conjugate. The conjugate, which can be regarded as a 'prodrug', should be systemically non-toxic. This means that the linker must be stable in circulation.

Upon internalization into the cancer cell, the conjugate should be readily cleaved to regenerate the active cytotoxic agent.

The objective of the proposed work is to design and develop polymer lipid hybrid nanoparticles simultaneously modified with RGD/Lactoferrin containing bioactive(s) for the site-directed delivery which will make them able to extravagate and reach the site for preferential uptake by the glioma cells. RGD/Lactoferrin anchoring will significantly enhance the ability of polymer lipid hybrid nanoparticles to transport bioactive(s) into the brain, while ligand modification improves the drug selectivity to overexpressed glioma cells, prolonged the retention of drug in glioma and peritumoral tissue and induce apoptosis. Overall, this proposed study will screen up the targeting potential and promises of bioactive(s) encapsulated ligand anchored polymer lipid nanoparticle to extravagate BBB and target the glioma cells lines. Practicability of its applications are:

- Receptor mediated targeted anticancer drug delivery and Selectivity of the antitumor drugs to tumors.
- Reduction in the dose of antitumor drugs due to higher carrying capacity Nanoparticles.
- Solubilization of insoluble drugs which creates problem in formulation development.
- Reduction in exposure of drug to other organs preventing other side effects.
- Dual targeting of anticancer drugs via receptor mediated and Enhanced Permeation and Retention (EPR) effect.





- **Development of novel polymer nanocomposites for toxic gas sensor**

Objectives

- Synthesis and characterization of pure and doped polymer samples.
- To determine various properties such as electronic, structural and morphological properties of nanomaterials.
- Development of polymer nanocomposites for toxic gas sensor.
- Study of electret state using thermally stimulated discharge current (TSDC) measurement.
- Transient current study in charging and discharging mode.

Outcome

We have doped two different polymers with four different types of nanocomposites in different combinations. We have synthesized pure PANI, PPy, ZnO nanoparticles, TiO2 nanoparticles, SiO2 nanoparticles, PANI/ZnO, nanocomposite. These pure polymers, nanoparticles and polymer nanocomposites have been characterized with the help of FTIR, XRD, UV-spectroscopy, and SEM.

The results highlight the promise of Protein-Polymer-Nanocomposite (PPNC)-based sensors as an innovative, economical, and sustainable method of detecting harmful gases. These sensors combine the special qualities of nanomaterials, conductive polymers, and biological molecules to provide increased selectivity and sensitivity for a range of dangerous gases. Because of their versatility and ease of development in a typical laboratory, PPNC-based sensors have great promise for a range of uses in industrial safety, environmental monitoring, and medical diagnostics. In addition to advancing the science of gas sensing, this work creates new opportunities for the creation of effective and sustainable sensor technology.

Future Benefits

Polymer nanocomposites, which combine polymers with nanoscale materials, are set to revolutionize numerous industries due to their unique properties and versatile applications.

- **An Intelligent fast and secure extended visual cryptography technique using two-level security for medical images**

Objective of Research Project:

In present times, medical images get shared among doctors for fast and efficient diagnosis. Also, the growth and popularization of network and multimedia technologies have led to an increase in digital data over the internet. Most of the data is confidential and requires an efficient algorithm to securely transmit the data over the insecure channel. Unfortunately, these images have high redundancy and high correlation, hence attacked in ease. Popular encryption techniques like RSA (Rivest Shamir Adleman) and DES (data encryption standard) provide higher security but limit their capabilities for images.

Recently in November 2022, All India Institute of Medical Sciences (AIIMS) Delhi, faced a heavy cyber-attack that derailed routine health services and affected thousands of patients. So to protect this patient information, this work proposes a fast, secure, and intelligent extended visual cryptographic technique using two-level security for medical images.

The application of the proposed project will reduce the chances of cyber-attacks in Madhya Pradesh. Testing and demonstration of the project will reduce the chances of cyber-attacks and also on commercial basis, we can implement our scheme in the various hospitals of Madhya Pradesh.

Outcome:

The overall research work is based on the two layers of security of digital images over the unsecured network, i.e., the Internet.

- **Bioaugmentation of crude oil using bacteria and fungus isolates from the oil spilled contaminated site**

Objectives:

- Isolation and screening of oil-degrading bacteria and fungus from contaminated sites.
- To assess the effect of environmental parameters on bacterial and fungal growth and their degradation rates.

- Formulation of bacterial and/or fungal consortium and their effect on petroleum hydrocarbon degradation.
- Qualitative and quantitative analysis of the untreated and bacterial/ fungal treated petroleum hydrocarbons sample.
- To study the effect of different factors including pH, temperature, salinity, U.V. and X-rays over bacterial/ fungal culture on petroleum hydrocarbon degradation.
- To enhance the degradation ability of bacterial cultures by bacterial and/or fungal cell Immobilization.

Outcome:

The results of this study isolate have been isolated from various samples collected from various locations of the Gwalior region, found as bacteria and fungus. Out of bacterial species have been found as coccus, rod shape and filamentous in shape. Morphological characterization of isolates and gram staining have been done and observed that both kinds of bacteria are present gram-positive and gram-negative. Fungi species have been also successfully isolated and have septate along with filamentous morphology. Isolated has been successfully grown over Bushnell Hass agar medium by providing crude oil as a sole source of carbon. The isolated microbes can resemble Corny bacterium, Streptomyces spp., Stenotrophomonas sp. DBK, Candida maltose (EH 15 & 60), Exophiala mesophila, Aspergillus sp. RFC-1.the outcomes could help in bioaugmentation of crude oil.

Antibiofilm activity evaluation of phytochemicals loaded metallic nanoparticles against pathogens with special reference to Gwalior region

Objectives:

- Isolation and identification of biofilm-producing bacteria from clinical and environmental samples.
- Synthesis of mono and multimetallic nanoparticles through a bio-assisted route using plant extracts.
- Characterization of nanoparticles using biophysical techniques such as SEM, TEM, FTIR, and XRD.
- Evaluation of antibacterial and anti-biofilm activities of nanoparticles against the isolated pathogens.
- Investigation of the synergistic effects of metallic nanoparticles with existing antibiotics.

- Optimization of the nanoparticle synthesis process for enhanced efficacy and reduced environmental impact.

Outcome:

The synthesized Mult metallic nanoparticles are expected to outperform their monometallic counterparts due to their superior properties, such as a larger surface area-to-volume ratio and heightened antimicrobial activity. This work may pave the way for developing innovative nanotechnology-based formulations to manage infections caused by biofilm-forming microorganisms effectively, ultimately contributing to advanced medical treatments and improved environmental health management.

- **VIDHYA: Virtual Intelligent Digital Helper for Youth and Adolescents**

The proposed project aims to use technology to enhance the education system in rural areas of India. The project will involve the development of a prototype model of a digital platform, VIDHYA (Virtual Intelligent Digital Helper for Youth and Adolescents), that will provide educational resources and support to students and teachers in remote areas where access to quality education is limited. The project's objectives are to address the observed gaps in the existing education system, build upon the available traditional knowledge, and provide innovative solutions to meet the educational demands of rural communities. The framework adopted for this project will involve a multi-stakeholder approach with strategies for demand identification, impact studies, scalability, commercialization, and outreach. The work plan proposed for this project will involve developing, validating, and commercializing the technology catering to the identified problems. The project will be executed in three stages: the prototype development, testing, and deployment. During the prototype development stage, the team consisting of ML Engineers and MERN Stack developers will develop the digital platform's various components, including the AI model development, virtual character development and integration of an LED screen with Raspberry Pi or Jetson Nano. In the testing stage, the platform's functionality will be evaluated to ensure that it meets the project's objectives. Finally, in the deployment stage, the platform will be implemented in various rural communities in selected states. The project's approach and planned activities will be executed within the stipulated timeline, as outlined in the PERT

chart. The budget allocation has been made year-wise, and the cost of implementing one prototype model has been estimated. The project's impact is envisaged to be significant in terms of improving the learning outcomes of students and enhancing the quality of teaching. The delivered technologies will not only bridge the gap in access to quality education but also contribute to the sustainable development of rural communities. In summary, the proposed project aims to use technology to bridge the gap in access to quality education in rural areas of India. The project's approach involves a multi-stakeholder strategy, which will address the identified gaps and build upon traditional knowledge to provide innovative solutions. The planned activities will be executed within the stipulated timeline and will lead to the development of a digital platform that will significantly impact the learning outcomes of students and enhance the quality of teaching in rural communities. Engineering students and faculty members can get hands on experience about village life while working on the program. Students involved in this program become professional trainer and get certified. Students can create start-ups. Students and staffs learn technical details.

Amity University Rajasthan

- **Automatic Solar Tracking System**

An Automatic Solar Tracking System optimizes solar energy absorption by adjusting solar panels to follow the sun's movement. It consists of key components such as solar panels, light and position sensors, actuators (motors), and a controller that processes sensor data to reposition the panels.

There are two main types: Single-Axis Trackers, which move panels from east to west, and Dual-Axis Trackers, which adjust both vertically and horizontally for

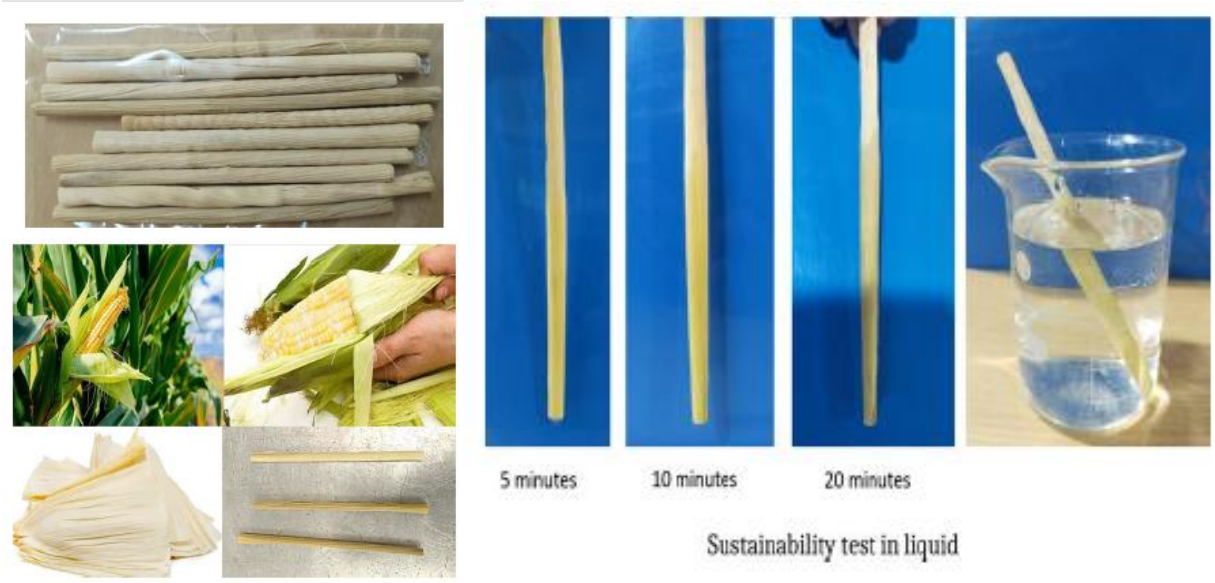
higher efficiency. While these systems enhance energy production by 20-40%, they come with drawbacks such as higher costs, maintenance needs, and space requirements. Design considerations include geographic location, durability, energy efficiency, and system type, ensuring optimal performance and return on investment.

- **Glee (A Mental and Wellness Platform)**

Glee could be a mental health and wellness platform aimed at improving individuals' well-being, mental clarity, and emotional health. Platforms like Glee are increasingly popular as they offer various tools and services to support mental health, personal growth, and self-care

- **Bio Sip: A Sustainable Choice**

Bio-Sip is an innovative approach that offers a promising alternative to pollution-causing plastic and paper straws. We have come up with a way to make biodegradable straws using leftover corn husk. Once used, these straws can be used as compost to enhance soil fertility, benefiting the agricultural sector and the sustainable utilization of agricultural waste. The biodegradable straws are made entirely from corn husks, and we have used food-grade glue to keep the straws in shape.



Sustainability test in liquid

- **Portable UV-TLC Chamber**

UV TLC chamber is an equipment for monitoring reaction progress in organic synthesis. It allows chemists to visualize the separation of compounds on a thin-layer chromatography (TLC) plate under UV light. To address the problems with traditional UV TLC chambers, including reliance on a large power source, bulky size, and high cost, you can design or acquire an improved, compact, and cost-effective UV chamber.

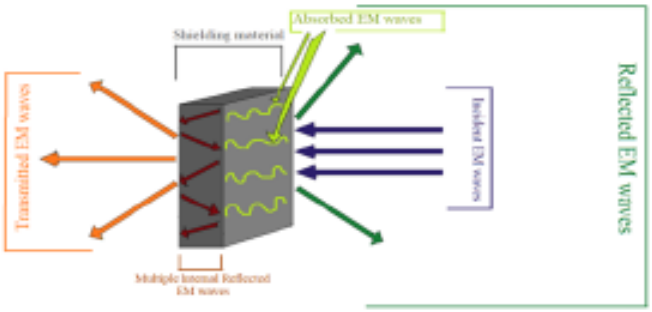
Compact, cost-effective UV TLC chamber operates on batteries, making it portable and ideal for reaction monitoring in labs and remote locations. Its use of energy-efficient UV LEDs ensures affordability, safety, and precision. A portable, battery-operated UV TLC chamber using energy-efficient LEDs for affordable, precise, and field-ready reaction monitoring.

- **Date Seed Coffee Instant Mix**

Date seed coffee is an innovative beverage derived from the roasted seeds of dates, offering a healthy, caffeine-free alternative to traditional coffee. The product combines the richness of natural flavors with the benefits of utilizing what is typically considered agricultural waste. Date seeds are rich in antioxidants, dietary fiber, and essential minerals, making them a healthy addition to daily diets.

- **Human-Compatible Radiation Shield**

This project focuses on developing advanced radiation shielding solutions, particularly for military tents, to protect sensitive equipment and personnel from electromagnetic interference (EMI).



Military Applications:

Shielding for tactical systems, communication devices, army tents, and weapons systems. Secure operation in military test sites and communication facilities.

Advantages

• Lightweight and Flexible: Ideal for portable and deployable structures.

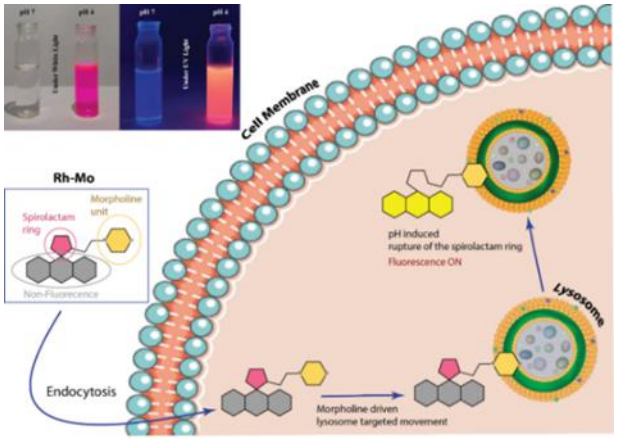
• Durable and Corrosion-Resistant: Ensures long-term performance.

Eco-Friendly Alternative: Replaces heavy metallic shields with sustainable solutions.

Amity University West Bengal

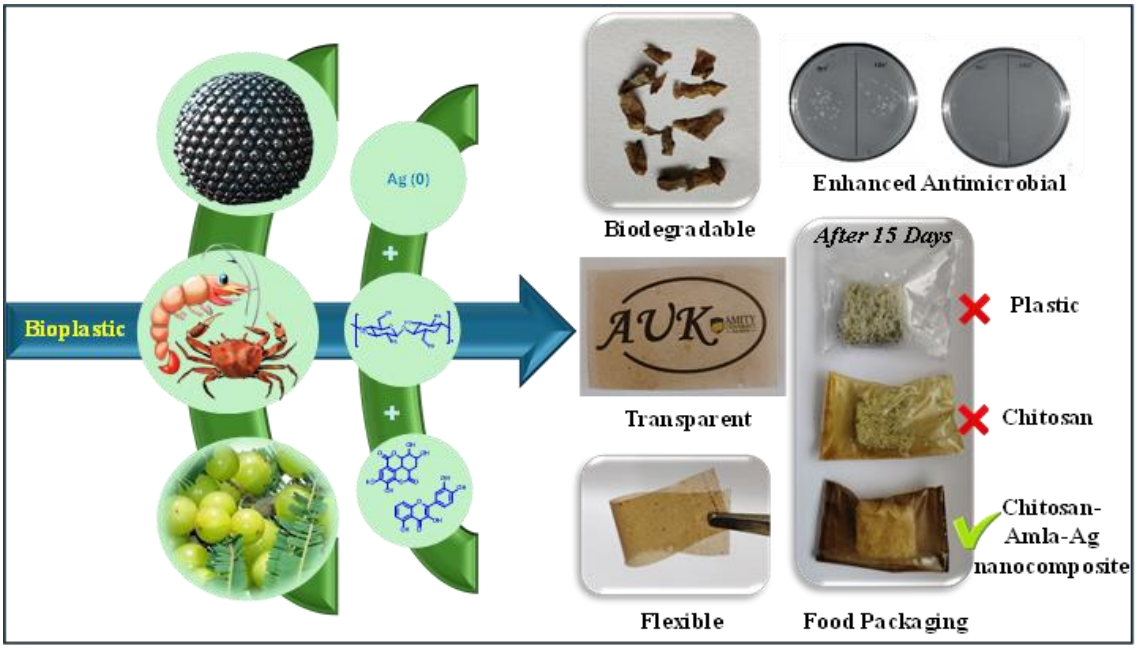
- **Rhodamine-Based Fluorescence Probe for Monitoring of Lysosomal pH: Spectroscopic Insights and Cellular Applications**

  The scientists have developed a rhodamine-based fluorescence probe, Rh-Mo, designed for lysosomal pH sensing and lysosome specific imaging of human cells. Spectroscopic studies reveal that Rh-Mo undergoes a colour change and fluorescence enhancement in acidic conditions. The probe exhibits a high fluorescence quantum yield at acidic pH (0.84 at pH = 4.0) and a pKa value of 5.85, enabling sensitive detection of lysosomal pH changes. Theoretical calculations support the mechanism of protonation-induced ring opening, elucidating the spectroscopic behavior of Rh-Mo.



In cellular studies, Rh-Mo exhibits low cytotoxicity and efficient uptake and co-localization with lysosomes in MCF-7 cells, highlighting its potential for bioimaging applications.

- **Enhanced Antimicrobial and Degradable Properties of Silver Nanoparticles-Reinforced Chitosan-Indian Gooseberry Films for Sustainable Food Packaging**



- **AI-based Sagittal Kinematic Observational Gait Analysis System for Low Back Pain**

  This innovation integrates AI and computer vision to evaluate low back pain (LBP) through gait analysis. By capturing gait videos and calculating kinematic parameters like stride length and joint angles, the system provides insights into gait abnormalities and pain intensity. The system uses machine learning to predict disability levels and offers real-time monitoring for immediate feedback. Its user-friendly interface makes it adaptable for use in various healthcare settings, especially in resource-constrained areas, and has been patented for its cost-effective and reliable approach to LBP management.

- **AI-Based Voice Generator for Motor Neuron Disorder Patient**

  This low-cost AI-powered voice generator helps individuals with Motor Neuron Disorder (MND) communicate effectively despite impaired vocal cords and limited mobility. Using facial expressions, gaze tracking, and initial utterances, the system generates accurate speech through AI, enabling patients to convey complex ideas. A tablet interface makes it easy for patients to select words and phrases, while emotion detection allows caregivers to monitor the patient's emotional state. This inclusive, affordable solution has been patented to improve communication for MND patients in healthcare environments.

- **AI-based Portable Device for Minimally Invasive Low Back Pain Treatment**

  This AI-driven portable device aids in the accurate insertion of spinal needles for chronic low back pain (LBP) treatment, reducing the need for high-radiation fluoroscopy. It uses machine learning to analyze fluoroscopic and clinical images, providing real-time guidance on needle placement and drug administration. The device is cost-effective, using affordable hardware like Raspberry Pi, and improves the safety and accuracy of minimally invasive procedures for LBP patients. The innovation has been patented for its potential in reducing radiation exposure and enhancing medical procedures.

- **Real-Time Road Obstacle Detection for Self-Driving Ambulances in Blockchain Framework**

  This project focuses on enhancing self-driving ambulances by integrating AI and blockchain for real-time road obstacle detection. The system uses Support Vector Machines (SVM), Convolutional Neural Networks (CNN), and YOLOv4 to accurately identify road obstacles, ensuring better ambulance routing. It incorporates blockchain for secure, real-time data sharing, and a genetic methodology for improved security. By leveraging a unique dataset of road images, this technology ensures faster emergency responses and improved control over critical situations, making it a significant advancement in emergency services.

- **Small RNA sequencing approach to find out miRNA-based predictive biomarkers in Gastric Cancer patients treated with adjuvant and palliative chemotherapy.**

  Summary: Gastric cancer (GC) is the fifth most common malignancy and fourth leading cause of cancer mortality. Most patients are diagnosed at advanced stages, limiting treatment options. While adjuvant and palliative treatments can improve survival in metastatic GC, they do not lead to cures, and many patients relapse or develop metastases post-surgery. There is an urgent need for predictive biomarkers to identify patients who would benefit from less toxic adjuvant treatments. For GC patients in India, we will be the first to discover predictive biomarkers in advanced GC patients systematically through small RNA-Sequencing and we will evaluate their potential to translate into plasma-based noninvasive predictive biomarkers to help advanced GC patients choose the right treatment.

  So far, we have made the collaboration with lead oncologists and clinician from different cancer hospital in West Bengal and northeast India and RNA samples are ready for small RNA sequencing. Dring bioinformatics pipeline sterilization we have developed miRNA based predictive marker panel (miR-490-3p, miR-551b-3p, miR-129-2-3p, miR-3199 and miR-7704) using publicly available stomach cancer datasets (TCGA-STAD).

- **Development of biomarkers signature for early detection of gastric cancer**

  Most patients with GC present with advanced disease at diagnosis, and current chemotherapy confers only modest survival benefits. However, available

screening modalities are a burden for patients due to the invasiveness of endoscopy. In this context, highly sensitive noninvasive biomarkers could be transformative for screening and would save lives. An endogenous noncoding RNA called circular RNA was identified recently. Circular RNAs will be derived from multiple sources, including micro-vesicles, apoptotic bodies, and immune cells. As liquid biopsy markers for the early detection of GC, combining cell-free (cf) and exosomal (exo) circRNAs is a novel approach, which has never been undertaken previously. The aim is to discover a rapid, reproducible, high-throughput, qPCR-based validation of selected cf- and exo-circRNA biomarkers for their clinical translation in patients with GC. We have collected different gastrointestinal cancer (GC, CRC, PDAC etc.) tumors, adjacent normal, and matched serum plasma samples after collaboration with doctors from SSKM hospital, Kolkata. RNA was extracted and the samples were transported for total transcriptomics sequencing. We will be using the novel transcriptome data analysis pipeline which will be generate the mRNA and circRNAs count data simultaneously from the sequences of same samples.

Amity University Maharashtra

- **Amity University Mumbai Launches India's First Biological Payload to Study Plant Growth in Space**

  Amity University Mumbai, under its Centre for Excellence in Astrobiology (ACoEA), has achieved a remarkable milestone by designing and launching India's first biological payload into space in collaboration with In-Space and ISRO which is being sent today by ISRO through PSLV C60 (Spadex Mission). This pioneering experiment, titled **Amity Plant Experimental Module in Space (APEMS)**, aims to explore the potential for food and nutrition sustainability during prolonged space missions. APEMS is a cutting-edge experimental module designed to monitor how plants adapt to space conditions, such as gravitational stress, and regulate their growth direction in response to stimuli like gravity and light. Spinach callus, which can differentiate into shoots, roots, or whole plants through specific

phytohormones, was selected due to its robust nature and green coloration, which allows easy monitoring of growth and health using an in-built camera.

The biological payload, which focuses on real-time monitoring of plant growth in microgravity, seeks to address one of the most pressing challenges of space exploration: developing sustainable life-support systems. The experiment involves studying the growth of plant callus from **Spinacia Oleracea (commonly known as spinach)**, chosen for its totipotency and resilience as a model system for plant biology research. The color changes and the lateral growth will be studied through onboard cameras and sensors. To support human exploration in space, we need to provide fresh food as well and hence cultivation of plant needs to be addressed through series of experiment. This will the first step in that direction.The launch was scheduled from Satish Dhawan Space Centre, SHAR, ISRO, Sriharikota on 30 December 2024 at 9:58 pm.

Key Features of APEMS:

Parallel Experiments: Two experiments will run simultaneously - one aboard the satellite in space and another on the ground at Amity University Mumbai.

Simulated Sunlight and Nutrients: The module uses LEDs to simulate sunlight and a nutrient-rich gel medium to support growth.

Advanced Monitoring: Equipped with a camera, pressure sensor, humidity sensor, and CO2 sensor, the module captures real-time data on plant health, including coloration changes and growth patterns.

Significance: The study aims to understand how plants respond to microgravity, which is critical for advancing plant growth in space and on Earth.

This groundbreaking initiative highlights Amity University Mumbai's leadership in astrobiology research and its vision to contribute to India's global standing in science and technology. The launch also underscores the role of academic institutions in addressing challenges related to space exploration and ensuring the success of future space missions.

- **Design, Fabrication and Performance Evaluation of 6 DoF Robotic Arm**

  The main purpose of building this robotic arm was to create an easy to replicate design for other students to make and modify. The 6 DOF robotic arm was made using off the shelf servo motors, a combination of laser cutting 3mm MDF and 3D printing PLA. The software for controlling the robot runs on an ESP32 Wi-Fi and Bluetooth enabled microcontroller which is powered by a 12v wall adapter. The controller is a custom made app made using MIT APP INVENTOR.

The study and research for the project included researching different types of robots, history, and various control schemes. These control schemes and designs inspired the design of the robotic arm. What makes this different from the other available designs is the extreme modularity that is provided by the laser cut design. Each item is panelized and hence can be modified or replaced as needed according to requirements. The control for each motor also uses standard PWM signals and the actuators can also be replaced. The tool also as a result is very versatile and can be replaced according to needs like drilling, cutting, welding etc.

In the current design, configuration and parts used, the arm has a maximum load capacity of 200 gm when fully extended. The cost of the entire project was also minimized and kept under ₹10,000.

- **Microalgae cultivation facility:** Innovative approach of integrating wastewater treatment and microalgae cultivation

Microalgae are considered as promising feedstock for biofuels production; however, the cultivation is still unfeasible due to input cost of chemical nutrients and fresh water requirement. Wastewater is comprised of nutrients such as ammonia, nitrates, phosphates, organic carbon etc. which can support microalgal growth. Use of wastewater can improve the economics of microalgae cultivation and reduce the fresh water footprint of the process. During cultivation microalgae also sequester CO2 for photosynthesis process. The biomass generated can be used for production of biofuels, biofertilizer and various bioproducts.

Amity University Punjab

- **Structure-Function Analysis of a Non-canonical Primase Domain of the Vertebrate Mcm10**

Abstract: The canonical primase performs a conserved function of synthesis of RNA primers complementary to the replicating DNA sequence. These primers are extended into short DNA chains, known as Okazaki fragments by the DNA polymerase during lagging strand synthesis. The RNA fragments abutting the neighbouring Okazaki fragments are subsequently completely degraded by RNaseH and the remaining gaps filled by DNA polymerase and ligase. However, a unique noncanonical primase function associated with Cdc23/Mcm10 has been associated with insertion of 1-2 ribonucleotide moieties into the newly synthesized DNA chain at the mat1 locus in the fission yeast, Schizosaccharomyces pombe. Like the canonical primase, Cdc23/Mcm10 is also associated with the catalytic subunit of DNA Pol, which extends the RNA primers into the DNA chain. One

striking difference with respect to the standard replication is the retention of the 1-2 ribonucleotides at the site of imprint in the newly synthesized lagging strand at the mat1 locus. Notably, Mcm10/Cdc23 also performs an essential role in DNA replication in all eukaryotes. It associates with the MCM-helicase and DNA Pol in elongation stage of DNA replication. The primase function of Cdc23/Mcm10 has been ascribed to the presence of putative primase domains found in the dnaG. In particular, conserved Aspartate residue found in this domain has been shown to be critical for the primase function and ribonucleotide insertion at the mat1 locus in fission yeast. Interestingly, the dnaG-associated primase motifs are present in all the metazoan orthologs of Mcm10. However, no primase activity has been associated with the vertebrate Mcm10. In this project, we propose to carry out structure-function analysis of at least one vertebrate ortholog of Mcm10, that is, from X. laevis (Xl). The XlMcm10 (860aa) is much bigger in size than that of S. pombe (593aa). A comparison of primase function-associated motifs shows that domains IV-VI of the T7 gene 4 primase-helicase also possess the primase activity. The corresponding homology regions are found within the residues 416 to 593 in SpMcm10 and residues 560-750 of the XlMcm10. We envisage that the region spanning the residues 560-750 in XlMcm10 may be associated with the primase activity, but the activity may be inhibited by the presence of the extra C-terminally associated residues 750-860 (which have a role in DNA binding) in the full length XlMcm10. Therefore, we propose to subclone regions of the XlMcm10 into an E. coli expression vector with a hexahistidine or GST tag and investigate the structure and primase function of different subdomains of the XlMcm10 by computational, biophysical and molecular methods.

In the results so far, we have subcloned different regions of XlMcm10 and SpCdc23 in to the vector pGEX-KG and confirmed their expression as fusion proteins with Glutathione S-transferase (Figure 1 and 2). In addition, genes encoding T7 primase domain and E. coli dnaG have been expressed with hexahistidine tag. Purification of these proteins is in progress.

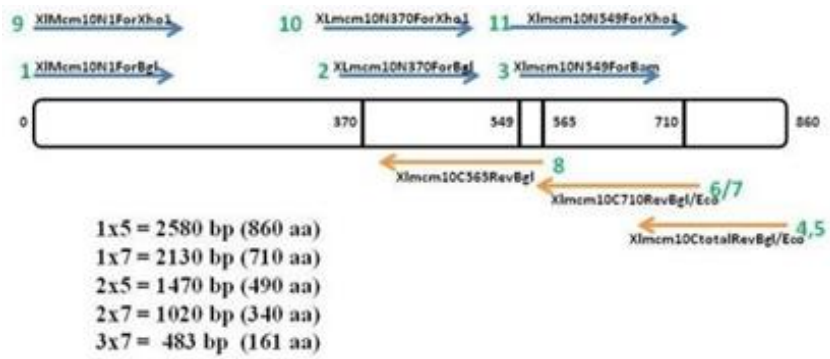


Figure 1. Name and position of primers to express different fragments of xlMCM10 protein.

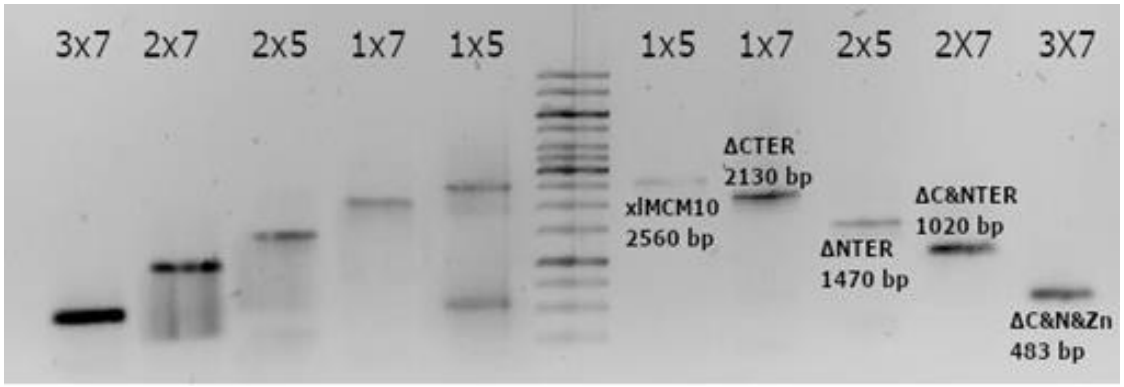


Figure 2. Unpurified and purified PCR products were run on 0.8% agarose gel. Lanes are marked with primers numbers as defined in figure 1.

Computational analysis showed that the structure of the C-terminal region of XlMcm10 showed similar structure to that of the T7 primase domain (Figure 3)

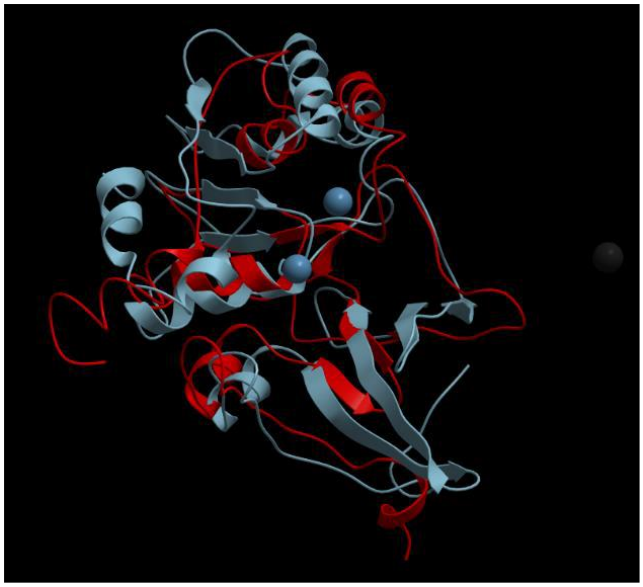


Figure 3. The structure of the putative primase domain of Mcm10 (amino acids 565 – 710) was computationally modeled by Rosetta server using the primase domain of T7 primase-helicase (PDBID: 1NUI) (amino acids 68 – 255) as a template. The generated model has more than 95% amino acids in the allowed region of the Ramachandran Plot. The computationally generated model could be structurally superimposed onto the primase domain of T7 primase domain with an RMSD of 3.4 Å.

Amity University Chhattisgarh

- **Performing a Comprehensive assessment and overall analysis of all wild species of Catharanthus roseus for commercial aspects**

  Today, women are more likely to experience vaginal infections, which are primarily brought up by the variety of microorganisms that infects the vaginal tract which results in a variety of disorders like vaginitis, urinary tract infections, bacterial vaginosis, vulvovaginal candidiasis, and sexually transmitted diseases, trichomoniasis, as well as other contagious disorders. Catharanthus Roseus has a lot of biological potential as per the study reported. Clinical and pharmacological studies utilizing standardized extracts and isolated phytochemical components are necessary to explore this plant's unrealized potential. Catharanthus roseus is a well-known plant of Ayurveda. Catharanthus roseus has various pharmacological properties such as antidiabetic, anticancer, antiulcer, antioxidant, antimicrobial, etc. It is used in the treatments of various diseases such as diabetes, menstrual regulators, hypertension, cancer and etc. Since this plant has antimicrobial properties and may be able to target infections and renew the growth of microflora, this study has helped us to better understand the significance of traditional herbal medicine in the treatment of various women's genital diseases, which can be a better alternative to antibiotics as it shortens the length of treatment with least side-effects. The main objective is to demonstrate that the extracts present the ability to inhibit these bacteria without affecting Lactobacillus strains. Our main focus in this research is to study and analyze the proximate, elemental, and phytochemical potential of Catharanthus roseus as well as their efficacy on antimicrobial activity against vaginal microbiota and antioxidant characteristics since in the future, this plant's extracts will be explored in the commercial market to produce intimate washes and other cosmetic products. plant's extracts will be explored in the commercial market to produce intimate washes and other

- **Next-GEN Wound Dressings -Biocompatible, Biodegradable and Sustainable Gauze**

  The conventional Cotton Wound Dressing Gauze creates huge Biomedical Waste and Contagion Issues with increased Environmental Load. To counter this, we plan to Innovate the Next GEN biocompatible, biodegradable, and sustainable wound dressing gauze from the cellulosic biomass derived from the

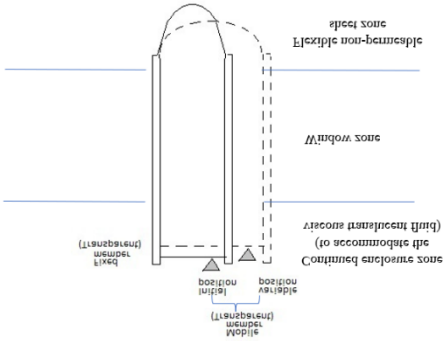
agricultural waste. The outcome would be the Development of Wound dressing gauze with Cost effective (Source of Raw material, Agro-waste Cellulose Biomass) Persistent with 3 of sustainability (Reduce, Reuse, Recycle). Micro/Nanofiber based material with higher surface area and adhesion properties. High Biocompatibility Biodegradability Sustainability with at-par efficiency to the currently available conventional gauze.

Future benefits to the society: 3 R's of sustainability (Reduce - Reuse - Recycle) - Cost effective (Source of Raw material, Agro-waste Cellulose Biomass) - Applicability - Public/Community Health Centres, First Aid Essentials, Medical Emergency and Trauma Centres

Amity University Patna

- **An automatic energy efficient system for consistent desirable luminance within an enclosure**

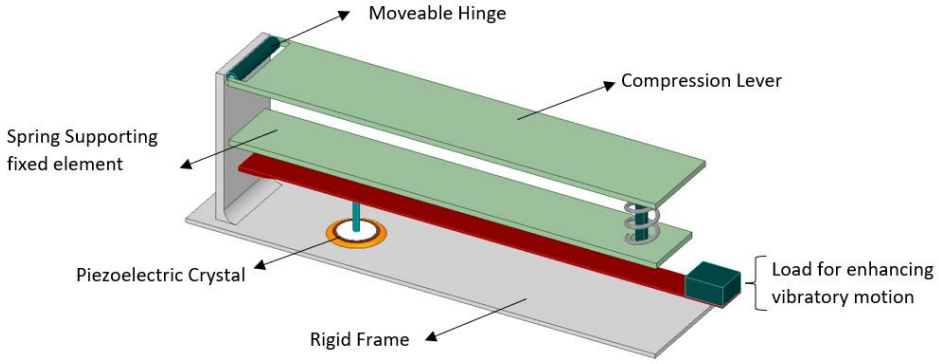
  The proposed device is a automatic energy efficient system for consistent desirable luminance within an enclosure by allowing the desired amount of light to pass through the glass/ window pane/ car windshield or car window" and the additional luminating source inside.



- **"Torsion-Based Piezoelectric Energy Harvesting System for Vehicle Motion"**

  The developed technology utilizes a Piezoelectric Energy Block to harness electricity from vehicle movement on roads. Piezoelectric crystals, when subjected to external stresses, generate small amounts of electricity. This

innovative approach effectively captures energy from vehicle motion, offering a renewable method for electricity production from road traffic.



Amity University Jharkhand

- **Novel 3D plate-like g-C3N4/BiOCl heterojunction as a highly efficient photocatalyst for the degradation of carbofuran in wastewater under visible light irradiation**

  The g-C_3N_4/BiOCl (gCN-BCl) heterojunction photocatalyst was synthesized using a low-temperature precipitation method for effective photocatalytic degradation of carbofuran (CBF). All gCN-BCl composites demonstrate greater efficacy in removing CBF compared to its individual constituents. The synergistic effect of incorporating the 0D structured BiOCl onto the 2D structured g-C3N4 was comprehensively examined using various microscopic, X-ray, and spectroscopic analytical techniques. Additionally, optical and photoelectrochemical analyses were conducted. The findings validated that the interaction between the two semiconductors at the heterointerfaces enhanced remarkable physical and structural stability, promoted high charge separation and transfer properties, and improved photocatalytic degradation.

Chapter - 11 A BIRD'S EYE VIEW OF DIVERSE ACTIVITIES UNDERTAKEN BY ASTIF IN 2024

- **ASTIF ORATIONS:**

The Amity Science, Technology & Innovation Foundation (ASTIF) actively identifies eminent experts from diverse fields such as Science & Technology, Engineering, and Medicine and invites them to deliver expert lectures. These sessions provide faculty, researchers, and students with invaluable insights, allowing them to benefit from the speakers' extensive tacit knowledge and lifelong hands-on experience.

In 2024, ASTIF had the privilege of hosting **Prof. Dipankar Banerjee** – Professor at the Department of Materials Engineering, Indian Institute of Science (IISc), Bengaluru, and Chairman of the Center for Study of Science, Technology and Policy (CSTEP). Prof. Banerjee, a Former Distinguished Scientist and Director General (then Chief Controller, R&D) at DRDO, shared his expertise in advanced materials research, policy implications, and technological advancements.

Prof. Dipankar Banerjee, Professor at the Department of Materials Engineering, IISc, Bengaluru & Chairman of the Center for Study of Science, Technology and Policy (CSTEP)
Former Distinguished Scientist and DG (then Chief Controller (R&D)

- **PATHBREAKING SCIENTIFIC ACHIEVEMENTS DELIBERATIONS**

The relentless efforts of Amity's esteemed faculty, scientists, researchers, and technocrats have significantly contributed to the university's global recognition in research. Their dedication and groundbreaking work across diverse fields have led to remarkable achievements.

In line with the vision of Hon'ble Founder President, Dr. Ashok K Chauhan, a dedicated forum has been established to recognize and showcase the contributions of Amity's scientists. This initiative aims to highlight their unique research, assess its global impact, and explore prospects.

As part of this initiative, 19 Amity researchers have presented their pioneering research in the presence of 39 distinguished experts. In 2024 alone, four exceptional researchers from Amity shared their innovative research accomplishments, which were evaluated by nine eminent external experts from leading institutions in India and abroad.

Amity Researchers and Their Pathbreaking Contributions (2024)

Name of Amity Speaker & Title of Talk	External Experts
Dr. Sunita Rattan, Director, Amity Institute of Applied Sciences, AUUP: *Towards Sustainability & Equity through Polymer Chemistry*	1. **Prof. Bhuvanesh Gupta**, Emeritus Professor, Department of Textile & Fibre Engineering, IIT Delhi 2. **Prof. M. S. Alam**, Dean, School of Chemical & Life Sciences, Professor & Head, Department of Chemistry, Jamia Hamdard
Prof. Chanderdeep Tandon, PhD, FRSB, FRSC, Dean - Faculty of Sciences, Amity University Punjab, Mohali: *Insights into Pathophysiology and Management of Urolithiasis: Research Journey*	3. **Dr. Sunil Khare, FRSC, FNAAS**, Institute Chair Professor of Biochemistry, Former Dean (R&D), Enzyme and Microbial Biochemistry Research Group, Dept. of Chemistry, IIT Delhi 4. **Dr. S.K. Singh, MBBS, MS, MCh, FAMS**, Director - Urology, Fortis Hospital Mohali; Prof. & Ex-Head, Urology, PGIMER Chandigarh

Dr. M.K. Dutta, Director, Amity Centre for Artificial Intelligence, Amity University, Noida: *Artificial Intelligence as an Impactful Science in Disruptive Innovations*	5. **Dr. P.K. Saxena**, Former PSA Fellow, O/o PSA to GoI & Director, Systems Analysis Group (SAG), DRDO 6. **Dr. Savita Ahlawat**, Co-Founder, Managing Director, Botlab Dynamics 7. **Dr. Sandeep Kumar**, Dept. of Electrical Engineering, School of Artificial Intelligence, IIT Delhi
Dr. Hridayesh Prakash, Deputy Director, Amity Center for Translational Research, Amity University, Noida: *Towards Designing New Therapeutics for Tuberculosis and Cancer*	8. **Dr. Ranjeet Sahoo**, Dept. of Medical Oncology, IRCH & Dept. of Pulmonary Medicine and Sleep, AIIMS New Delhi 9. **Dr. Vijay Hadda**, Additional Professor, Department of Pulmonary, Critical Care & Sleep Medicine, AIIMS New Delhi

Prof. M.K. Dutta delivered an insightful talk on "Artificial Intelligence as an Impactful Science in Disruptive Innovations" in the presence of esteemed external experts

This initiative continues to serve as a **platform for scientific dialogue, knowledge exchange, and collaboration**, ensuring that Amity University remains at the forefront of **cutting-edge research and innovation** on a global scale.

- **MEMORANDUMS OF UNDERSTANDING (MoUs)**

ASTIF initiated/ renewed a total of **Eight MoUs** in 2024 to strengthen research collaborations and academic partnerships.

- ✓ Saint Petersburg Electrotechnical University "LETI
- ✓ University of Debrecen
- ✓ Kepler Aerospace Pvt. Ltd
- ✓ Moscow Aviation Institute
- ✓ CCRUM
- ✓ ICAR
- ✓ CSIR
- ✓ Tomsk University Russia

- **POLICY AND GUIDELINES FORMULATED**
  - ✓ Concept note for the **"Dr. Ashok Kumar Chauhan Amity Global Award"**
  - ✓ Concept note for the **Centre of Excellence (CoE) in Hydrogen Research**

- **ACCREDITATION & RANKINGS**
  - ✓ **NIRF 2025**: Data compilation and submission.
  - ✓ **NAAC – AQAR (Criteria III)**: Data for **AY 2022-23 and 2023-24** was compiled and submitted.

- **RESEARCH PROJECT MANAGEMENT SYSTEM**

A **Research Project Management System** has been developed on Amizone to facilitate approvals for procurement, reimbursement, advances, and UC submissions for AUUP Noida. In 2024:

- ✓ **1,165** indents were raised, analyzed, and approved for fund release.
- ✓ **39 cases** of refunds were processed.
- ✓ ASTIF provided continuous **support to Principal Investigators (PIs)** for all project-related financial activities.

- **Campus Visits for Research & Innovation Assessment:** Regular **campus visits** were organised to assess and strengthen the **research and innovation ecosystem** across Amity University campuses, providing strategic support for ongoing and future initiatives.

- **Research and Innovation Target Setting & Monitoring:** To ensure the achievement of research and innovation targets for **Amity University Campuses in 2024**, ASTIF conducted **online review meetings** to monitor progress and provide necessary support.

- **Mega Mission: Publications:** ASTIF maintains a **University-wise database of publications**, undertaking **regular analysis and reporting on a monthly basis** to track research output and impact.

- **Mission h-Index:** A continuous effort is made to **sensitize and motivate faculty members** to enhance their research impact through improved **citations and h-index scores**.

- **Institutional Reviews for AUUP Noida:** Institutional reviews were undertaken for the following research centers:
  - ✓ **AIHRS** (Amity Institute of Herbal Research & Studies)
  - ✓ **AIP&P** (Amity Institute of Phytochemistry & Phytomedicine)
  - ✓ **AINN** (Amity Institute of Nanotechnology & Nanosciences)
  - ✓ **AIVI** (Amity Institute of Virology & Immunology)
  - ✓ **AINST** (Amity Institute of Nuclear Science & Technology)
  - ✓ **AISST** (Amity Institute of Space Science & Technology)
  - ✓ **AIPH** (Amity Institute of Public Health)

- **Some Events/ Visits/ Webinars organized/ coordinated by ASTIF**

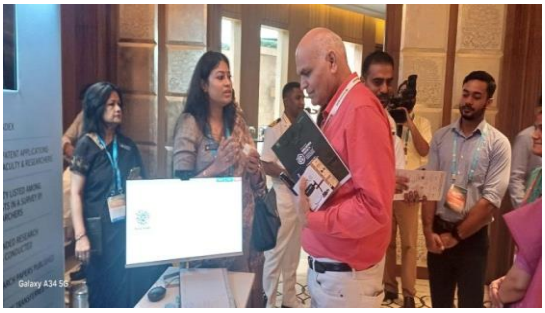
In 2024, ASTIF organized and coordinated several events, visits, and webinars aimed at fostering research collaboration and enhancing academic exposure. This included facilitating strategic meetings and visits within Amity to strengthen interdisciplinary partnerships.

Additionally, ASTIF played a key role in enabling Amity faculty and students to engage with external institutions, industries, and research organizations, providing them with valuable exposure to emerging scientific advancements and global best practices.

Through these initiatives, ASTIF successfully created opportunities for knowledge exchange, industry-academia collaboration, and the synergy of intellectual resources, reinforcing Amity's commitment to cutting-edge research and innovation.

Brief details of such events are shared below:-

- ✓ INSA Public Lecture series on the talk titled "India's Fight Against COVID-19" was delivered by Padma Shri Prof. Balram Bhargava, Chief, Cardiothoracic Centre, AIIMS, New Delhi.
- ✓ Conference on "Strengthening Indo-US Relationship in Amritkal-Aatmanirbhar Bharat"
- ✓ INSA - INYAS National Science Day Celebration 2024 at INSA Auditorium, INSA, New Delhi for the INSA Distinguished Lecture was delivered by Padma Shri Prof. (Dr.) Arvind Kumar.
- ✓ Facilitated Amity participation in the INSA Public Lecture series held on April 26, 2024 at 3:00 PM) where in the talk was delivered by Dr. Shekhar C. Mande, Former Director General, CSIR and Secretary, DSIR, Govt of India titled "Viksit Bharat@2047- The role of Science and Technology"
- ✓ International Yoga Conclave and Wellness Expo 2024 at Dr. Ambedkar International Auditorium, New Delhi
- ✓ India Space Congress (ISC) 2024 held during June 26-28, 2024
- ✓ 2nd Global Food Regulators Summit at Bharat Mandapam, New Delhi
- ✓ National Teachers Awards – 2024 presentation ceremony held at Vigyan Bhawan
- ✓ Global Bio India 2023
- ✓ ISPA Conference programme held at AICTE
- ✓ Amity's participation in India Space Congress (ISC) 2024
- ✓ Inno Health Conference 2024
- ✓ ET Government India Defence Conclave 2024



2nd edition of " Atmanirbharta in Age of Emerging Technologies & Transforming Geopolitics."

- **VISIT AT AMITY**
  - ✓ Dr. Richard Woychik, Director, National Institute of Environmental Health Sciences (NIEHS)
  - ✓ Dr. Yulia Shichkina from LETI University Russia
  - ✓ Dr. Irfan Rahman, Dean's Professor of Environmental Medicine, Medicine (Pulmonary), Public Health Sciences, and General Dentistry and Director of Flavor Inhalation Toxicology Research at Departments of Environmental Medicine, Medicine, Public Health Sciences, Dentistry at University of Rochester Medical Center, USA
  - ✓ Visit of a team from Center for Study of Science, Technology, and Policy (CSTEP)
  - ✓ Visit of DG, CCRUM and team
  - ✓ Dr. Keishin Kimura, President of Asia Yoga Therapy Society (AYTS) and Founder of Japan Yoga Niketan
  - ✓ Dr. Frank Arthur, Professor, Environmental and Occupational Health, School of Public Health, Drexel University, USA
  - ✓ Shri S. P Dobhal, Director of ITM (Institute of Technology and Management), DRDO
  - ✓ Prof. (Dr.) Bhagwati Prasad, Infosys Young Investigator, Materials Engineering Department, Indian Institute of Science, Bengaluru
  - ✓ Delegation from the Army Design Bureau (ADB) headed by Gen. C. S. Mann to AUUP, Noida
  - ✓ Dr. K. Jayaprakash Rao Former Chief PRO, Defence Research and Development Organization, India to Amity Institute of Higher Education, Mauritius Campus
  - ✓ Co-organized Amity Institute of Defence Technology's programme Defence Technology Awareness Programme for school students
  - ✓ EICS Group of Companies

- **More than 200 presentations and panel discussions were delivered by Dr. W. Selvamurthy. Some of them include:**
  - ✓ Keynote address on "Science Communication for Viksit Bharat" for Science & Technology Media and Communicators Conclave" on during IISF 2024.
  - ✓ Talk on "Technology Application for Strategic Leadership in the BSF" for program on "Leadership and Management Development Program (LMDP)" for DIGs.
  - ✓ Plenary Lecture on 'Science Education and Research in Swaraj India' at XLVII Indian Social Science Congress, University of Science and Technology, Meghalaya.
  - ✓ Plenary Lecture at the 12th International Conference on Issues and Challenges in Doctoral Research" (ICICDR-2024)
  - ✓ GMR Institute of Technology "International Conference on AI Powered Technology Integration for Sustainability (AI-PTIS-2024)
  - ✓ Symposium titled "Integrated Medicine- The Current and Emerging Clinical Practice" organized by Indraprastha Apollo Hospital, Delhi
  - ✓ "Yoga for Viksit Bharat" for JSW Officers
  - ✓ ITM, Mussoorie to address the newly recruited officers of DRDO.
  - ✓ Role of Faculty in Driving Research Impact and Innovation during Two-Week Online Faculty Development Program cum Short-Term Professional Development Certificate Program on the theme "Enhancing University Rankings: Strategies, Best Practices, and Faculty Contributions" at Amity University Haryana
  - ✓ National Conference SHASHWAT SRISTI SANRAKSHAN: "A Pledge for protecting World against Natural Hazards: Agro-Biotechnological Approach"
  - ✓ Defence Renaissance Summit 2024
  - ✓ National Brainstorming on "Transforming STI Ecosystem of India" organised by Department of Science and Technology (DST) in partnership with Indian National Science Academy (INSA) at INSA, New Delhi.
  - ✓ Creating a Space Ecosystem: A New Era-Igniting Young Minds for Space Exploration during National Space Day Celebration at AICTE Auditorium, New Delhi
  - ✓ Round Table discussion titled "Strengthening India's Health Preparedness Framework" organised by Observer Research Foundation.

- **In addition, he was also invited by various news channels such as Rajya Sabha TV, Mirror Now, Republic TV, NewsX, News18, DD etc. for discussion on Space, Defence and other National priorities.**

India's 'BIG' Defence Move! Fifth-Generation Fighter AMCA Project Gets CCS Nod | Nation Tonight

Agni 5 Missiles | Ex DRDO Chief On First Flight Test of Agni 5 Missiles | Mission Divyastra | News18

India's Chandrayaan 3, Space Tourism & More | Dr. William Selvamurthy Speaks to NewsX

Dr. W. Selvamurthy Talks About ISRO's Major Achievements in 2024 | The Bharat Almanac Episode 11

Amity University, Mumbai, has successfully grown spinach tissue in microgravity conditions aboard the PSLV Orbital Experiment Module (POEM), part of ISRO's PSLV-C60 mission launched on December 30, 2024. This marks India's first non-ISRO biological space experiment. The spinach callus tissue exhibited growth patterns similar to ground-based samples during the first week in orbit, indicating potential for sustainable space-based agriculture.

- **Glimpse of some of the visits undertaken:**
  - ✓ 9th Smart Cities INDIA EXPO" at Bharat Mandapam
  - ✓ INSA - INYAS National Science Day Celebration 2024 at INSA Auditorium, INSA, New Delhi
  - ✓ DEFCONNECT 2024 at the Manekshaw Centre, New Delhi.
  - ✓ Participated in the Selection Committee Meeting of the committee constituted by Ministry of AYUSH
  - ✓ Attended 37th Convocation of the Sri Ramachandra Institute of Higher Education and Research (SRIHER), Chennai as Chief Guest of the event and SRIHER's IQAC General Body Meeting on July 20, 2024.
  - ✓ AICTE - 167th Meeting of the Executive Committee and 66th Council Meeting (online)
  - ✓ 29th Raising Day celebration of CEPTAM, DRDO

Panel Discussion at The ETGovernment India Defence Conclave on the topic of "Defence Strategies for Viksit Bharat@2047: Shaping India's future in an Evolving Geopolitical Milieu"