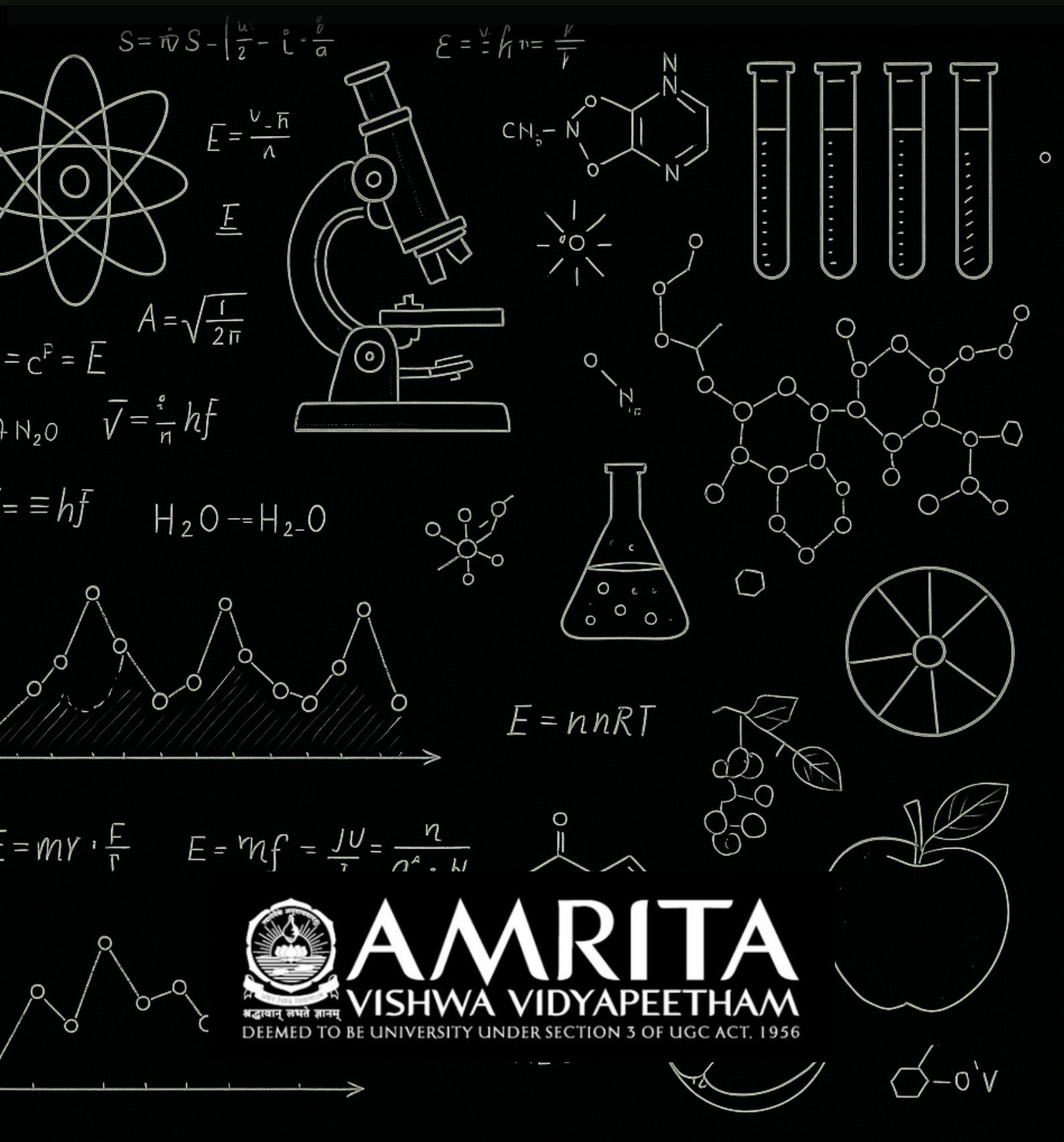
ISSUE 1 VOL. 3 JAN-JUNE 2025

VIGNANAMRITAM

A NEWSLETTER FROM AMRITA SCHOOL OF PHYSICAL SCIENCES



VIGNANAMRITAM

Vol III, Issue I JAN-JUNE 2025
AMRITA SCHOOL OF PHYSICAL SCIENCE
AMRITA VISHWA VIDYAPEETHAM,COIMBATORE

From the Editor's Desk

Prof. Prasanna Ramani
Department of Chemistry
Amrita School of Physical Sciences,Coimbatore

We are delighted to present the fifth edition of our interdisciplinary departmental newsletter, which brings together updates and achievements from the Departments of Physics, Mathematics, Food Science, and Chemistry.

This issue brings into focus several significant highlights from the past semester. Among them, the successful conduct of SciVio 2025, a dynamic platform that showcased the innovation and scientific temper of our student community, stands out as a milestone event. With enthusiastic participation across departments, SciVio reflected the true spirit of collaboration and creativity.

Each department has made remarkable contributions to research this term, with noteworthy publications in high-impact journals across diverse domains—from quantum materials and mathematical modeling to food safety and organic synthesis. This edition includes a curated list of these publications as a testament to the scholarly rigor of our faculty and students.

Furthermore, a series of invited talks and expert lectures were organized, enabling valuable dialogue between our academic community and leading minds from the scientific world. These sessions not only enriched our curriculum but also inspired deeper inquiry and interdisciplinary engagement.

We hope you enjoy reading this edition and stay connected with the latest happenings and achievements from our departments.

About Amrita School of Physical Sciences

Amrita School of Physical Sciences—Coimbatore is a vibrant component of the Amrita Vishwa Vidyapeetham, which has 76 faculty members belonging to the disciplines of Physics, Chemistry, Mathematics, Data Science, and Food Sciences and Nutrition. It has over 1000 undergraduate and postgraduate students. The school is very active in research, with around 100+ Full-time Scholars and has funded projects from National Research agencies like DST, DBT, SERB, DRDO, etc. It runs undergraduate, Five-Year Integrated MSc Program, Two-year MSc Program, and PhD programs in the field of Physics, Chemistry, Mathematics, Data Science, Food and Nutrition, and Applied Statistics. The thrust area of the School is Materials for Energy Applications, Bio-inspired materials, Water technology, Biosensors, Cancer chemistry, Data Science, Graph theory, and Modelling - to name a few.

RESEARCH LABS

Advanced Multifunctional Materials and Analysis Laboratory (AMMAL)

Amrita Material Processing Laboratory

Amrita Medicinal Research and Industrial Technology Acquisition (AMRITA) Laboratory

Bio-Materials Chemistry Research Laboratory

Biomaterials Laboratory

Biosensor Research Lab

Ceramics Research Laboratory

Dhanvanthri Laboratory

Energy Technology Laboratory

Functional Materials Laboratory

Light and Photonics Research Laboratory

Analytical Instrumentation Laboratory

OUR SCIENCE STUDENTS AT CONFERENCES/WORKSHOPS

POSTER PRESENTATIONS

- "Suzuki-Mayura Cross-Coupling: A Gateway to the Synthesis of Non-isoprenoid phenolics" **Bhadra A** at International Conference on Advancement of Chemical and Physical Sciences, Amrita Vishwa Vidyapeetham, Mysuru, 23-24 January 2025
- "PANI/MoS2: Organic and Inorganic Hybrid Framework for Asymmetric Supercapacitor" **Mohanraj M** at the International Conference on Emerging Trends in Physics, Energy Storage Materials, and Nanotchnology (ICEPEN-2025), at Mannar Thirumalai Naicker College, Madurai-625 004, Tamil Nadu from Feb 3-4, 2025.
- "Impact of parental nutrition education for children with autism: a pre- and post-intervention study" **Shreya P. Sarathy** at the WUACD International Conference 2025 on "One Health – Equitable and Holistic Approach for Sustainable Balance and Optimization of Health & Ecosystem", held at Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, on February 6–7, 2025
- "The Effect of Heteroatoms Doping in N-Doped Carbon Hollow Sphere for EDLC Supercapacitor Application" **Mohanraj M** at International Conference On Emerging Materials for Energy & Sustainability (EMES-2025) at VIT - Chennai, From 6-8 February -2025.
- "Rapid adsorption of Pb(II) ions from water using magnesium ferrite-gelatin Bionanocomposite" **Gopika G** at International Conference on Recent Advances in Material Chemistry (ICRAMC- 2025), at SRMIST, Chennai, Tamil Nadu, from 13-15 February, 2025
- "Vortex droplets and lattice patterns in two-dimensional traps: A photonic spin-orbit-coupling perspective" **Sanjay S** at the conference of Nonlinear Systems and Dynamics 2025 at Bharathidasan University, Tiruchirappalli from 10 - 13 March 2025.
- "Collective dynamics in an ensemble of excitable and self-oscillatory neurons: The role of higher-order interactions", **Soorya P P** at Conference on Nonlinear Systems and Dynamics (CNSD), School of Physics, Bharathidasan University, Tiruchirappalli, 10-13 March 2025.
- "Insights into the influence of electrolytes on the performance of carbon-based electrodes for aqueous zinc-ion batteries" **Swapnika Suresh** at the 3rd International Conference on Advanced Materials and for Clean Energy and Health Applications at the University of Jaffna, Sri Lanka from 27-28 March 2025.
- "Fluorine-incorporated graphene oxide for hydrovoltaic power generation: Improving proton migration and storage capacity"- **Neethu M** at the 3rd International Conference on Advanced Materials and for Clean Energy and Health Applications at the University of Jaffna, Sri Lanka from 27-28 March 2025.
- "Solvent-influenced structural transformation of the organic single crystals for the self-powered photodetector," **P S Sugatha** at the 3rd International Conference on Advanced Materials and for Clean Energy and Health Applications at the University of Jaffna, Sri Lanka, from 27-28 March 2025.
- "In situ heterostructure formation of $NaSbS_2$ and $Na_2Sb_4S_7$ for efficient photogenerated charge separation" **Edita J** at the 3rd International Conference on Advanced Materials and for Clean Energy and Health Applications at the University of Jaffna, Sri Lanka from 27-28 March 2025.
- "A preliminary investigation on thermally stable Schiff base metal complexes for hyperthermia: synthesis and biological evaluation" **Amritha S** at National Conference on Advances in Organic and Materials Chemistry (AOMC 2025) – CSIR-NIIST Thiruvanathapuram, 26-27 June 2025

OUR SCIENCE STUDENTS AT CONFERENCES/WORKSHOPS ORAL PRESENTATIONS

- “Sustainable Fabrication of Graphene Oxide Cathodes from Graphite of End-of-life Commercial Li-Ion Batteries for High-Performance Aqueous Zn-Ion Batteries” **Swapnika Suresh** at the 13th International Symposium on Electrochemical Science and Technology (iSAEST-13) at Uday Samudra Hotel, Thiruvananthapuram, Kerala from 8-10 January 2025.
- "Investigations on the structural and photoluminescence properties of alkali-doped Cesium Copper Iodide single crystals" **Aryalakshmi S** at the Third International Conference on Materials Science and Technology (ICMST 2025) at St Thomas College Palai(Autonomous), Kerala from 12-14 March 2025
- "H9C2 Cell-based Bioassay–Guided Fractionation and Characterization of Antioxidants from Crataegus monogyna: Extraction, Isolation and Cardioprotective Potential" Presented by **Dr. Haripriya Ravikumar**, **Nithya Alagesan**, and **Shreya P. Sarathy** at the International Conference – Ascend 2025, organized by IAPEN India Association for Parenteral and Enteral Nutrition, held on 15–16 March 2025. (Page No. 9)
- "Promotion and Evaluation of the Efficacy of Millet-Based Recipes in Preventing Gestational Diabetes Mellitus in Second Trimester Pregnant Women" Presented by **Preethika Rajarathinam** at the International Conference – Ascend 2025, organized by IAPEN India Association for Parenteral and Enteral Nutrition, held on 15–16 March 2025. (Page No. 12)
- "Evaluating the Effects of Parental Nutrition Education on Children with Autism: A Pre-and Post-Intervention Analysis" Presented by **Devalakshmi T.A**., **Dr. Haripriya Ravikumar,** and team at the International Conference – Ascend 2025, organized by IAPEN India Association for Parenteral and Enteral Nutrition, held on 15–16 March 2025. (Page No. 13)
- "Valorization Potentials in Watermelon Rind and its Application in the Food Industry" Presented by **Haritha** at the International Conference – Ascend 2025, organized by IAPEN India Association for Parenteral and Enteral Nutrition, held on 15–16 March 2025. (Page No. 15)

OUR FACULTIES IN CONFERENCES/ WEBINARS

- **Dr Sudip K. Batabayal** was invited as a distinguished speaker at the International School and Conference on Evolution of Electronic Structure Theory & Experimental Realization, scheduled to take place from 8-11 January 2025 at IIT Madras.
- **Dr. Aarathi Pradeep** delivered the keynote address for the 2nd National Conference on Intelligent Biosystems for Healthcare Analytics on 5th March 2025 at the Department of Biomedical Engineering, Karpagam Academy of Higher Education, Coimbatore.
- **Dr. Ramanujam B.T.S** delivered the keynote address for the Third International Conference On Materials Science And Technology (ICMST 2025) on 12-14 March at the Department Of Physics, St. Thomas College Palai.
- **Dr Sudip K. Batabayal** was invited as a distinguished speaker at the Conference -University of Jaffna- AMCEHA 2025- Third International Conference on Advanced Materials for Clean Energy and Health Applications held on March 27- 28th, 2025, Jaffna, Sri Lanka.
- **Dr Sudip K. Batabayal** was invited as a distinguished speaker at the International Working Seminar on HERCHET-UTFORSK project hosted by Western Norway University of Applied Sciences, Norway, in collaboration with Coimbatore Institute of Technology, Coimbatore, on 25th June 2025 at Coimbatore Institute of Technology, Coimbatore.
- **Dr.Prasanna Ramani** delivered a talk on Malonates as anti-prostate cancer agents at the International Symposium (online) on "New Advances in Medicinal Chemistry: Bioactive Compounds and Exploitable Targets" held on 20 June 2025, organized by the Department of Pharmacy, “G. d’Annunzio” University of Chieti-Pescara, Italy

WEEKLY FACULTY WEBINARS

The **Department of Mathematics** at Amrita Vishwa Vidyapeetham has been conducting a series of weekly webinars as part of its academic enrichment initiatives. These webinars provide a platform for faculty members to share their ongoing research, explore advanced mathematical concepts, and engage in meaningful discussions with peers and students. Covering a wide range of topics—from pure and applied mathematics to interdisciplinary applications—the sessions aim to foster a vibrant research culture within the department. The webinars also serve as an opportunity for students to stay updated with recent developments in the field. These regular interactions have strengthened academic engagement and encouraged deeper exploration of mathematical sciences. Overall, the webinar series reflects the department's commitment to continuous learning and academic excellence.

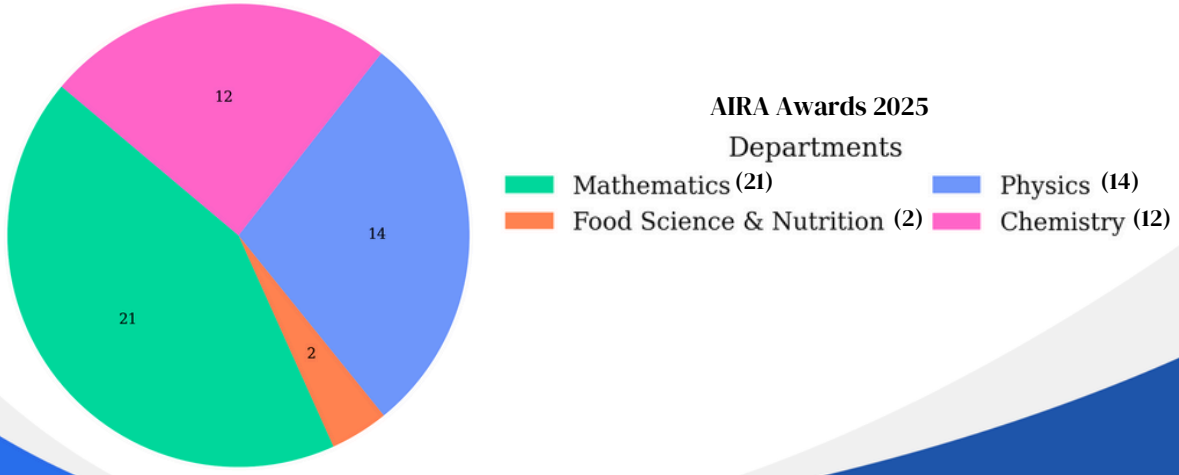
- **Dr. K. Somasundaram**, Department of Mathematics, delivered a talk on "Applications of AI in Healthcare", on 7th May 2025
-
- **Dr. T. Palanisamy**, Department of Mathematics, delivered a talk on "Applications of Statistics in AI", 13th May 2025

- **Dr. Deepa Gopakumar**, Department of Mathematics, delivered a talk on " Bio-Medical Analytics", 20th May 2025,

- **Dr. Sriramakarishnan P**, Department of Mathematics, delivered a talk on "Data Analytics and its Applications", 27th May 2025

AIRA AWARDS 2025

The AIRA Awards 2025 (Amrita Innovation and Research Awards) were held on April 4, 2025, as part of the ARISE – Amrita Research and Innovation Symposium for Excellence. Organized at the Mata Amritanandamayi Math, Amritapuri, the event was graced by the presence of Chancellor Amma and distinguished dignitaries. The chief guest, Dr. V. Narayanan, Chairman of ISRO and Secretary of the Department of Space, commended Amrita's efforts in merging scientific innovation with human values. During the ceremony, 27 outstanding researchers from Amrita—many of whom are recognized among the global top 2% scientists by Stanford—were honored for their contributions. A total of 49 faculty members from the Amrita School of Physical Sciences received the prestigious AIRA Awards this year. Amma highlighted the need for science to be rooted in compassion and aimed at uplifting society. The AIRA Awards 2025 not only celebrated research excellence but also reinforced Amrita's vision of purposeful innovation guided by ethical and spiritual values



One Day Research Meet 2025

The One Day Research Meet 2025 was successfully conducted on January 4th, 2024, at Sudhamani Hall, with the goal of fostering research awareness and curiosity among students. The event featured insightful presentations by faculty members from the departments of Physics, Chemistry, and Food Science & Nutrition, who shared their ongoing research work, methodologies, and potential applications. This interactive session provided students with a valuable glimpse into the diverse research landscape within the institute and encouraged them to explore opportunities for academic and research engagement. The meeting served as a vibrant platform for knowledge exchange and collaboration, inspiring students to think beyond the classroom and engage with real-world scientific challenges.

SciVio 2025

A SCIENCE DAY CELEBRATION

The annual Science Day celebration, SciVio 2025, was held on 24th March 2025 at Sudhamani Hall and Seminar Halls I & II, from 9:30 a.m. to 4:30 p.m., with enthusiastic participation from students and faculty. The event commenced with an insightful keynote address on quantum computing delivered by Dr. Amit Kumar Pal, Associate Professor, Department of Physics, IIT Palakkad. His talk introduced the audience to the fundamentals and future prospects of quantum technologies, sparking thought-provoking questions and discussions. The event featured around 50 posters and 20 models presented by research scholars from various departments, covering diverse and interdisciplinary topics. An expert panel evaluated the presentations, and the most outstanding contributions were recognized with the Young Scientist Awards. These awards encouraged participants to pursue scientific excellence and provided well-deserved recognition for their hard work. In addition to the technical sessions, fun and engaging science-themed games were organized for students, adding an element of enjoyment and interactive learning to the day.

Young Scientist Award

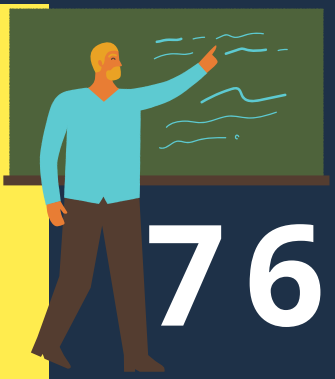
Neena P K
Research scholar
Department of Chemistry

Mohanraj M
Research scholar
Department of Physics

NCRTST-2025

The Second National Conference on Recent Trends in Science and Technology (NCRTST–2025) was held on May 2, 2025, at Sandeepani Hall, AB2, in the Amrita School of Physical Sciences, Amrita Vishwa Vidyapeetham, Coimbatore. The conference showcased the vibrant research culture among postgraduate students, with 73 research posters presented across a wide range of scientific domains. The event featured expert talks from distinguished speakers who shared current advancements and future directions in science and technology. Interactive sessions provided a platform for students to engage with researchers and peers, encouraging critical thinking and scientific dialogue. A major highlight of the day was the Best Poster Awards, with 14 students being recognized for their exceptional research work and presentation skills. The conference aimed to nurture the spirit of inquiry and build research confidence among M.Sc. students. It also offered an opportunity for interdisciplinary exposure and networking within the scientific community. Overall, NCRTST–2025 proved to be an enriching experience, reinforcing the importance of research-oriented learning at the postgraduate level.

SPOTLIGHT



76
FACULTY

1000+
STUDENTS

4
DEPARTMENTS

180+
RESEARCH SCHOLARS

12
RESEARCH LABS

10
ACADEMIC LABS

700+
PUBLICATIONS SINCE ‘08

40+
PATENTS FILED
SINCE ‘08

2200L
RESEARCH GRANTS

WALL OF FAME

HONOURING THE DOCTORATES

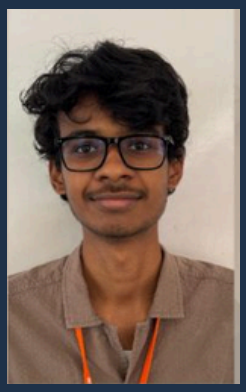
Dr. Hemalatha R

Dr. Navaneeth

Dr. Ashna

Dr. Anamika Chatterjee

HEARTFELT CONGRATULATIONS TO THE GATE SCORE WINNERS 2025



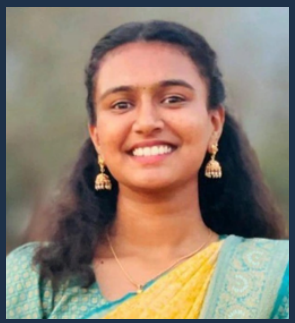
G Pranav Karthik
Inegrated MSc Physics
(2022 Batch)

Jothika Rajendran
MSc Physics
(2023 Batch)

Devananda R S
Integrated MSc Physics
(2022 Batch)

Devika Biju
Integrated MSc Chemistry
(2020 Batch)

PLACED IN NESTLE



Ms. Deepthi R

Ms. Dhanusri V

WALL OF FAME

Mr. Mohanraj M, research Scholar from the Department of Physics, has won the Best Oral Presentation Award at the International Conference on "Emerging Materials for Energy & Sustainability-2025" at VIT-Chennai campus and was awarded a 1-year free membership to the Royal Society of Chemistry.

Kavya C, research scholar from Department of Chemistry, has won Best Poster Presentation Award in the International Conference on Advances in Functional Materials (ICAFM) held on 13-14 February, 2025 at St.Joseph's College, Tiruchirappalli.

Amrita H V, final year student of Integrated M.Sc. Chemistry, has won Best oral presentation awards at 11th national conference on "challenges in chemical and biochemical engineering for sustainable development" held at annamalai university in 24th January 2025 and First prize in the paper presentation at Evogen 2025, the 2-day international conference on Bio Nexus towards global sustainability organised by division of biotechnology, Karunya institute of science and technology Coimbatore on March 13-14,2025.

Devathara S, third year B.Sc. student, Department of Food Science and Nutrition, has secured first prize in Model presentation at SCIVIO 2025 conducted by Amrita School of Physical Sciences, Amrita Vishwa Vidyapeetham, Coimbatore.

Annapoorni G, first-year student of Integrated M.Sc. Mathematics and Computing has been selected for the INSPIRE Fellowship (2025) throughout her academic period (five years).

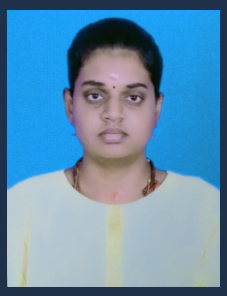
WALL OF FAME

Dr. Haripriya Ravikumar Assistant Professor, Department of Food Science and Nutrition, has won 1st prize for presenting best paper titles "H9c2 cell based bioassay-guided fractionation and characterization of antioxidants from Crataegus monogyna: extraction isolation and cardioprotective potential" at ASCEND 2025 organized by Department of Clinical Nutrition, in association with IAPEN held at Amrita Institute Of Medical Sciences, Kochi, India

Shreya P Sarathy, research scholar, Department of Food Science and Nutrition has won first prize in poster presentation on "Impact of parental nutrition education for children with autism: a pre- and post-intervention study" at the WUACD International Conference 2025 on "One Health – Equitable and Holistic Approach for Sustainable Balance and Optimization of Health & Ecosystem", held at Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, on February 6–7, 2025.

Nathania Solomon, research scholar, Department of Food Science and Nutrition, has won first prize in poster presentation at SCIVIO 2025 for "Binding Agents and Agricultural Byproducts in Food Inks for Advanced 3D Food Printing" conducted by Amrita School of Physical Sciences, Amrita Vishwa Vidyapeetham, Coimbatore

Jyothilakshmi O P, research scholar from the Department of Physics, has won second prize in poster presentation at SCIVIO 2025 for "Effect of anisotropy on non-radial oscillations of dark energy stars" conducted by Amrita School of Physical Sciences, Amrita Vishwa Vidyapeetham, Coimbatore

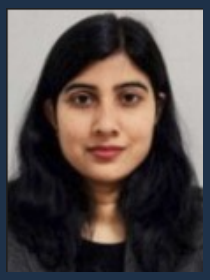


Abikayasavee V.L., research scholar from the Department of Food Science and Nutrition, has won third prize in poster presentation at SCIVIO 2025 for "3D food printing publication analysis, using VOS Viewer" conducted by Amrita School of Physical Sciences, Amrita Vishwa Vidyapeetham, Coimbatore

WALL OF FAME

Nandana M, Manav Nambiar, Pranav A, and I Sandeep Rajkumar received first prize in Model presentation in SCIVIO 2025 for their model on "An Alternative to Dynamic Light Scattering"

Congratulations on the impactful publication titled "Single-Atom Engineered Sensors for Volatile Organic Compounds" in Materials Science and Engineering: R: Reports (Impact Factor: 26.8)



Dr. Sowjanya Vallem

Dr. T G Satheesh Babu

Dr. P V Suneesh

Congratulations to Dr. Prasanna Ramani on being invited to serve as an editorial board member of Anti-Cancer Agents in Medicinal Chemistry (Bentham Science Publishers)

Congratulations to Dr. K. Somasundaram on his successful collaborative visit to the University of Turku, Finland, where he worked with Dr. Juha Plosila, Professor and Head of Robotics and Autonomous Systems, from 11th January to 16th February 2025.

WEBINAR

DR. N. THARANI DEVI

On March 29, 2025, the admissions department hosted a webinar titled “The Future of Food: How Science and Nutrition are Shaping What We Eat” for prospective students of the Food Science and Nutrition program. Conducted by Dr. N. Tharani Devi via Zoom, the session explored key trends including personalized nutrition, nutrigenomics, sustainable proteins, food waste reduction, AI in food systems, and 3D-printed food. The webinar also highlighted career opportunities and showcased the department’s advanced lab facilities, offering attendees a comprehensive view of emerging innovations and academic prospects in the field.

INDUSTRIAL VISIT TO CFTRI & DFRL

On March 21–22, 2025, students and research scholars from the Department of Food Science and Nutrition, Amrita Vishwa Vidyapeetham, Coimbatore, visited the Central Food Technological Research Institute (CFTRI) and Defence Food Research Laboratory (DFRL) in Mysore. At CFTRI, the team was welcomed by Dr. Ramesh, who provided a historical overview of the institute and its pivotal role in food science research since its establishment in 1950. Participants explored various R&D departments specializing in food biotechnology, microbiology, sensory science, and food safety. A detailed session on product innovation, such as green coffee and spice oil extraction, highlighted CFTRI's contributions to industry with over 300 technologies developed and licensed to thousands of commercial users. Students also visited the food processing and animal labs, gaining insights into product testing and safety assessments.

The following day, the visit to DFRL was led by Dr. Illayaraja, who introduced the institute's focus on developing advanced nutritional solutions for the Indian Armed Forces. Students learned about DFRL's innovations, such as ready-to-eat meals, instant mixes, space food for the Gaganyaan mission, and eco-friendly packaging. Demonstrations and exhibitions showcased preservation technologies like retort pouching and the use of analytical kits for food safety. The visit offered students valuable exposure to high-impact food research with real-world applications in both civilian and defense sectors.

Workshop on AI Tools in Academic Research

On January 25, 2025, the Department of Food Science & Nutrition conducted a workshop on the application of AI in academic research, led by Dr. V. Sowmya from the Amrita School of Artificial Intelligence. Attended by undergraduate students, research scholars, and faculty from the Food Science and Chemistry departments, the session covered the use of AI tools to enhance research efficiency, streamline literature reviews, and improve data analysis. Dr. Sowmya demonstrated platforms such as Connected Papers, Semantic Scholar, Zotero, and Mendeley, and highlighted AI software for data visualization and statistical accuracy. The interactive workshop was well-received, offering practical insights into integrating AI technologies into scientific research.

Community Eye Camp

On March 16, 2025, the Department of Food Science and Nutrition at Amrita Vishwa Vidyapeetham, Coimbatore, held a community eye camp at Mariyamman Temple, Ettimadai, benefiting 106 locals with free screenings for glaucoma, cataracts, and other vision issues. Conducted after a need assessment in February, the camp also promoted eye health through nutrition education, highlighting the role of foods like leafy greens, carrots, and fish. The event, graced by the Village head(Oor Gounder), combined healthcare access with nutritional awareness for impactful community outreach.

Amritotsavam 2025 Cooking workshop

The Department of Food Science and Nutrition at Amrita Vishwa Vidyapeetham organized a cooking workshop as part of Amritotsavam 2025 on March 21, 2025, in the Food Science and Nutrition lab at Amrita School of Physical Sciences, Coimbatore. Led by Mr. John Milton Siluvai, a renowned Sous Chef from Residency Towers, the workshop saw enthusiastic participation from 23 student teams. The session began with the chef demonstrating recipes such as Pumpkin Soup, Onion Soup, and a Vegetable Salad, while also showcasing innovative presentation techniques and professional culinary skills.

Following the demonstration, students engaged in a hands-on cooking activity where they prepared multicuisine salads and presented their creations for individual evaluation. Chef Milton offered constructive feedback, helping students refine their culinary, processing, and presentation skills. The workshop concluded with a group photo featuring Chef Milton, Dr. P.R. Janci Rani (Head of Department), and the event organizers. The session provided a valuable experiential learning opportunity, equipping students with practical kitchen skills and enhancing their understanding of professional food preparation.

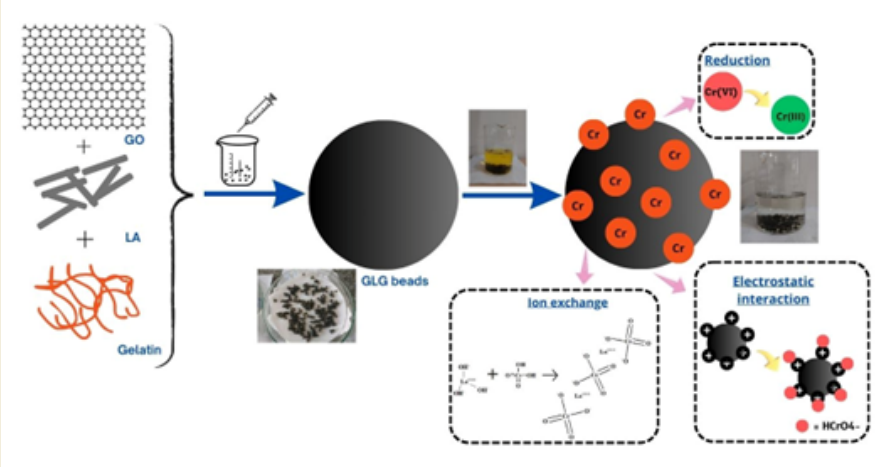
Agratha 2025

On March 29, 2025, the Department of Food Science and Nutrition hosted a heartfelt farewell event, “Agratha 2025,” at Sudhamani Hall to honor its outgoing final-year students. Organized by the juniors, the celebration began with a prayer and a motivating address by Dr. P.R. Janci Rani, followed by vibrant cultural performances that brought joy and emotion to the occasion. The event served as a touching send-off, marking both an end and a new beginning for the graduating batch.

LANTHANUM HYDROXIDE DECORATED GRAPHENE OXIDE REINFORCED GELATIN TERNARY COMPOSITE HYDROGELS FOR THE DETOXIFICATION OF HEXAVALENT CHROMIUM

GOPIKA G

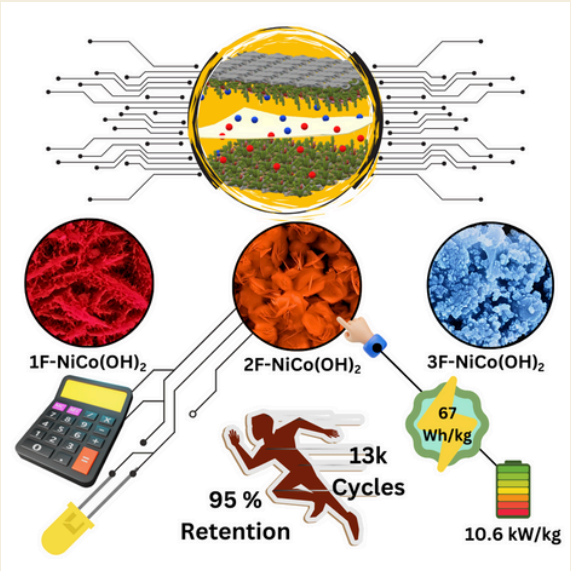
The quality of water resources across the globe has been deteriorating due to various industrial practices, which subsequently cause lethal effects on aquatic and terrestrial species. Industrial effluents contain a heterogeneous cluster of organic and inorganic substances, with heavy metals constituting a notable category of non-biodegradable and bio-accumulating components. Among the heavy metal ions, hexavalent chromium (Cr(VI)) is particularly concerning due to its high carcinogenic and teratogenic nature. According to the World Health Organization (WHO), Cr(VI) is classified as a group 1 carcinogen, with a maximum permissible limit of 50 µg/L in drinking water. Around the globe, scientists have been studying various strategic hybrid materials for the adsorptive removal of Cr(VI). Considering the material stability and its practical applications, much interest is now in developing nanocomposite hydrogels for Cr(VI) adsorption.



The study aims to develop a ternary composite hydrogel involving gelatin as its matrix and the nanomaterials, such as graphene oxide (GO) and La(OH)3 (LA), as the reinforcements. Rod-like La(OH)3 nanoparticles were decorated on graphene sheets, and these fillers were uniformly dispersed throughout the gelatin matrix. The resulting mesoporous hydrogel is spherical, with an average diameter of 1.993 mm. The highest adsorption rate is observed at pH 3.5, contact time of 120 min, 0.4 g of hydrogel dosage, and 50 mg/L Cr(VI) solution at 298 K. The adsorption of Cr(VI) is prompted by electrostatic attraction, ion exchange, and partial reduction of Cr(VI) to Cr(III). The ternary system also exhibited stable regeneration characteristics for three consecutive cycles. Furthermore, the proposed hydrogel demonstrated remarkable performance in the adsorption of Cr(VI) from real electroplating effluent.

POWERING THE FUTURE: A LAYERED LEAP IN ENERGY STORAGE

CHARIS CHAROLINE



In the race towards sustainable energy solutions, supercapacitors have emerged as game-changers, offering rapid charging, long cyclability, and environmental compatibility. But the challenge lies in materials:

What should we build them with? That's where my research journey on Layered Double Hydroxides (LDHs) began. LDHs are a class of materials with a fascinating structure: imagine a stack of positively charged metal hydroxide layers, sandwiched with anions in between. This flexible structure allows for tuning, which makes LDHs ideal candidates for energy applications. In this work, we designed and synthesized fluorine-doped nickel cobalt layered double hydroxides (F–NiCo(OH)$_2$) using a hydrothermal method.

Why fluorine? Because its high electronegativity tweaks the electronic structure, enhancing charge transfer and surface activity. It is exactly what a high-performance electrode needs.

When tested in a three-electrode system using 1 M KOH as electrolyte, these nanowires delivered excellent electrochemical performance: a high specific capacity, rapid redox kinetics, and great cyclic stability.

The star feature? Their unique succulent-like morphology, which offers abundant active sites and easy electrolyte access, leads to efficient faradaic reactions.

But science is more than numbers. It's about creating real solutions. So, we assembled an asymmetric supercapacitor device, pairing my F–NiCo(OH)$_2$ with activated carbon.

The result? A stable working voltage window of 1.6 V, high energy density of 67 Wh/kg, and excellent cycling retention over 13000 cycles. These metrics push the boundaries of what LDH-based supercapacitors can achieve and hint at their potential in next-gen portable electronics and renewable energy storage.

What excites me the most is the tunability. By adjusting metal ratios, introducing dopants, or engineering nanostructures, we can design properties at the atomic level. It's like being a molecular architect, constructing the future of clean energy, one layer at a time.

The work doesn't stop here. The next step is to integrate photoactive materials, aiming for hybrid devices that can harvest and store solar energy as photochargeable supercapacitors. Imagine your phone charging itself while lying in the sun!

From lab benches to global goals, this research aligns with Sustainable Development Goals (SDG 7: Affordable and Clean Energy and SDG 13: Climate Action). By advancing low-cost, scalable energy storage materials, we are building a more resilient and electrified world.

Energy is no longer just about power; it's about empowerment. And for me, every synthesized sample and every volt stored is a step toward a cleaner, smarter planet.

ADVANCING DECISION-MAKING WITH GENERALIZED HEXAGONAL NEUTROSOPHIC MODELS

Augus Kurian

In recent years, the field of decision-making has faced increasing challenges due to the complexity and vagueness inherent in real-world data. To address these issues, this study introduces a novel mathematical model known as the **Generalized Nonlinear Hexagonal Neutrosophic Number with Asymmetry (GNHNNA).** This new form of neutrosophic number extends the classical fuzzy number model by incorporating asymmetry and nonlinearity in truth, indeterminacy, and falsity functions, allowing it to represent a wider range of uncertainty and ambiguity. One of the major contributions of this work lies in the development of arithmetic operations for GNHNNA, which are not only mathematically robust but also computationally more efficient compared to the traditional (α, β, γ)-cut-based methods. The study demonstrates that by eliminating the need for such cuts, the process becomes significantly simpler and more intuitive, particularly when applied to problems involving a large amount of uncertain information.

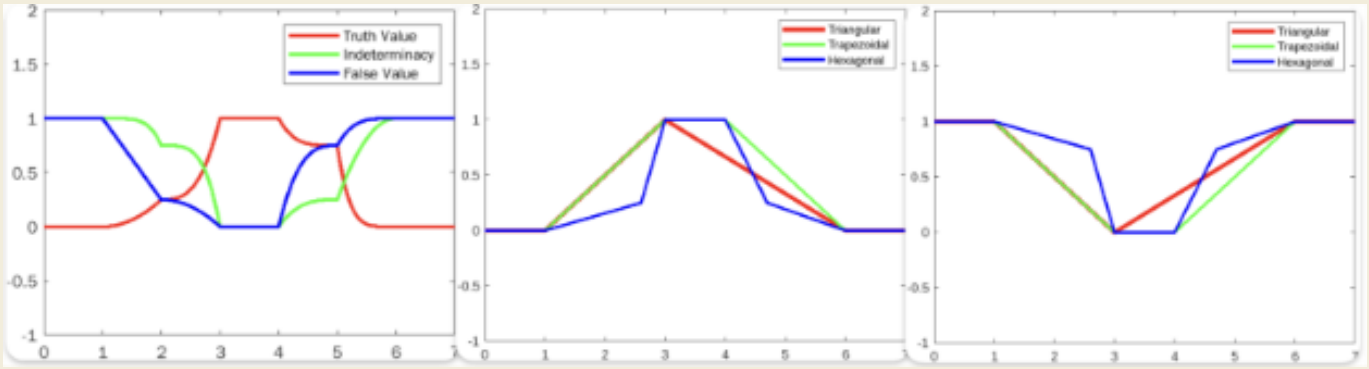


Figure: Hexagonal Neutrosophic Number

A key application of the GNHNNA model is found in Multi-Criteria Decision-Making (MCDM), a domain where precise ranking and evaluation of multiple conflicting criteria are critical. We introduce a novel ranking technique based on the values and ambiguity of the generalized number, enabling more accurate ordering without the need for defuzzification. This advancement allows decision-makers to process and interpret data more realistically. To validate the practicality of the proposed method, the study applies the GNHNNA framework to a risk analysis problem. The results indicate that the model not only handles imprecision effectively but also provides meaningful insights that can be used in high-stakes decision-making environments, such as engineering assessments, financial risk evaluation, and strategic planning. Furthermore, this work lays a strong foundation for future research. The GNHNNA model can be extended to solve a variety of mathematical and real-world problems, including linear and nonlinear programming, as well as differential equations under neutrosophic environments. Such extensions could significantly enhance the modeling capabilities in fields like optimization, systems engineering, artificial intelligence, and operations research

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Communications in Combinatorics and Optimization
Q1 IF:0.8

Best Proximity Point Results for Multivalued Non-Self Mappings in O-Complete Metric Space
V. Pragadeeswarar, V. Thinkal and Manuel De la Sen
International Journal of Analysis and Applications **Q3 IF:0.8**

RECENT PUBLICATIONS-MATHEMATICS

A class of t -weight codes and its applications
J. Prabu, J. Mahalakshmi and S. Santhakumar
Journal of Algebra and its Applications **Q2 IF:0.6**

Two families of Z_p^m-linear codes and their applications
J. Prabu and J. Mahalakshmi
Applicable Algebra in Engineering, Communications and Computing **Q2 IF:0.6**

Chromatic choosability for some classes of perfect graphs
Nandana K. Vasudevan, J. Geetha, and K. Somasundaram
Discrete Mathematics, Algorithms and Applications **Q3 IF:0.4**

Comparative study of numerical methods for singularly perturbed boundary turning point problems with mixed boundary conditions
Sekar E, G. Janani Jayalakshmi, V. Raja and A. Tamilselvan
Journal of Mathematical Modeling **Q3**

Optimizing Bayesian Repetitive Group Sampling Plan For Quality Control To Enhance Decision Making Efficiency In Modern Manufacturing
Devika V, Kaviyarasu V. and Sivakumar P.
Reliability: Theory and Application **Q3**

Exploring the Dynamics of a Model for HIV Infection Featuring Dual Time Delays
Sangeeta Kumari and Parimita Roy
Journal of Applied Nonlinear Dynamics **Q4**

RECENT PUBLICATIONS-MATHEMATICS

Inverse Independent Outer Connected Domination Number of Few Classes of graphs
G Menon, Mallikarjun S Biradar, R R Iyer and K S Sreeranjini
Communications on Applied Nonlinear Analysis Q4

CONFERENCE PROCEEDINGS

Optimized Deep Learning Technique for the Effective Detection of Windows PE Malware
Kirubavathi Ganapathiyappan and Abhishek Yadav
2nd International Conference on Cyber Warfare, Security and Space Computing, SpacSec 2024 Jaipur

A Deep Learning Approach to PDF Malware Detection Enhanced with XAI
Kirubavathi and Fathima Noorudheen
2nd International Conference on Cyber Warfare, Security and Space Computing, SpacSec 2024 Jaipur

Linguistics of Sacred Semantics: Exploratory Data Analysis of Shri Bhagavad Gita
Dr. L. Gnanaprasanambikai
IEEE Conference on 2024 International Conference for Women in Computing Conference

Framework for Drug User Analysis and Prediction
Somasundaram K, Dhanush Sethuraman, Ela Ananya, Joseph Jeffrey J, Senthil Kumar Thangavel and P Rangasami
IEEE Xplore, Proceedings of the Fourth International Conference on Sentiment Analysis and Deep Learning

RECENT PUBLICATIONS-MATHEMATICS

An Enhanced Optical-Flow Based Attendance Tracking System for Campus Environment
K Somasundaram, S Karthik Ram, Senthil Kumar Tangavel, M G Venkatesa, Selvanayaki Kolandapalayam and N Manjunadh Reddy
IEEE Xplore, Proceedings of the Fourth International Conference on Sentiment Analysis and Deep Learning

Person Re-Identification Using Siamese Triplet Network
K Somasundaram, Aparna Menon, Yashwanthika R, Shreya J V, Senthil Kumar Thangavel and Shreeya Asawa
IEEE Xplore, Proceedings of the Fourth International Conference on Sentiment Analysis and Deep Learning

Web Phishing Detection Using Decision Tree Random Forest and XGBoost
T Palanisamy, BP Keerthana, A Siva, T Senthilkumar and N Prabhu
2025 International Conference on Inventive Computation Technologies

Hybrid Approach Using Deep Learning Techniques to Enhance Forecasting Accuracy in Garch Model.
T Palanisamy and KK Tharun
International Conference on Data Science and Applications

Deep Learning Based Driver Drowsiness Detection in Real Time Environment - An Enhanced Approach
K Somasundaram, Ashin Ajay, Naveen Kumar Ashok, Gokul Balajiram, Abinesh Tamizhselvan and Senthil Kumar Thangavel
IEEE Xplore, Proceedings of the Fourth International Conference on Sentiment Analysis and Deep Learning

A Grading Model for Jasmine Flowers Using Deep Learning and Quantum Machine Learning
Pratiksha Cauvery K P, Thrisha R, Harshitha T, Suman Panigrahi, Senthil Kumar Thangavel and C.P.Boopathy
IEEE Xplore, Proceedings of the Fourth International Conference on Sentiment Analysis and Deep Learning

RECENT PUBLICATIONS-MATHEMATICS

Enhancing Milk Yield Forecasting in Dairy Farming Using an Interpretable Machine Learning Framework
K. Somasundaram, Srinithi. B, Sruthi Nirmala S. R, Senthil Kumar Thangavel and M. Ramasamy
IEEE Xplore, Proceedings of the Fourth International Conference on Sentiment Analysis and Deep Learning

Voice assistance to blind people by detection of surrounding objects, activities, and humans
K Somasundaram, Suhas Preetham Kambham, Raahul Varman, Tadepalli Sri Valli Ramya, M K Eniyan, Senthil Kaumar Tangavel
Proceeding of 2024 International Conference on Computing and Intelligent Reality Technologies

Smart Signature-based Intrusion Analysis System with Pre-Scaled Learning for Large Networks
K Somasundaram, Hemanth Sai Vardhan Balivada, Shanmuka Vardhan Bandarupalli, Dasari Vishal, Soma Siva Pravallika, Manas Pandey, Senthil Kumar Thangavel
Proceeding of 2024 International Conference on Computing and Intelligent Reality Technologies

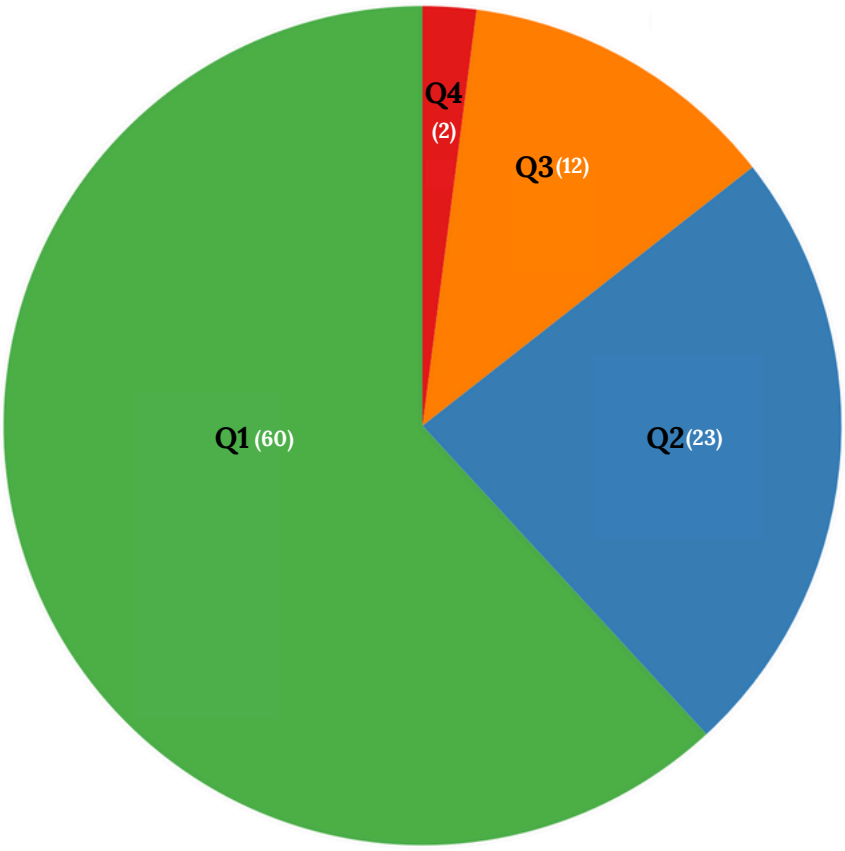
Fashion Design Transformation using Text-Guided Diffusion Models
T Palanisamy, Arjun Adityan, Kabeleswar, Karthikeyan Vaiapury and Senthil Kumar Tangavel
4th International Conference on Sentiment Analysis and Deep Learning

RECENT PUBLICATIONS-FOOD SCIENCE

Eco-profile approach in watershed and river basin management for addressing water rights and conflicts at micro scale.

Mavhaire Damasco[1] Rajendrakumar S[2*] Tharanidevi N[3*] Shimly S[4] Dil Bahadur Rahut[5] Raja Rajendra Timilsina[5]

Frontiers In Water Q2 IF: 2.8



Distribution of Journal Publications (Jan-June 2025) by Amrita School of Physical Sciences

Invited Talks

FOOD SCIENCE

"Science, Technology and Innovation for a Sustainable Future"

The Department of Food Science and Nutrition, School of Physical Sciences, Amrita Vishwa Vidyapeetham, organized an insightful invited talk on June 24, 2025, at Acharya Hall, delivered by the eminent Dr. C. Anandharamakrishnan, Director of CSIR–NIIST and Rashtriya Vigyan Shri Awardee. Centered on the theme "Science, Technology, and Innovation for a Sustainable Future," the talk explored critical global challenges like climate change, sustainable food systems, and eco-conscious innovation. Dr. Anandharamakrishnan emphasized science-driven climate resilience, sustainable packaging, and low-carbon technologies, while showcasing pioneering initiatives such as India's first 3D food printer, vegan leather technology transfer, and ARK®—Asia's first engineered human gastrointestinal model. Encouraging students and researchers to view food science as a transformative tool, he called for inclusive and adaptive innovations tailored to regional needs. The session concluded with an engaging Q&A, fostering enriching discussions on sustainability, innovation strategies, and collaborative efforts, and ended with a token of appreciation and a heartfelt vote of thanks.

PHYSICS

Research talk on Electrochemistry!

Dr. Anantharaj Sengeni offered a talk on tremendous value to scholars and researchers working in electrochemical applications, shedding light on recent advancements and experimental best practices. Dr. Sengeni clearly articulated the principles of battery performance, highlighting redox behavior and scan rate dependencies. His explanation of capacity evaluation and electrode kinetics, along with practical guidance on avoiding common electrochemical pitfalls, made the session both informative and impactful.

Harnessing DNA into Energy!

Dr. Samanth Kokkiligadda, Research Professor, Gyeonggi, South Korea, delivered an insightful talk on Harnessing DNA into Energy: Advanced Materials for Sustainable Energy Storage and Conversion on February 4, 2025. The session explored the role of DNA in crafting next-generation materials for energy storage and conversion. His insights into DNA synthesis, material design, and future sustainability sparked thought-provoking discussion among students, researchers, and faculty.

Quantum Computation: When Atoms Become Processors!

Dr. K. T. Satyajith, Director, IMJ Institute of Research, Kundapura, Udupi, India, for an enlightening talk on Quantum Computation: When Atoms Become Processors on February 14, 2025. The session offered deep insights into bits vs. qubits, superposition, quantum supremacy, and the Deutsch algorithm. His innovative approach using calcium ion traps and the interactive quiz on quantum gate operations made it especially engaging for students, researchers, and faculty alike.

Lecture series of Statistical Mechanics!

Dr. Ajeeth Kumar Sharma, Head of the Department of Physics, IIT-Jammu, delivered a series of insightful lectures on Statistical Mechanics on March 3rd & 4th, 2025. He covered foundational topics such as canonical and grand canonical ensembles, partition functions, and their applications to thermodynamic properties like heat capacity. His clear explanations and interactive discussions inspired students to further explore the field, with several expressing interest in research internships at IIT-Jammu.

Supercapacitors and their industrial impacts!

Dr. T. Boobalan, Scientist, Surge Supercapacitors, Pune (Maharashtra), delivered an insightful session on Supercapacitors: An Industrial Perspective on June 2, 2025. The talk was highly beneficial for researchers exploring next-generation energy storage devices, highlighting practical design challenges and performance metrics of supercapacitors. He emphasized materials selection, electrode architecture, and reliability concerns in commercial applications. The session offered an excellent bridge between academic research and industrial deployment strategies.

Shield the EM waves!

Prof. V. Subramanian, Professor, Department of Physics, IIT Madras, delivered an insightful research talk on EMI Shielding at Microwave Frequencies on June 6, 2025. The session was highly beneficial for scholars focused on electromagnetic interference mitigation, discussing materials and design strategies for microwave shielding. He explained key mechanisms behind shielding effectiveness and field attenuation, emphasizing frequency-specific behavior and composite architectures. The session provided valuable guidance for developing advanced EMI shielding solutions in high-frequency domains.

MATHEMATICS

Convergence analysis of regularised learning algorithm in reproducing kernel Hilbert space

Prof. Sivananthan Sampath
Department of Mathematics
IIT Delhi

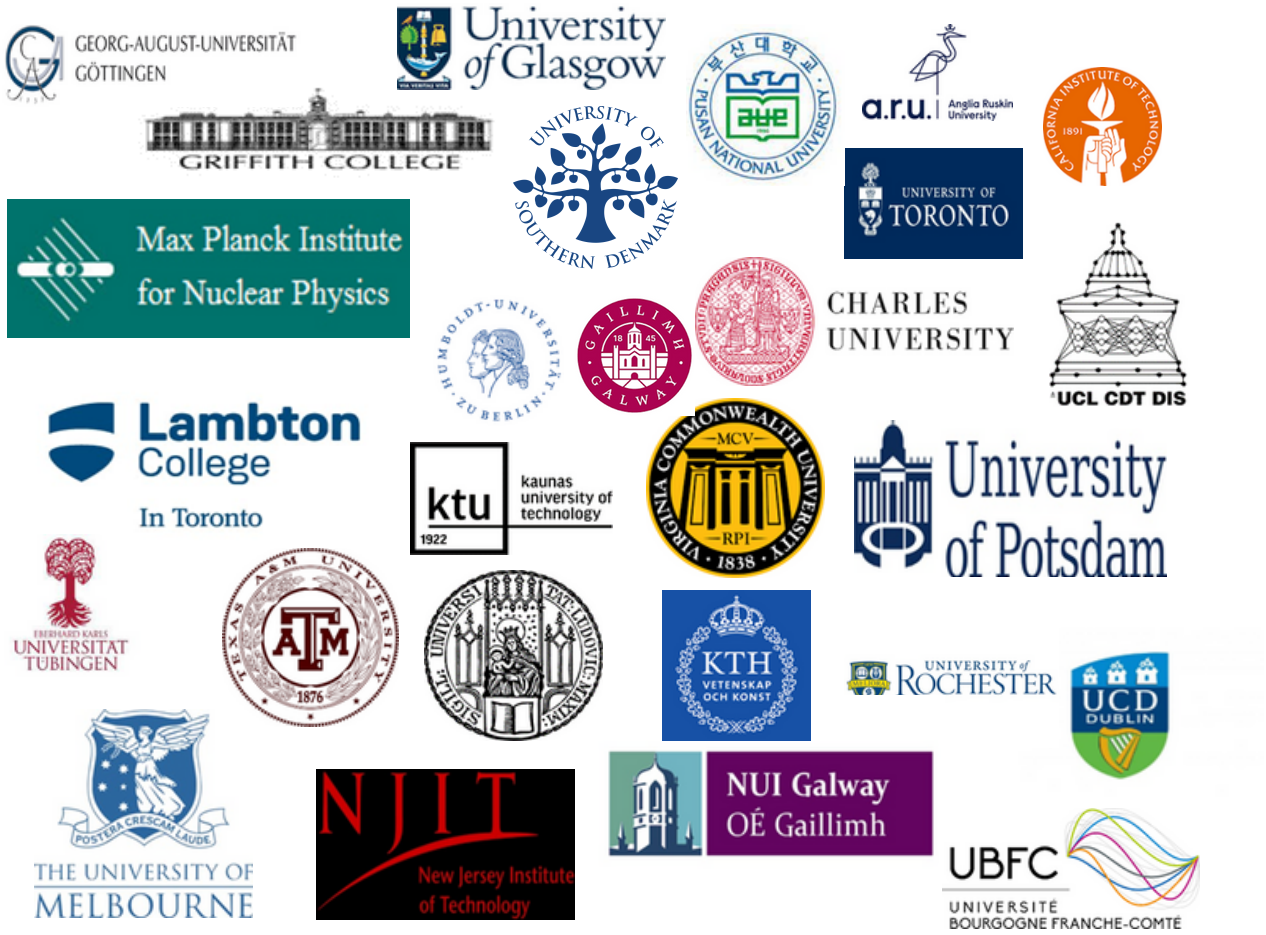
Prof. Sivananthan Sampath from the Department of Mathematics, IIT Delhi, delivered a compelling talk on the Convergence Analysis of Regularised Learning Algorithm in Reproducing Kernel Hilbert Space (RKHS). The lecture focused on rigorous mathematical frameworks that underpin the consistency and convergence rates of kernel-based learning algorithms. By leveraging tools from functional analysis and statistical learning theory, Prof. Sampath highlighted how regularisation in RKHS ensures generalisation in high-dimensional settings.

Hands-on Workshop: Mastering LLMs

Mr. Prabhu Palaniswamy
BestFrnd.AI,
Bangalore

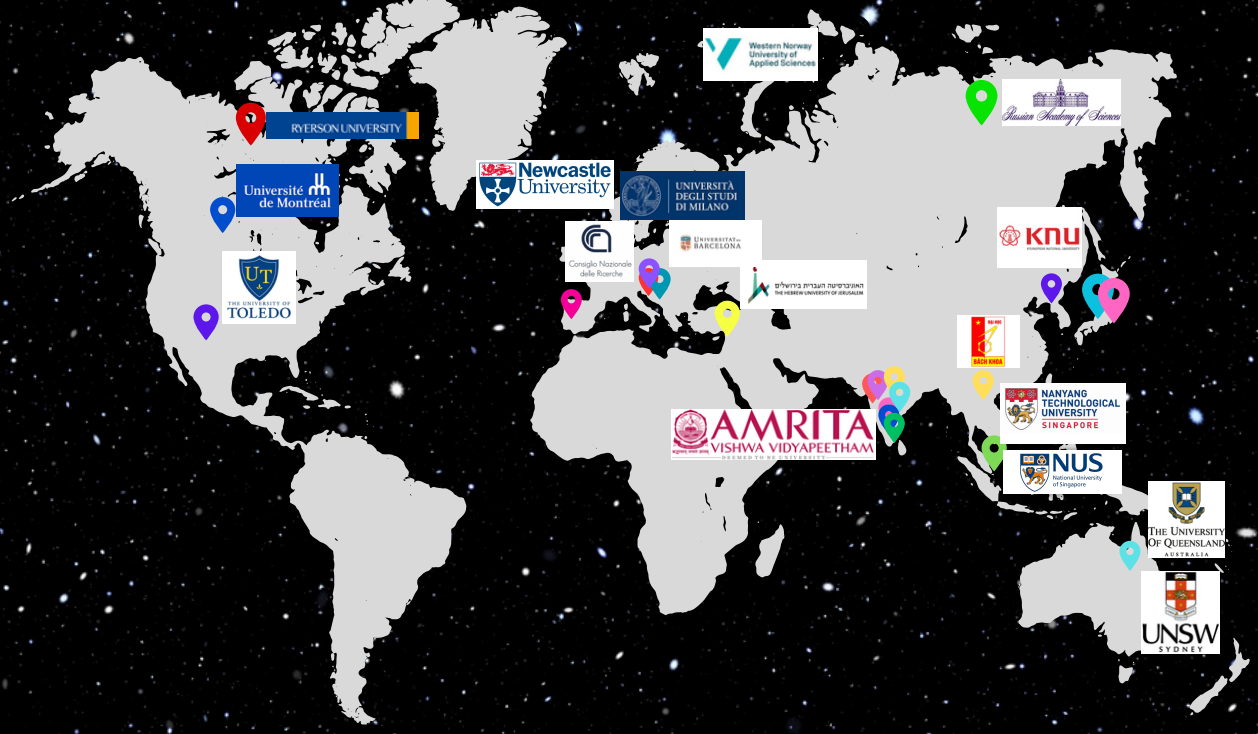
Mr. Prabhu Palaniswamy led an engaging Hands-on Workshop: Mastering LLMs, designed for data science students and AI enthusiasts. The session introduced participants to the core principles and practical aspects of working with large language models (LLMs), including prompt engineering, fine-tuning, and real-world application development. With a strong focus on experiential learning, the workshop empowered students to build scalable AI solutions and better understand the transformative potential of generative models in modern data science.

DISTINGUISHED ALUMNI



PLACEMENTS

COLLABORATIONS



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·NISER, Bhubaneswar
·IIT, Gandhinagar
·IISc, Bangalore
·AIMS, New Delhi
·VIT, Vellore
·VNIT, Nagpur

UPCOMING EVENTS

- **International Conference on Advances and Applications of Numerical Analysis (ICAANA – 2025)** 21 - 23, July 2025

- **International Conference on Graph Theory and its Applications (ICGTA25)** 15-17 December 2025

- Research Scholars are welcome to submit their articles for the upcoming issue.

- Entries to be sent to **vignanamritam@cb.amrita.edu**

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