

PROJECT REPORT

BRIEF REPORT OF THE WORK / ACTIVITIES

The Directorate of Projects primarily oversees all activities related to research projects undertaken by the teaching faculty across various departments of the University of Calicut. These projects are predominantly funded by external funding agencies such as DST (FIST, PURSE), DBT, UGC, MoEF, KSCSTE, ANRF (formerly SERB), MHRD, and others, with duration typically ranging from one to five years.

In addition, the Directorate manages Research Promotion Grant projects supported by the University of Calicut and other special initiatives. The Branch handles all administrative responsibilities associated with research projects, including:

- Submission of proposals to various funding agencies
- Recruitment of project staff
- Sanctioning of project-related purchases (equipment, chemicals, etc.)
- Settlement of project accounts

Through these functions, the Directorate plays a pivotal role in facilitating and promoting research activities within the University.

SPECIAL ACHIEVEMENTS, IF ANY, IN THE YEAR 2025:

Prestigious external funded project PAIR (Partnership for Accelerated Innovation & Research) - sanctioned with total allocation of Rs. 8,02,80,900/- has been implemented in the Department of Chemistry, University of Calicut, a spoke institute in collaboration with Indian Institute of Science, Bangalore which stands as Hub of the Project. Bangalore University, National Institute of Technology, Nagaland, Pondicherry University etc are the other spoke institutes involved in the project. No. 267/DOP-ASST-1/2022/Admn Calicut University.P.O, Dated: 22.01.2026

The details of Proposals submitted for new projects, completed projects, ongoing projects (Funded by external agencies and the University) and newly implemented projects, during the year from 01.01.2025 to 31.12.2025 are furnished below.

Project Proposals:

Project proposal		
Sl No	Department	Number
1	Zoology	8
2	Botany	2
3	Chemistry	8
4	Nano Science & Technology	2
5	Russian and Comparative literature	3
6	Economics	6
7	Education	1
8	Physics	3
9	Psychology	3
10	Library & Information Science	2
11	Philosophy	4
	Total	42

34 Proposals have been submitted by faculty members of various departments to the funding agencies like DST, KSCSTE, CSIR, ICPR, ICSSR, IUAC etc during this year so far. Faculty members from Zoology (8) and Chemistry (8) have submitted more proposals during this year. All the office works related to the submission of proposals are done by this office.

Completed Projects:

Completed Projects in 2025

a. Externally Funded Projects

Sl No	Department	No.of Projects	Amount (Rs.)
1	Botany	3	67,78,876

2	Chemistry	3	80,63,305
3	Mathematics	1	6,60,000
4	Zoology	3	84,54,690
5	Physics	3	61,85,718
6	Education	1	10,00,000
	Total	14	3,11,42,589/-

b. Funded by University

1	Chemistry	2	6,00,000
2	Nanoscience & Technology	1	3,00,000
3	Botany	1	3,00,000
4	Biotechnology	1	3,00,000
5	History	1	2,94,000
6	Computer Science	1	2,99,000
7	Statistics	1	3,00,000
8	Education	1	3,00,000
9	Hindi	3	6,20,000
10	Sanskrit	1	1,55,000
11	Arabic	1	3,00,000
12	Malayalam	1	2,05,000
13	Philosophy	4	9,85,000
14	Zoology	1	3,00,000
15	English	2	5,50,000
16	Commerce	2	5,50,000
17	Psychology	1	1,75,000
18	Journalism and Mass Communication	1	1,95,000
	Total	26	67,28,000

In the current financial year, so far, 14 externally funded projects have been completed. The details are given below:

1. DST-SHRI Project entitled Integrating the conservation of indigenous practices and approaches for strengthening the vector control research in Wayanad district of Kerala, India under Dr .Aneesh E M in Department of Zoology with total allocation of 28,88,583/-.
2. SERB, Core Research Grant Project entitled Morpho-molecular characterisation and phylogenetic analysis of the genus Riccia L. (Ricciaceae; Marchantiophyta) in the Western Ghats under Dr. Manju C. Nair in the Department of Botany for a period of 3 years with a total allocation of RS. 39,56,876/-.
3. SERB Start Up Research grant under Dr. Zuhail K P, in the Department of Physics with a total allocation of Rs.31,86,700/- for a period of 2 years. This project is entitled "Microswimmers in Anisotropic Liquid".
4. KSCSTE Project under E&E (Ecology & Environment) Programme entitled 'Metagenomics and bioprospecting of selected wetlands in North Kerala' with Dr. C D Sebastian, Professor, Department of Zoology as PI and Dr. Abraham Joseph, Senior Professor, Department of Chemistry as Co-Investigator for a period of three years w.e.f 22/12/2022 with a total financial outlay of Rs. 19,00,000/-.
5. Project funded by Kerala State Biodiversity Board entitled "Documentation, Nutritional evaluation, and Value addition of underutilized banana varieties from Kerala" under Dr. Resmi L, Department of Botany for a period of 2 years with a total allocation of 8,36,000/-.
6. MHRD/MoE, Govt. of India Scheme for Promotion of Academic and Research Collaboration (SPARC) project entitled Biomimetic sensing artificial muscles based on conducting polymer/ hydrogel hybrid systems has been granted to Dr. Yahia A I, Department of Chemistry with an allocation of Rs 60,98,305/- for a period of 2 years.
7. SERB - MATRICS Project entitled "Operators on Hilbert Spaces of functions, completion problem in some classes of operators related to isometries, and Cauchy dual subnormality problem" under Dr. Prasad T in the Department of Mathematics for a total outlay of Rs 6,60,000 (Rs 2,20,000 per each year) for a period of 3 years.

8. DST- SERB Project entitled "Ecofriendly mussel-inspired functionalized catechol-rich biomaterials as reusable adsorbent for water purification} with a total outlay of Rs. 36,66,107/- for a period of 3 years under Dr. Y. Shibu Vardhanan Department of Zoology.
9. Council of Scientific & Industrial Research, New Delhi sponsored Project under Dr. Santhosh K P Department of Physics entitled "Theoretical investigation on synthesis and decay of superheavy elements for total allocation of Rs.19,36,000/- (Nineteen Lakh Thirty Six Thousand Only).
10. ICSSR Project entitled Social life, equity and mental health of tribal students at the secondary stage of Kerala in the post covid-19 pandemic has been granted to Dr. Jibin V K, Department of Education with allocation of 10 lakhs for a period of 1 year.
11. UGC-DAE-CSR Kolkata Centre under Dr. M. M. Musthafa in Department of Physics entitled Measurement of (n,?) cross sections of long living radionuclides using surrogate ratio method with total allocation of 10,63,018 for a period of 3 years.
12. SERB -TARE Project under Dr. Derry Holaday entitled Density Functional Theory Assisted Studies on structure, Properties and applications of Metal – Organic Framework. under for a total allocation of Rs.18,30,000 for a period of three Years in Department of Chemistry.
13. KSCSTE Project under Dr. Sunojkumar entitled "Molecular Phylogeny, biogeography, Taxonomic Revision, Chemical Diversity Studies and Conservation of the Subfamily Lamiodeae (Lamiaceae) with special reference to the genus Pogostemon in India" with a total allocation of Rs.19,86,000/- for a duration of 3 years.
14. UGC- DAE - CRS Project under Dr. Yahya A .I in Department of Chemistry with a total allocation of 45000 year for a period of 3 years

In the current financial year, so far, 26 projects funded by the University, have been completed. The details are given below

Sl No. Name and designation

No. of Principal Investigator Title of the Project

Summary of the projects.

1	Dr. Ajay Mohan M Assistant Professor Department of Philosophy	An Inquiry into Davidson's notion of Language	The project provides a theory of Language by following Davidson's intuitions concerning Language and using resources from complexity theory. An amount of Rs.2,40,000 has been allocated to the project.
2	Dr. Ali Noufal K. Associate Professor in Arabic	An Analytical study of the Topics and Methodology adopted by the Research Scholars	The Project is an effort to categorise and analyse the abstract of the Research work carried out by the Research Scholars at Department of Arabic, University of Calicut and at the Research Centres affiliated to the University of Calicut. The Project will help the Supervisors and the Research scholars to have sound literature review while selecting the topics of research. It will help the Departments to avoid repetitions and ensure the quality and productivity of the research. An amount of Rs. 3,00,000/- has been granted for the project.
3	Dr Anu Joseph, Associate Professor Department of Biotechnology	Expression studies of matrix metalloproteinases and their inhibitors in the hyperinsulinemic and diabetic patients:	The project is of immense clinical application and importance in the field of health sciences. This project envisions the identification of specific MMPs/TIMPs that play a critical role in the development and progression of cataracts. The identified MMPs/TIMPs can be used as potential biomarkers for early diagnosis and drug targets for managing cataracts Identifying potential biomarkers for cataract and other eye diseases. The project is carried out in two phases in collaboration with Comtrust Eye Hospital, Calicut. An amount of Rs. 3,00,000/- has been allocated for this project.
4	Dr. Renjith Rajan Assistant Professor	DHVANVANTAR ISAMHITA OF GARUDAPURANA: A STUDY	The objective of the project, is to document and analyse how the COVID -19 pandemic has

	Department of Sanskrit		prompted a cultural response in Kerala. Further the study aims to emphasise Socio-Cultural and Political Shifts brought about by the pandemic focusing on investigating newer and reworked conceptions of "Public: and "Private" spaces incorporating all religious communities and various spheres of life in Kerala. Rs.1,55,000/- (One Lakh Fifty Five Thousand only) has been allocated for this project.
5	Dr. Krishnarani S D Associate Professor Department of Statistics	Spatio-temporal statistical models and their applications	This project is aims to develop theoretical framework of spatio-temporal models and their predictions, identify and compare different ways of modeling of spatio-temporal data sets, establish the applications of spatio-temporal effect on the environmental, climatic, hydrological, economic, and health data sets using the models SLM, SEM, and SDM and their non-linear forms and to develop new models as generalizations of SLM, SEM, and SDM and Apply the generalized models through real/simulated data. Rs.3,00,000/- has been allocated for this project.
6	Dr. Sreesha C.H. Assistant Professor Department of Commerce and Management Studies	Impact of Merger of SBI and Associates	The main objective of the project is to measure the operational efficiency of Merger of State Bank of India, to measure the impact of merger on financial performance of State Bank of India and to measure the impact of merger on reducing Non performing assets of State Bank of India. Sanctioned amount Rs.3,00,000/-.
7	Prof. Prabhakaran Hebbar Illath Professor Department of Hindi	Concept of freedom in the contemporary Hindi Poetry	The project relates to new approaches to Concept of Freedom in terms of sustainable breaking from the bondages and new tools for analysing contemporary poetry. An amount of 2,50,000/- has been allocated for this project.
8	Dr. Manmathan M.R Department of History,	Revisiting Mattannur Revolt, 1852-2022: Textual Narratives and Social Memories	The project aims to develop a social narrative of the rebellion; to explore its origin, nature and ideological roots; to attempt a comparative analysis with its south Malabar counterparts; to examine its immediate and gradual consequences; to discuss its role in moulding later political and social environment of the region; to assess the nature of colonial accounts in comparison with folk/oral narratives; to construct an oral history of the revolt from varied strands of collective memory. This project is granted Rs. 2,94,000/-
9	Dr. Manoj Praveen G. Associate Professor Department of Education	Effect of Schema Based Problem Solving on the understanding of problem solving processes in Physics among Prospective Teachers	To find out the effect of schema-based problem solving on the understanding of problem-solving processes in Physics among Prospective Teachers. It also has Specific Objectives: i.e to find out the effect of schema-based problem solving on Problem Solving Processes among Prospective Physics Teachers of grade 11 and to find out the attitude towards schema-based problem solving among Prospective Physics Teachers of grade 11. An amount of Rs.3,00,000/- has been allotted to this project.
10	Rajeev S. Menon Associate Professor	Investigations on the unique transformations of unsaturated	The major objectives of the present investigation are i) Design and synthesis of structural

	Department of Chemistry	sulfones for the rapid construction of antitumor alkaloids and analogues	analogues of Subincanadine F; ii) Evaluation of their anticancer potential, and iii) Development of a preliminary structure-activity relationship (SAR) pattern. Subinacandine F is a member of indole family of alkaloids which shows high levels of anticancer activity. The alkaloid and its structural derivatives with improved cytotoxicity and better pharmacological profiles will be synthesised and tested. An amount of Rs. 3,00,000/- has been granted for this project.
11	Dr.K.V Prasanna Assistant Professor Department of Philosophy	Women and Philosophy in India: A Study on the Systematic Forms of Exclusion in Academics	The study focuses on understanding why the female under- representation emerges in India. The present study helps to rethink the absence of women philosophers in academics and curriculum. The objective of the study is to find out women philosophers in India and addressing the gender gap present in the academic sphere of Philosophy in India. The study tries to find out how and why this research gap occurs in Indian academics on the subject of philosophy. An amount of Rs-2,35,000/-has been granted for this project.
12	Dr.Sajitha M.A. Associate Professor Department of English	The Representation of Tourette Syndrome in Select Works	The aim of this project is to explore in detail Disability Studies with special emphasis on Tourette Syndrome, to analyse the construction of normalcy and practices of the able-bodied and the disabled, to examine different types and aspects of disability, to explore in detail the representation of Tourette Syndrome in select works, to create an awareness of Tourette syndrome amongst educators and students, to raise the consciousness levels of students, parents and teachers and thereby create a more tolerant and informed group in educational institutions, and to compare the rehabilitation facilities available in India and abroad for the people with Tourette Syndrome and give proper recommendations to the authority concerned.
13	Dr. Natasha P. Assistant Professor Department of Commerce and Management	Stock Market Efficiency of SAARC Nations before and during Covid-19: A Comparison	The main objectives of this project is to analyse the stock market efficiency of SAARC nations before the Covid- 19 Pandemic period and to make a comparison of the stock market efficiency of SAARC nations before and during the Covid-19 Pandemic period.. An amount of Rs. 2,50,000/- has been granted by the University under seed money projects.
14	Dr.Shibi C Assistant Professor Department of Hindi	Origin and development of Hindi in Malabar: - Special reference to Kozhikode and Malappuram districts.	With a focus on the residents of the districts of Kozhikode and Malappuram, this study seeks to comprehend the style of Hindi that the people of Kerala speak. Understanding the Hindi language's spread throughout Kerala was made easier by this study. This study was conducted with a variety of participants from diverse backgrounds. This includes people who are immigrants, traders, students, parents, and children whose mother tongue is Malayalam but who also know Hindi. Field surveys and interviews will add depth to the study. An amount of Rs. 2,05,000/- has been allotted to this project.

15	Dr. Binitha N N Professor Department of Chemistry	"Green Fabrication of Layered MoS ₂ / Graphene Hybrid Electrodes for a Wide Potential Window Flexible Supercapacitors"	The project mainly focuses on the development of layered MoS ₂ /Graphene hybrid electrode material for fabricating flexible supercapacitor devices. Graphene is synthesized by a green eco-friendly method and the incorporation of MoS ₂ results in nanocomposite formation with high specific capacitance. The combined effect of both electrical double- layer capacitance as well as pseudo capacitance reveals the enhanced performance of the newly formed nanocomposite. Studies regarding flexible devices using MoS ₂ /graphene are nanocomposites are also performed by fabricating different devices. Rs. 3,00,000/- has been allocated for this project.
16	Dr. Shamla K.M. Associate Professor Department of English	"The Aesthetics of Protest: A Study of Shirin Neshat's Visual Art"	The present study is undertaken with the objective of revealing the convergence of the verbal and visual arts in the performances of protest with reference to Shirin Neshat's visual arts. This study may surface the subtle ways in which the poetic mediated through verse converses with the visual to articulate the Silenced . The history of protests and Shirin Neshat's contribution to it may be brought out through this project. The performative aspect of the Protest enhanced through interart communion, forms another objective of the present project. The agency of Protest entrusted with the veiled Muslim women, challenges the stereotypical postures of passivity and vulnerability in which they are projected by the popular media. An amount of 275000/- has been granted for this project.
17	Dr. Manju C. Nair Assistant Professor Department of Botany	Bryophyte Diversity of Kuttiady Churam in the Western Ghats of Kozhikode District, Kerala	This project aims to determine the bryophyte diversity of Kuttiady churam in Kozhikode district, identification of the microhabitats of each species and its association, preparation of voucher specimens for future reference and an updated taxonomic account on the bryophyte flora of the area supported by photographs, following the recent nomenclature and classification. An amount of Rs.3 lakhs has been allocated for this.
18	Dr. Mahesh .S Assistant Professor Department of Hindi	समकालीन हिन्दी कविता में पारिस्थितिक मनोविज्ञान: एक अध्ययन	The main objectives are: 1.To introduce the correlation between eco- psychology & literature 2. To examine the contemporary literary expression of ecological consciousness expressed in folk culture and literature. 3. To examine the expression of collectivism embedded in art and cultural consciousness from the perspective of contemporary Hindi poetry. 4. To examine how art and literature can avoid the mental state of considering development and ecological thinking as opposites.
19	Dr Ramshida A.P Assistant Professor Department of Psychology	Identifying and addressing the unmet needs of students of higher education: A youth participatory action research	The present study is framed under qualitative research design and its major forte being its approach- participatory action research (PAR). The people who are concerned or are being affected by an issue taking lead role in every phase of research from knowledge production to dissemination intending towards some change,

			action or improvement in the issue being researched is the major purpose of participatory action research.
20	Dr. Sindhu S Associate Professor Nanoscience and Technology	"The Development of Multifunctional Nanostructured Electrode Materials and the Assembly of Electrochromic Supercapacitors"	Major aim of this project is to design a multifunctional device based on electrochromic - supercapacitor with better performance and stability. Binary and ternary metal oxide system as the primary materials to use as electrodes. Vanadium oxide and barium titanate are chosen as the basic materials. The synthetic and post synthetic treatment strategies will fix to enhance the density of active sites with suitable size for easy intercalation and deintercalation of ions. Two electrode system will be used to check the device performance individually and in the integrated form. Here a common electrolyte suitable for both supercapacitor and electrochromic device will be used either in the gel form or in the liquid form to check the performance. The project runs with Rs. 2 lakhs sanctioned by the University.
21	Dr. L.Divya Associate Professor Department of Zoology	Understanding polyphenism through a transcriptomic approach in social hymenopterans.	This study aims to provide a central, web-based transcriptomics resource for O.smaragdina that facilitates user querying of sequences and functional annotations. It is sanctioned with Rs.3,00,000/-
22	Dr. Nuaiman K A Assistant Professor, Journalism and Mass Communication	Writing Cultures in the Malabar Coast: The Library of Dar al Ifta al Azhariyya, Chaliyam	This project aims to study historical evolution of writing cultures among Muslim communities in the Malabar coast, to provide historical context for libraries attached to Muslim centres of learning and worship, to place Muslim libraries in the region as a significant source for writing intellectual history of Kerala and to prepare and make available library catalogues for future researches.
23	Dr. Savithri. A Assistant Professor Department of Philosophy	A Study based on Abhidhamma Pitaka	The objective of the project is to analyse the philosophical or psychological elements of Buddhism * Try to find the teachings of social consciousness in Abhidhamma Pitaka and to find out the possibilities of socializing 'Buddham, Dhammam, and Sangham'. An amount of Rs. 2,50,000/- has been allocated for this project.
24	Robin E J Assistant Professor Department of Philosophy	The Point of Writing: Possibility of Phenomenological Psychopathology and Basheer's Writings	The project examines the realms of phenomenological psychopathology and its intersection with literature. The project runs with an amount of Rs. : 2,55,000/-
25	Dr. Aparna T. Assistant Professor Department of Malayalam & Kerala Studies	ജീവിതവും സംസ്കാരവും: കളനാടി വിഭാഗക്കാരുടെ മുൻനിർത്തിയുള്ള പഠനം	The project is related to detailed study about Kalanadi community. Kalanadies are a group of people with many cultural characteristics. They have their own specialities in customs, way of life and art.
26	Dr Lajish V.L Associate Professor Department of Computer Science	Studies on Deep Learning Models for Malayalam Fake News Detection on Social Media	The primary objective of this work is to create and implement advanced deep learning models aimed at facilitating the construction of automated fact-checking systems. The emphasis is on ensuring that these systems require minimal involvement or exertion from technical experts. The study focuses on the detection of Malayalam fake news in social media using different deep learning techniques including CNN (Convolutional Neural

Networks), LSTM (Long Short- Term Memory), and BiLSTM (Bidirectional Long Short-Term Memory) and predict, analyses and compare the performance of these models. The expected research outcomes of the project is the development of reliable deep learning models and algorithms which can be effectively utilised for Malayalam Fake News Detection on social media.

New projects Implemented during 2025:

New projects Implemented during 2025

SI No	Department	Number of Projects	Allocated amount Rs.
1	Life Science	1	40,97,400
2	Chemistry	1	45,000
3	PAIR (Chemistry)	1	8,02,80,900
4	Botany	1	13,32,000
5	Nanoscience	1	7,20,000
Total			8,64,75,300/-

Seminar/workshop/Invited Talk - 2025

1	Frontiers in Chemical Science in Department of Chemistry	2	4,90,000
2	BINA workshop in Department of Physics	1	11,00,000
3	Prof. PR Pisharoty Memorial Lecture	1	31,000
4	Yusuf Hamied Chemistry camp	1	1,79,144
5	International travel grant in connection with XXth International Botanical Congress, Spain	1	90,437
Total			18,90,581/-

New projects Implemented during 2025 Funded by University (Research Promotion Grant)

SI No	Department	Number of Projects	Allocated amount Rs.
1	Life Science	1	3,00,000
2	Chemistry	2	6,00,000
3	Education	1	1,50,000
4	Zoology	2	6,00,000
5	Journalism & Mass Communication	1	2,00,000
6	Mathematics	2	3,20,000
7	Biotechnology	1	3,00,000
8	History	3	6,00,000
9	Economics	1	2,00,000
10	Sanskrit	1	2,00,000
11	Commerce	1	2,00,000
12	School of Drama	2	4,00,000
Total			40,70,000/-

During the year 2025 five projects have been implemented in the University, one project each in the Departments of Chemistry, Botany, Nanoscience, and Life Science. The fifth one is the Partnership for Accelerated Innovation & Research (PAIR) project funded by ANRF. A total of Rs.8,64,75,300/- (Eight Crore Sixty Four Lakh Seventy Five Thousand Three Hundred Only) has been allocated by various funding agencies like DST, ANRF (PAIR), UGC and KSCSTE. It may also be noted that some of the projects are progressing with the foreign collaborations also. Apart from project-related activities, the Directorate of Projects has also been handling the fund distribution and settlement procedures for seminars, travel grants, and workshops funded by external agencies.

Ongoing projects:**Ongoing projects****Funded by external Agencies.**

SI No.	Department	No.of Projects	Amount Rs.
1	Botany	5	1,57,98,380
2	Zoology	4	1,47,75,463
3	Physics	5	2,65,28,288
4	Chemistry	5	3,61,04,560
5	Mathematics	1	6,60,000
6	Education	1	6,60,000
7	Physical Education	1	1,50,00,000
8	Life Science	1	40,97,400
9	Nano Science	2	17,20,000
10	PURSE (Physics, Chemistry, NanoScience & Photonics)	1	10,60,56,160
11	PAIR - ANRF (Chemistry)	1	8,02,80,900
	Total	27	30,16,81,151

It may also be noted that there are 27 active research projects in the University funded by external funding agencies. A total amount of ₹. 30,16,81,151 (Thirty Crore Sixteen Lakh Eighty one Thousand One Hundred and Fifty One Only) sponsored by various funding agencies is being utilised for the research projects in various departments of the University. This is one of the greatest achievements in the field of Research Projects in the History of the University. Prestigious external funded project PAIR (Partnership for Accelerated Innovation & Research) - sanctioned with total allocation of ₹. 8,02,80,900/- has been implemented in the Department of Chemistry, University of Calicut, a spoke institute in collaboration with Indian Institute of Science, Bangalore which stands as Hub of the Project. Bangalore University, National Institute of Technology, Nagaland, Pondicherry University etc are the other spoke institutes involved in the project. Many project proposals are being submitted to various funding agencies. The University is awaiting the approval from the funding agencies. Submission of research projects proposals and the sanctioning of new research projects have created a great enthusiasm in research among teachers in the University. Moreover, the administration works related to the research projects as well as settlement of accounts have been made easier within the permissible limits so as to make the teachers proactive in the research activities.

PROJECTS SPONSORED BY FUNDING AGENCY-WISE:**PROJECTS SPONSORED BY FUNDING AGENCY-WISE**

SI No	Name of Funding agency	No of Projects	Amount Rs.
1	DST- PURSE	1	10,60,56,160
2	DST-FIST	3	4,91,25,000
3	PAIR (ANRF)	1	8,02,80,900
4	DST - Other Schemes	6	2,05,09,528
5	ANRF (Old SERB)	7	1,91,24,968
6	KSCSTE	3	37,44,000
7	DBT	1	34,65,203
8	ICSSR	1	1,50,00,000
9	CSIR	1	26,70,392
10	WAHEI	1	6,60,000
11	UGC DAE CSR	2	10,45,000
	Total	27	30,16,81,151/-

On comparison of research projects granted by various funding agencies on the running projects, a prestigious Partnership for Accelerated Innovation & Research (PAIR) project funded by ANRF with a total allocation of ₹. 8,02,80,900/- in collaboration with Indian Institute of Science, Bangalore standing as Hub of the project, and Bangalore University, National Institute of Technology, Nagaland, Pondicherry University etc as other spoke institutes awarded to our University is a marvelous achievement this year. Projects sponsored by ANRF, DST, ICSSR, -BRNS, ICSSR, ICPR and IUAC as mentioned above are also progressing. DST is the major sponsor of research

projects in the University during these years.

DETAILED DESCRIPTIONS OF PROJECTS

Funded by External funding agency :

1. DST PURSE Project:

1. Name of the Principal Investigator/Co-ordinator/Director : Prof. Abraham Joseph

2. Department: Department of Chemistry

3. Name of the funding agency: DST - PURSE

4. Title of the Project: Harvesting Renewable Energy for a Sustainable Future: Explorations on Designer Molecules and Functional Materials

5. Date of implementation of the project : 30.11.2023

6. Sanctioned amount : 10,60,56,160/-

7. Tenure/Period of project : 4 Years

8. Objective of the project :

Theme 1: Energy Production

Molecular level engineering and electrochemical benchmarking of novel antenna systems and catalyst units.

Development of bi-metallic or tri-metallic precision noble metal nanoclusters for enhanced electrochemical activation of small molecules.

Electronic and bandgap tuning of semiconductors and atomic level surface doping/grafting strategies. Systemization of molecular chromophore-catalyst assembled semiconductor electrodes for photoelectrochemical cells.

Theme 2: Energy Storage

Hydrogen storage in organic molecules and retrieval via catalytic dehydrogenation Development of supercapacitor devices based on high-quality modified graphene electrodes

Theme 3: Energy Utilization

Development of carbon nanostructured electrocatalysts for PEMFCs applications

Atomistic simulations and computations for prediction and optimization of properties

The efficiency of photocatalytic hydrogen production depends largely on the effective transfer of electrons from reductants such as water under visible-light irradiation. Inspired by natural photosynthesis, artificial photosynthetic systems aim to convert and store solar energy directly into chemical bonds, generating sustainable solar fuels. The success of such systems relies on three critical aspects: efficient light harvesting, controlled photo-induced charge separation, and optimized catalytic reactions.

DST PURSE project focuses on the development and benchmarking of molecular and nanocluster-based architectures for key energy conversion reactions, including the oxygen and hydrogen evolution reactions. Atomically precise noble metal nanoclusters, owing to their sub-nanometer dimensions and tunable optical and electronic properties, offer a unique bridge between molecules and bulk nanomaterials. Their electrocatalytic performance is influenced by factors such as core size, surface charge, heteroatom composition, and ligand environment. By tailoring these parameters, next-generation catalysts with enhanced activity, selectivity, and stability will be designed to improve solar-to-chemical conversion efficiency.

Beyond solar fuel generation, the project also explores advanced energy storage and utilization systems. Graphene-based hybrid materials incorporating metal oxides, metal-organic frameworks, and conducting polymers will be developed for high-performance supercapacitors. In parallel, novel materials for reversible hydrogen storage and cost-effective, durable electrocatalysts for polymer electrolyte membrane fuel cells will be investigated. Together, these efforts aim to advance sustainable, integrated solutions for clean energy conversion, storage, and utilization.

Publications related to the project,

1. Arshad, M., Ajayan, A., Joseph, V. & Joseph, A. Highly sensitive detection of copper in aqueous media using a fluorescent probe developed from isophthalaldehyde and (E)-1-(hydrazonomethyl) naphthalen-2-ol. *Sensors and Actuators A: Physical* 373, 115436, doi:10.1016/j.sna.2024.115436 (2024).

2. Arshad, M., Williams, L., Ajayan, A. & Joseph, A. 2-hydroxy-1-Naphthaldehyde Based Colorimetric Probe for the Simultaneous Detection of Bivalent Copper and Nickel with High Sensitivity and Selectivity. *J Fluoresc* 35, 5119-5130, doi:10.1007/s10895-024-03895-3 (2025).
3. Joseph, V., Arshad, M., Ajayan, A. & Joseph, A. Synthesis and applications of a fluorescent cyan 2-aryl benzimidazole for environmental sensing, luminescent ink, and coating technologies. *Journal of Photochemistry and Photobiology A: Chemistry* 465, 116346, doi:10.1016/j.jphotochem.2025.116346 (2025).
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1. H. Anamangattupurakkal, A. Kaniyantavida, J. Kaippully, A. Chencharodi, Sajimon, S. N. Remello, H. Tachibana, H. Inoue, F. Kuttassery. Molecular Characteristics of Indium-Porphyrin Complexes for Two-Electron Water Oxidation in Artificial Photosynthesis. *Res. J. Chem. Int.*, (Accepted, In Press) (2025)
2. H. Baby, M. Manoj, S. Varghese, R. Joseph, A. Mohan, H. Anamangattupurakkal, J. Kaippully, F. Kuttassery, H. Tachibana, H. Inoue, S. N. Remello. Activity of Anionic Cobalt Porphyrin as a Bifunctional Molecular Catalyst for the Redox Reactions in Artificial Photosynthesis: A Consideration of the Role of Aggregation. *Res. J. Chem. Int.*, (Accepted, In Press) (2025)
3. R. Joseph, H. Baby, A. K. Gopi, S. K. Ibrahim, A. Kallattil, A. Thomas, S. Mathew, S. Haridas, F. Kuttassery, H. Tachibana, H. Inoue, S. N. Remello. Tailoring the Multi-protolytic Equilibrium of Tin Porphyrins as Promising Molecular Catalyst for the Two-Electron Oxidation of Water in Artificial Photosynthesis. *Eur. J. Inorg. Chem.*, 28(4), e202400667 (2025) (DOI: 10.1002/ejic.202400667)
4. R. Nakazato, Y. Ohsaki, A. Thomas, S. Mathew, Y. Nabetani, A. Sebastian, F. Kuttassery, S. N. Remello, H. Tachibana, H. Inoue. Enhancement of Charge Separation in the Photochemical Two-Electron Water Oxidation by Sn-Porphyrins Covalently Bound through Silylation with Flexible Bridging Moieties on SnO₂ Nanoparticles. *J. Phys. Chem. C.*, 128 (45), 19128 – 19133, (2024) (DOI: 10.1021/acs.jpcc.4c05813)
5. A. Sebastian, S. Mathew, F. Kuttassery, S. N. Remello, K. Sano, H. Tachibana, H. Inoue, Factors Controlling the Photochemical Two-Electron Water Oxidation Initiated By One-Electron in the Molecular Catalyst Sensitized System for Artificial Photosynthesis. *J. Phys. Chem. C.*, 128(3), 1087 – 1099, (2024), (DOI: 10.1021/acs.jpcc.3c07534)
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4. Mymoona, P; Shibu, E. S.; Jeyabharathi, C.* Adsorbed Carbon Monoxide-Enabled Self-Terminated Au- Grafting on Pt₆ Nanoclusters for Enhanced Methanol Electrooxidation. *Small* 2024, 29, 29215015. (DOI: 10.1002/sml.202401998).

2. PAIR Project funded by ANRF

1. Name of the Principal Investigator/Co-ordinator/Director : Prof. Rajeev S Menon
2. Department : Department of Chemistry, Physics, Nanoscience and Zoology
3. Name of the funding agency : ANRF PAIR (Hub Institute: IISc Bangalore)

4. Title of the Project : An Eight Institute Partnership for Advancing Materials Research and Development: From Fundamental Designing to Emerging Applications in Structural, Functional and Biomaterials spaces.
5. Date of implementation of the project : 26.09.2025
6. Sanctioned amount : 1,03,86,04,500/- (For the PAIR Network of 8 institutes) Sanctioned budget for University of Calicut: 8,02,80,900/-
7. Tenure/Period of the project : 5 Years (2025 – 2030)
8. Objective of the project :
 - Ø Synthesis of catalysts & interfaces using low-energy input routes, Transparent hybrid films and particles for photocatalysis, Storable fuel generation from water, sunlight and CO₂.
 - Ø Fabrication of chiral nanoclusters from low-cost precursors for the development of light-emitting devices having high external quantum efficiency.
 - Ø Experimental investigation on soft materials, nanomaterials, and biomaterials for Intracellular lasing, medical diagnostics and neuroimaging.
 - Ø Advanced Computational studies for the design and development of novel materials and understanding the origin of elements

This ANRF–PAIR proposal establishes a strategic research partnership between the Indian Institute of Science (IISc) and the University of Calicut, functioning as collaborating SPOKE institutions, to address critical scientific challenges through interdisciplinary research spanning materials science, chemical sciences, and computational chemistry. The collaboration leverages IISc's advanced infrastructure and expertise with the University of Calicut's strengths in synthesis, spectroscopy, and applied chemical research to create a synergistic platform for innovation, capacity building, and translational outcomes. The research programme is organized around three interlinked thematic areas:

- (i) Advanced materials for energy and optoelectronics,
- (ii) Biomaterials and advanced diagnostic techniques, and
- (iii) Computational chemistry.

In the energy and sustainability theme, the project focuses on the synthesis of catalysts and functional interfaces using low-energy input routes, the development of transparent hybrid films and particulate systems for efficient photocatalysis, and the generation of storable solar fuels from water, sunlight, and CO₂. These efforts aim to advance scalable and environmentally benign energy solutions. In the optoelectronics theme, the proposal targets the fabrication of chiral nanoclusters from low-cost precursors for next-generation light-emitting devices with high external quantum efficiency. The biomaterials theme emphasizes experimental investigations of soft materials, nanomaterials, and biomaterials for intracellular lasing, medical diagnostics, and neuroimaging, enabling high-resolution and minimally invasive diagnostic platforms.

Complementing these experimental efforts, advanced computational chemistry studies will guide material design, elucidate structure–property relationships, and deepen fundamental understanding of material behavior and the origin of elements. Overall, the IISc–University of Calicut partnership aims to deliver high-impact scientific outcomes while strengthening research capacity, training, and national collaboration.

3. DST FIST Project in Department of Physics, Chemistry and Zoology:

Ministry of Science & Technology, Department of Science & Technology has granted a project to the University under the scheme “Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST) Program – 2023”. The Scheme is intended to provide basic infrastructure and enabling facilities for promoting R&D activities in new and emerging areas and attracting fresh talents in universities & other educational institutions. DST has awarded FIST level Two to Physics department with a financial assistance of Rs.1,67,00,000/- (Rupees one crore and sixty-seven lakhs only), 2,57,00,000 to Department of Chemistry and 67,25,000 to Department of Zoology for a duration of 5 years. The Scheme will provide optimal infrastructure facilities for post-graduate and higher research, such as, renovation of existing laboratory space (no fresh constructions) and cold room, modernization of laboratories involved in PG and higher research, acquisition of essential equipment, upgradation of existing facilities, networking & computational facilities including software & databases, scientific & technical books (no journals), maintenance & refurbishing of existing and new facilities etc. The synergy and focus of research may preferably be aligned to National Missions/ priorities. The duration of support for each FIST Project will be for a period of 5 years.

4. DST - INSPIRE :

1. Name of the Principal Investigator/Co-ordinator : Dr. Fazalurahman K
2. Department : Department of Chemistry
3. Name of the funding agency : DST - INSPIRE

4. Title of the Project : Sustainable Fuels from the Sun and Ambient Air
5. Date of implementation of the project : 04.01.2021 (Transferred to University of Calicut w.e.f. 16.02.2021)
6. Sanctioned amount : 35,00,000/-
7. Tenure/Period of the project : 5 Years (2021 – 2026)
8. Objective of the project : Systemization of efficient harvesting molecular-semiconductor hybrids for solar fuel generation

Various molecular semiconductor hybrids will be studied for efficient charge separation and coupled chemical reactions for solar fuel production.

Publications related to the project :

1. H. Anamangattupurakkal, A. Kaniyantavida, J. Kaippully, A. Chencharodi, Sajimon, S. N. Remello, H. Tachibana, H. Inoue, F. Kuttassery. Molecular Characteristics of Indium- Porphyrin Complexes for Two-Electron Water Oxidation in Artificial Photosynthesis. Res. J. Chem. Int., (Accepted, In Press) (2025)
2. R. Joseph, H. Baby, A. K. Gopi, S. K. Ibrahim, A. Kallattil, A. Thomas, S. Mathew, S. Haridas, F. Kuttassery, H. Tachibana, H. Inoue, S. N. Remello. Tailoring the Multi- protolytic Equilibrium of Tin Porphyrins as Promising Molecular Catalyst for the Two- Electron Oxidation of Water in Artificial Photosynthesis. Eur. J. Inorg. Chem., 28(4), e202400667 (2025) (DOI: 10.1002/ejic.202400667)
3. R. Nakazato, Y. Ohsaki, A. Thomas, S. Mathew, Y. Nabetani, A. Sebastian, F. Kuttassery, S N Remello, H Tachibana, H Inoue. Enhancement of Charge Separation in the Photochemical Two-Electron Water Oxidation by Sn-Porphyrins Covalently Bound through Silylation with Flexible Bridging Moieties on SnO₂ Nanoparticles. J. Phys. Chem. C., 128 (45), 19128 – 19133, (2024) (DOI: 10.1021/acs.jpcc.4c05813)
4. A. Sebastian, S. Mathew, F. Kuttassery, S. N. Remello, K. Sano, H. Tachibana, H. Inoue, Factors Controlling the Photochemical Two-Electron Water Oxidation Initiated By One-Electron in the Molecular Catalyst Sensitized System for Artificial Photosynthesis. J. Phys. Chem. C., 128(3), 1087 – 1099, (2024), (DOI: 10.1021/acs.jpcc.3c07534)
5. F. Kuttassery*, Y. Ohsaki, A. Thomas, R. Kamata, Y. Ebato, H. Kumagai, R. Nakazato, A. Sebastian, S. Mathew, H. Tachibana, O. Ishitani, and H. Inoue. A Molecular Z-Scheme Artificial Photosynthetic System Under the Bias-Free Condition for CO₂ Reduction Coupled with Two-electron Water Oxidation: Photocatalytic Production of CO/ HCOOH and H₂ O₂ . Angew. Chem. Int. Ed., 62, e202308956, (2023), (DOI: 10.1002/anie.202308956) (Hot Article).

5. DST WOS-A Project -

1. Name of the Principal Investigator/Co-ordinator/Director : Dr Radhika Narayanan Nair
2. Department : Chemistry
3. Name of the funding agency : DST
4. Title of the Project : Theoretical insights into nickel-induced immune responses in humans
5. Date of implementation of the project : 28-03-2023
6. Sanctioned amount : revised: ? 40,06,160
7. Tenure/Period of project: 3 years
8. Objective of the project :

To understand how Ni²⁺ ions induce hypersensitivity in humans.

Brief description of the project :

Allergic reactions due to metal ions is a common health concern worldwide. Metal cause allergy through skin contacts, lung inhalation and metal-containing artificial medical body implants. Nickel is most frequently detected metal allergen worldwide. Nevertheless, nickel is widely used in modern industrial products like cosmetics, ornaments, watches, coins, dental and orthopedic implants, cardiovascular stents etc. Nickel allergy affect lifestyle and occupational choice of an individual. The pathogenesis of nickel allergy is vague. There are no reports available on molecular- level understanding of development of nickel hypersensitivity using quantum mechanical tools. In general, metal allergens can bind with human major histocompatibility complex (MHC) proteins and specific peptide, which can be recognized by metal-specific T cell receptor (TCR) in T lymphocytes and cause toxicity to immune system. The structural basis for such interaction in nickel is obscure because crystal structure of Nickel-MHC-peptide complex is unknown. A series of molecular dynamic simulations and quantum chemical calculations will be carried out to understand binding of Ni²⁺

ion with MHC protein, peptide and interaction of nickel-MHC-peptide complex with TCR to bring out immune response. This study could give an insight on metal-protein interactions in general and other metal mediated allergic hypersensitivities and thus pave the way for clinical researchers to develop novel therapeutics.

Allergies to metals are common, with nickel and beryllium allergy being most common. Beryllium hypersensitivity is mainly associated with the MHC, HLA-DP having a glutamate residue at 69 th position of chain. However, HLA-DRPhe47 is genetic marker in HLA-DP^{Glu69} negative individuals. MD simulations were carried out to understand the binding of Be²⁺ with HLA-DR and peptide. Nickel hypersensitivity is also associated with HLA-DR allele. The binding studies gave an idea on the peptide that could bind with Be-HLA complex.

Publications related to the project :

Sonali Bera, Aryan Gautam, Radhika Narayanan, Gaurank Pal, Susmita De, Puja Prasad, "Dual-Responsive Luminescent Iridium(III) Complex-Based Sensors for Simultaneous and Selective Detection of Fluoride and Aluminium Ions", Chem Asian J. 2025, 20, e00780 (1 of 14) doi.org/10.1002/asia.202500780

6. Department of Science and Technology(DST). DST/WOSA/(WISE KIRAN) project

1. Name of the Principal Investigator : Fathima Shirin Shana.A.T
2. Department : Department of Physics
3. Name of the funding agency : Department of Science and Technology(DST).
DST/WOSA/(WISE KIRAN) project
4. Title of the Project : Experimental works on secondary neutron production and validation of nuclear reaction models
5. Date of implementation of the project : 13-03-2023
6. Sanctioned amount : 26,42,616.00/-
7. Tenure/Period of the project : 3 Years
8. Objective of the project :
 - Measure the inclusive energy spectra & angular distribution of neutrons from the nuclear reaction induced by 12 C bombarding on thick 56 Fe & 93 Nb targets at beam energies 7-10 MeV/nucleon
 - Exploration of nuclear reaction of models to understand the reaction mechanism, mainly equilibrium and pre-equilibrium reactions and analyze the data to validate the theoretical model predictions.
 - Develop experimental technique and coding/simulations to support experiment and analysis of neutron time of flight data from large detector array.
 - The data will be added to NNDC nuclear reaction database for public use.

Brief description of the project :

The production cross-section and energy distribution of secondary neutrons produced in nuclear reaction is of great importance for fundamental physics as well as applied nuclear medicine & engineering. Laboratory neutron sources commonly used in various applications such as dosimetry, neutron radiography, medical imaging & therapy are produced by nuclear fission or nuclear reaction by light charged particles on thick targets of light elements. While cross sections and energy distribution of neutrons from proton and alpha induced reactions are studied well, evaluated and validated with various nuclear reaction models using codes such as TALYS and EMPIRE, there is scarcity of experimental data and lack of complete understanding of the physics models describing heavy ion induced secondary neutron production. As energy of the primary beam is increased, the heavy ion reaction mechanism influence differently for the neutron production and angular distribution. It was found at higher energies, reaction process such as preequilibrium emission contributes significantly to the cross section and energy of the neutrons. Heavy ion accelerators are now common use in fundamental research and applications of heavy ion beam Therapy. Apart from knowing the basic nuclear reaction physics, since fast neutrons constitutes a major radiation background in these accelerator facilities, understanding the physics of neutron production and their flux distribution is a crucial part in radiation shielding and safety protection. The prime objective of this proposal is to extract the experimental data on reaction cross section and the energy- angular distribution of neutrons produced in the reaction of 12C primary beam incident on thick targets of 56 Fe and 93 Nb. The extracted data will be validated against theoretical results modeled using Monte Carlo statistical model code PACE4 and EMPIRE.

The project was implemented from 13-03-2023, The energy integrated angular distribution of the neutron yield obtained from nearby systems of 12C +56Fe was studied. The experiment was carried out at the NAND facility of the Inter-University Accelerator Centre (IUAC), New Delhi. 12 C beam in the energy range of 70 to 125 MeV was used on thin and thick targets of natural Fe (56 Fe) . The experiment proceeded smoothly, and data acquisition was successfully carried out. The collected data consists of neutron energy spectra and angular distributions. These measurements

are crucial for understanding the intermediate pre-equilibrium phase in nuclear reactions. The collected data was analyzed, the data analysis is in progress.

Publications related to the project

1. A work submitted to journal Oncology i Radiotherapy with title "Secondary neutron production from ^{56}Fe bombarded by ^{12}C ".
2. "Probing Pre-equilibrium Neutron Emission in heavy ion reactions at large projectile energies", Proceedings 67th DAE symposium.

7. DST WISE SCOPE (KIRAN)

1. Name of the Principal Investigator/Co-ordinator/Director : Dr.Liji P (Dr.Harikumaran Thampi, Professor of Biochemistry as Mentor of the project)
2. Department : Life Science
3. Name of the funding agency : DST
4. Title of the Project : Formulation and Nutritional Analysis of Millet-Based Probiotic Fermented Food Supplement Using the Selected Strain of Lactic Acid Bacteria
5. Date of implementation of the project : 30-06-2025
6. Sanctioned amount : 40,97,400
7. Tenure/Period of the project: 3 years

Brief description of the project :

The project entitled the "Formulation and Nutritional Analysis of Millet-Based Probiotic Fermented Food Supplement Using the Selected Strain of Lactic Acid Bacteria" aims to develop a nutritionally enriched millet- based probiotic food supplement using efficient strains of Lactic acid bacteria (LAB). Millets serve as staple foods for many people of lower socioeconomic status and are rich in folic acid, dietary fibre, antioxidants, and essential minerals such as iron, calcium, and magnesium. Being gluten free, they are particularly suitable for individuals suffering from gluten intolerance and celiac disease. Despite their superior nutritional composition, the utilization of millets remains limited due to inherent challenges such as a hard seed coat, poor digestibility, the presence of antinutritional factors, and low micronutrient bioavailability. Probiotic fermentation and germination have been reported to improve the nutritional quality of millets by enhancing protein digestibility, soluble fibre content, and the in vitro availability of micronutrients. With increasing lactose intolerance and concerns over cholesterol in dairy-based products, there is a growing demand for non-dairy probiotic foods. Lactic acid fermentation is a simple, low-cost, and effective method that not only enhances the nutritional and sensory characteristics of food but also increases mineral bioavailability and shelf life. The present study focuses on developing millet-based probiotic formulations using selected LAB strains with high efficiency and tolerance to extreme conditions such as low pH and high salt concentration, ensuring their potential survival and functionality in the gastrointestinal tract. Millet-based probiotic foods are expected to serve as inexpensive sources of calories and nutrients while also providing health-promoting phytochemicals such as phytoestrogens, phenolic compounds, antioxidants, phytic acid, and sterols. In addition to nutritional benefits, millets offer significant environmental advantages. They are drought-resistant crops that require minimal water and inputs, help maintain soil fertility and biodiversity, and contribute to ecological balance. Promoting millet utilization can enhance food security, support smallholder farmers, and provide sustainable livelihood opportunities. During the reporting period, an extensive review of literature was carried out to establish the research foundation. Protocols for the isolation, purification, and screening of lactic acid bacteria from different dietary sources were analysed and finalized. Quotations for the procurement of approved laboratory instruments and essential chemicals were sought from suppliers. The next phase of the study will involve the isolation and characterization of LAB strains, the fermentation of millet substrates, and the nutritional and stability evaluation of the developed probiotic product.

8. DST WISE KIRAN Project

1. Name of the Principal Investigator/Co-ordinator/Director : Jamshina Sanam P.K
2. Department: Physics
3. Name of the funding agency: Department of Science & Technology (DST)
4. Title of the Project : Delafossite based high temperature thermoelectric materials and devices
5. Date of implementation of the project :24.06.2024
6. Sanctioned amount :Rs.26,95,680/-
7. Tenure/Period of the project : 3 Years

8. Objective of the project :The fabrication of thermoelectric module with high temperature stability is the primary objective of the proposed work. This work focuses on synthesis of p-type delafossite semiconducting material with thermoelectrical efficiency nearly equal to one and an accurately paired n-type material. Adopting suitable dopants to improve the thermopower and carrier concentration of p-type material is the opted road map. Reducing thermal conductivity is other essential criteria needed to be full filled, and materials with reduced dimensions are conceived as a significant advancement in decoupling the correlations between electronic and thermal transport. Synthesis of delafossite thin films using RF magnetron sputtering system gives homogenous and low cost 2D system to ease fabrication of p- n junction.

The proposed project aims to develop a high-temperature-stable thermoelectric (TE) module by integrating advanced material design with scalable fabrication strategies. The central focus is on the synthesis and optimization of p-type delafossite oxide semiconductors, targeting a thermoelectric figure of merit (zT) approaching unity, along with the identification and pairing of a compatible n-type counterpart to enable efficient module fabrication. Delafossite oxides are particularly attractive for high-temperature thermoelectric applications due to their excellent thermal stability, chemical robustness, and environmental friendliness.

A key strategy of this work is the intentional incorporation of suitable dopants to tailor the thermopower and carrier concentration of the p-type material, thereby optimizing the power factor without compromising stability. In parallel, reducing lattice thermal conductivity is emphasized as a critical requirement for enhancing overall thermoelectric efficiency. To address the intrinsic coupling between electrical and thermal transport parameters, the project explores reduced-dimensional systems, where size confinement and interface effects can effectively decouple charge and heat transport.

In this context, the synthesis of delafossite thin films using an RF magnetron sputtering technique is proposed. This approach enables precise control over composition, thickness, and microstructure, yielding homogeneous, low-cost, and reproducible two-dimensional architectures. Such thin-film systems not only facilitate thermal conductivity suppression but also provide a practical platform for fabricating well-defined p–n junctions essential for thermoelectric module assembly. Overall, the project integrates materials engineering, thin-film processing, and thermoelectric device concepts to advance oxide-based thermoelectric modules suitable for reliable high- temperature energy conversion applications.

1. Spin entropy enhancement and valence band convergence for augmenting thermoelectric performance of Mg-N co-doped CuCrO₂ thin films"- SPK Jamshina, PP Pradyumnan Journal of Alloys and Compounds Volume 1026, 5 May 2025, 180303- <https://doi.org/10.1016/j.jallcom.2025.180303-IF-5.7>
2. Structural and magnetic modifications in Ni–Mg dual-doped CuCrO: Insights into carrier filtering and thermoelectric enhancement"- SPK Jamshina, Midhun Shah, PP Pradyumnan, Volume 36, article number 1458, 15 August 2025 DOI: <https://www.doi.org/10.1007/s10854-025-15526-z-IF-2.8>
3. Enhancing Seebeck coefficient through magnetic and non- magnetic dual doping in CuCrO₂ crystallites: A study on cationic influence JSPK, PP Pradyumnan Materials Science in Semiconductor Processing 186,109058-<https://doi.org/10.1016/j.materresbull.2023.112244-IF-4.1>
4. Multi-cation doped CuCrO₂ crystallite matrix: Exploring band gap tunability through Ni-Zn and Ni-Zn-Mg doping for optoelectronic application JSPK, M Shah, PP Pradyumnan, Optical Materials 157,116283- <https://doi.org/10.1016/j.optmat.2024.116283-IF-3.9>

9. DST WOS-A

1. Name of the Principal Investigator/Co-ordinator/Director: Dr. Janeesha A.P.
2. Department : Department of Botany
3. Name of the funding agency : Department of Science and Technology (DST)-Women Scientist-A (WoS-A)
4. Title of Project: An integrative approach for species delineation in *Henckelia* Spreng. (Gesneriaceae) of south India
5. Date of implementation of the project :20/11/2023
6. Sanctioned amount : 35,67,672/-
7. Tenure/Period of the project : 3 years
8. Objective of the project :
 1. To establish micro-morphological data that best reflects the evolutionary history of the genus
 2. To study the chromosome numbers of South Indian species of *Henckelia*
 3. To study the anatomy of South Indian species and their adaptations to survive as acaulescent habit.

The present study focuses on the taxonomic, anatomical, cytological, and micromorphological characterization

of *Henckelia* species (Gesneriaceae) from South India, aiming to clarify interspecific relationships and contribute to the systematics of this morphologically diverse genus. Extensive field explorations across the Western Ghats led to the collection and cultivation of eleven *Henckelia* species at the Calicut University Botanical Garden, including the newly described taxa *H. bracteata* and *H. wayanadensis*. Anatomical investigations of leaves and petioles revealed largely uniform tissue organization with subtle interspecific variations in vascular arrangement, trichome type, and crystal distribution, supporting their taxonomic utility. Micromorphological analyses using SEM highlighted distinct seed coat sculpturing and pollen grain ornamentation, with *Henckelia* species showing predominantly elliptic seeds and tricolpate, spheroidal pollen grains-features significant for species delimitation. Trichome studies indicated remarkable diversity in glandular and non-glandular forms, reflecting ecological adaptations and providing valuable diagnostic traits. Cytological studies established new chromosome counts for South Indian *Henckelia*, revealing a base number of $2n=32$ for most species, with meiotic data supporting karyotypic stability across taxa. The project also resulted in the discovery of a new species, *Henckelia möllerii*, communicated to Systematic Botany. Further fieldwork, anatomical, micromorphological, and cytological analyses are ongoing to complete the dataset for remaining species. During the project period, findings were presented in three national and international conferences, and two invited lectures were delivered in seminars related to plant taxonomy and systematics.

Papers published only in cited Journals (SCI)

1. Janeesha A.P., Santhosh Nampy, Harishma K.H., Krishnaraj T.P. & K. Arunima. 2025. Morpho-molecular evidence supports *Henckelia möllerii*, a new species of Gesneriaceae from the southern Western Ghats. Systematic Botany (communicated) Book chapters
1. Gesneriaceae in India: A Comprehensive Overview. Akhil M.K., Janeesha A.P. and Santhosh Nampy. 2024. Indian Association for Angiosperm Taxonomy (IAAT) Publications. ISBN: 81-901637-7-9. pp. 246-259 Papers published in Conference Proceedings etc.
1. Janeesha A.P. & Santhosh Nampy 2024. Systematics, biogeography, and character evolution of *Henckelia* Spreng. (Gesneriaceae) with special focus on the acaulescent species. 23 rd -25 th November, 2024. Organized by the Department of Life Science & Bioinformatics, Assam University, Silchar, Assam.
2. Janeesha A.P. & Santhosh Nampy 2024. The acaulescent species of *Henckelia* (Gesneriaceae). 21 st - 27 th July, 2024. XX International Botanical Congress Madrid 2024, Madrid, Spain. Represented India at International Botanical Congress.
3. Janeesha A.P. & Santhosh Nampy 2024. The genus *Rhynchoglossum* Blume (Gesneriaceae) of India: Taxonomy and Biogeography. International Seminar on Plant Systematics: Present status and Future Prospects. 15 th -17 th February, 2024. Organized by Department of Botany, University of Calicut, Kerala. Won Best Oral Presentation Award under the theme Modern Trends in Plant Systematics.

10.SERB CRG Project

1. Name of the Principal Investigator/Co-ordinator/Director: Dr. Pramod C.
2. Department : Department of Botany
3. Name of the funding agency : Anusandhan National Research Foundation (ANRF) Core Research Grant (CRG) Project
4. Title of the Project Structural and Aerodynamic characterization and biomimetic studies of winged diaspores of selected flowering plants of South India.
5. Date of implementation of the project : 13/03/2024
6. Sanctioned amount : 49,42,544
7. Tenure/Period of the project : 3 years
8. Objective of the project :
 - Extensive floristic exploration of the phytogeographic regions of South India for the collection of winged diaspores of flowering plants.
 - Identification of the aerodynamic behaviours performed by winged diaspores of South Indian flowering plants.
 - Detailed studies of the structure of selected winged diaspores and the underlying principle and biophysical mechanism behind their specific aerodynamic behaviour.
 - Identification of the biomimetic application of the aerodynamic behaviours of the selected winged diaspores.

A comprehensive literature survey will be conducted to identify flowering plants in South India that produce

winged diaspores, compiling a detailed list of species along with descriptions of their diaspores. Extensive fieldwork across various phytogeographic regions will be carried out to collect these diaspores and observe their aerodynamic behavior in situ. Collected diaspores will be air-dried and preserved in glass jars, while voucher specimens of plants will be prepared and deposited in the Calicut University Herbarium (CALI). Diaspores will be categorized based on aerodynamic characteristics, with selected samples undergoing detailed experimental studies in both field and laboratory conditions. Parameters such as wing area, wing loading, descent rate, mass, and flight direction will be measured. Experiments will be conducted by altering wing structures to study their influence on aerodynamic performance and the physical mechanisms of dispersal. Photo documentation will include field photography of plant morphology, movement of diaspores, and detailed imaging using stereo microscopes and scanning electron microscopy (SEM) to capture micro- and ultra-structural features. Results will be analyzed for generalizations and potential applications in biomimetic innovation.

10. Present status of Project The first year of the project focused largely on field explorations and experiments conducted in Kerala and Karnataka to collect and analyse winged diaspores of flowering plants. These regions, known for their rich flora and varied environmental conditions, provided a diverse set of species for study. The project aimed to gather detailed information on the structural and aerodynamic behaviours of winged diaspores, and the following report highlights the field exploration activities and experiments executed in these regions. The first task was to conduct extensive floristic explorations in the phytogeographic regions of Kerala and Karnataka. These two states, rich in biodiversity due to their tropical and subtropical climates, offered an ideal setting to gather a wide range of winged diaspores. In Kerala, field surveys were conducted in the Western Ghats forest areas, sacred groves, lateritic plateaus and shola regions particularly in areas such as Idukki, Kollam, Kottayam, Thiruvananthapuram, Kannur, Kozhikode, Malappuram, Palakkad and Ernakulam. In Karnataka, similar explorations were undertaken in the forest margins, ghat areas and edges of waterfalls including Agumbe, Chikkamangalore, Subramanya, Mallalli falls, Somwarpetta, Bababudhan Hills, Manipal and the areas surrounding the coastal town of Mangalore. Conducted a total of 22 field trips for the collection of diaspores in the current year. A total 45 species of winged diaspores were and collected during these field surveys, with an emphasis on flowering plants native to the regions. The specimens were collected in different stages of development from bud to mature fruit. The twigs are processed, dried and preserved for herbarium preparation. Winged diaspores that are collected were air-dried and preserved for further aerodynamic studies. The collections were made systematically, documenting the plant species, their specific locations and altitude. Challenges in the field included access to remote regions, particularly in the high-altitude areas of the Western Ghats, identification of the lianas of the collected diaspores from the thickets of forest entangled with diverse lianas and collecting diaspores from large trees. Despite these challenges, the fieldwork was largely successful, providing a rich and varied sample set of diaspores for subsequent analysis. Photographs are taken and documented in the field and laboratory.

After the collection of winged diaspores, the next phase involved testing their aerodynamic behaviours through field experiments. Experiments were carried out in natural conditions to observe the flight characteristics of the collected diaspores. The experiments were designed to identify how the shape, size, and structure of the wings influenced their movement through the air. Simultaneously with the field experiments, structural analysis of the collected diaspores was conducted to examine the micromorphological structure of their wings. While the primary focus of the first year was on field exploration and experiments, preliminary structural studies were carried out using magnification tools like hand lenses in the field. Detailed structural studies were done with the help of scanning electron microscopy (SEM) for 2 species to examine the wings at the micro and nanoscales. Further SEM analysis for the selected winged diaspores will be done in the coming year. These studies will provide a deeper understanding of the structural components that influence the aerodynamic performance of the diaspores. While the primary focus of the first year was on field exploration and aerodynamic experiments, the initial phase of identifying biomimetic applications was also undertaken.

Papers published only in cited Journals (SCI)

- 1) Drisya, V.V., C. Pramod, A.K. Pradeep & T.P. Suresh (2025) Autorotating dispersal units of *Getonia floribunda* Roxb. (Combretaceae): morphology, aerodynamics and geometrical significance. *Nordic Journal of Botany* (Accepted).
- 2) Chandini K.C., Drisya V.V., Pramod C. and Arunima K. (2025). Flight behaviour in the winged seeds of *Dolichandra unguis-cati* (Bignoniaceae), *Plant Science Today* (Under review).

Book Chapters:

- 3) Drisya, V.V., C. Pramod, A.K. Pradeep & T.P. Suresh 2024. Winged Diaspores in Flowering Plants: A Means of Plant Movement with Enigmatic Flight Mechanisms. In: Santhosh Nampy, Pramod C., Manju C.N. & Sunojkumar P. (Eds.) 2024. *Glimpses of Diversity: Fungi and Plants*. Indian Association for Angiosperm Taxonomy, Calicut.

Papers published in Conference/WAHEI Project Proceedings, Popular Journals etc.

- 1) Drisya, V.V., C. Pramod, A.K. Pradeep & T.P. Suresh 2024. Winged Diaspores in Flowering Plants: A Means of Plant Movement with Enigmatic Flight Mechanisms. In: Santhosh Nampy, Pramod C., Manju C.N. & Sunojkumar P. (Eds.) 2024. *Glimpses of Diversity: Fungi and Plants*. Indian Association for Angiosperm Taxonomy,

Calicut.

- 2) Drisya V.V., C. Pramod, A.K. Pradeep & T.P. Suresh 2024. Autorotating diaspores of flowering plants: an inspiring strategy in wind dispersal. Abstracts: XX International Botanical Congress, 21-27 July 2024, Madrid, Spain.
- 3) Pramod C. (2024). Bioinspiration from Dispersal of winged diaspores. Abstracts: XXXIV Annual Conference of Indian Association for Angiosperm Taxonomy and International Seminar on Botanical Symphony – Perspective and Current Challenges in Angiosperm Systematics, Silchar, Assam, November 23- 25, 2024.
- 4) Arunima K. & Pramod C. (2024). Studies on the Diversity and Variability in Wing Structures of Selected Seeds and Fruits of South India. Abstracts: XXXIV Annual Conference of Indian Association for Angiosperm Taxonomy and International Seminar on Botanical Symphony – Perspective and Current Challenges in Angiosperm Systematics, Silchar, Assam, November 23-25, 2024.
- 5) Drisya V.V., C. Pramod, A.K. Pradeep & T.P. Suresh 2024. An Investigation of the Morphological Diversity of Autorotating Dispersal Units of the Flowering Plants of South India. Abstracts: XXXIV Annual Conference of Indian Association for Angiosperm Taxonomy and International Seminar on Botanical Symphony – Perspective and Current Challenges in Angiosperm Systematics, Silchar, Assam, November.

11.SERB MATRICS Project

1. Name of the Principal Investigator/Co-ordinator/Director: Dr. Mubeena T
2. Department : Department of Mathematics
3. Name of the funding agency : Anusandhan National Research Foundation (ANRF)
4. Title of the Project: A Study of Twisted Conjugacy Problem in Groups
5. Date of implementation of the project : 12.02.2024
6. Sanctioned amount : 6,60,000/-
7. Tenure/Period of the project : 3 years
8. Objective of the project :
 1. Twisted conjugacy problem in S-arithmetic groups
 2. Quasi-isometric rigidity of groups having the R_8 -property
 3. z-classes of endomorphisms in infinite Groups,
 4. Topological transitivity property of continuous maps

The objective of the project is the z-classes automorphisms in certain infinite groups that are important in Geometric Group Theory:

- 1) To analyze the stabilizers of twisted actions of a group G on itself with respect to its automorphisms.
- 2) To classify twisted z-classes of automorphisms in certain infinite groups,
- 3) To explore connections between twisted z-classes and the property R_∞ ,
- 4) To develop examples and counterexamples illustrating the role of twisted z-classes in property R_∞ .
- 5) To advance this study in collaboration with Prof. Peter Wong, utilizing his expertise in the area.

12.SERB CRG Project

1. Name of the Principal Investigator : Dr.Santhosh Nampy
2. Department: Botany
3. Name of the funding agency: ANRF
4. Title of the Project: Utricularia L. (Lentibulariaceae) of India:Unravelling trap architecture using SEM and TEM studies
5. Date of implementation of the project: 27.06.2023
6. Sanctioned amount:Rs. 33,93,764/-
7. Tenure/Period of the project : 3 Years
8. Objective of the project :
 - To collect Utricularia specimens of all the eight sections, from different parts of India.

- To examine the trap structure using LM, SEM, and TEM.
- To analyse the trap morphology, function, and the evolution of traps.

Utricularia L. (Lentibulariaceae), the largest and most diverse genus of carnivorous plants, exhibits a unique morphology lacking true roots, shoots, and leaves, with vegetative parts usually submerged or embedded in the substrate. The genus comprises about 265 species worldwide (Taylor, 1989; Fleischmann, 2012, 2015; Delprete, 2014; Rutishauser, 2015; Kumar et al., 2018; Arya et al., 2020; Biju et al., 2020; Hong et al., 2021), while POWO (2025) recognizes 285 accepted species. In India, 37 species are currently reported (Janarthanam & Henry, 1992; Yadav et al., 2000, 2005; Kumar et al., 2018; Arya et al., 2020; Biju et al., 2020), distributed mainly in tropical and subtropical regions as aquatic, terrestrial, lithophytic, or epiphytic herbs. The genus is notable for its sophisticated prey-capturing bladder traps, providing a model for studying predator–prey interactions among plants (Albert et al., 2010). Evolutionary studies on *Genlisea aurea* and *Utricularia gibba* have revealed extreme genome miniaturization—63.6 Mb and 88 Mb respectively—making them key models for investigating genome contraction, as their genomes are smaller than that of *Arabidopsis* (Greilhuber et al., 2006; Ibarra-Laclette et al., 2013;

Fleischmann et al., 2014; Velebra et al., 2014). Despite their remarkable trap complexity, limited attention has been given to the evolution and functional diversity of these structures. The present study aims to investigate the morphology and anatomy of suction traps across eight Indian sections of *Utricularia*, encompassing all life forms, using LM, SEM, and TEM to assess correlations between trap traits, habitat, and ecological adaptations.

Extensive field expeditions were conducted across major biogeographical zones of India, including the Southern and Northern Western Ghats, Northeast India, and Sikkim, spanning multiple seasons to capture the full ecological and phenological diversity of *Utricularia* species. A few additional field trips are required to complete the collection of the remaining plant specimens. The collected specimens were preserved and processed for Light Microscopy (LM), Scanning Electron Microscopy (SEM), and Transmission Electron Microscopy (TEM), enabling detailed examination of trap morphology and structural adaptations. Light microscopy of almost all species has been completed, with only a few remaining. SEM imaging has also been carried out for several taxa, while a few more still need to be examined. TEM studies are yet to be conducted for the selected Indian taxa.

Publications related to the project:

- a) Krishnapriya M.P., Silva S.R., Miranda V.F.O. & S. Nampy 2024. Revisiting *Utricularia* section *Nigrescentes* (Lentibulariaceae) in India and re-instating *Utricularia roseopurpurea*, integrating morphological and molecular data. *Rheedea* 34(1): 20–38.
- b) Krishnapriya M.P., Nampy S., Vaishnavi K.P. & M. Sreya 2024. Botanical carnivores: an overview of Indian Bladderworts. In: *Glimpses of Diversity: Fungi & Plants* (eds.) Santhosh Nampy, Pramod C., Manju C.N. & P. Sunojkumar, Indian Association for Angiosperm Taxonomy, pp. 259–287 (ISBN 81-901637-7-9).

13. SERB POWER GRANT

1. Name of the Principal Investigator/Co-ordinator/Director: Dr. Susmita De
2. Department: Chemistry
3. Name of the funding agency: SERB
4. Title of the Project: Reverse-engineering of Effective Plastic Degrading Enzymes through Structure-based Optimization – A Combined Molecular Dynamics Simulations and Machine Learning Prediction
5. Date of implementation of the project: 28.08.2023
6. Sanctioned amount: ₹ 28,53,400 /-
7. Tenure/Period of the project: 3 years
8. Objective of the project:

To analyze the enzymatic mechanisms of PET degradation by different hydrolase enzymes and predict a set of suitable enzymes for plastic degradation having higher activity. In response to the global challenge of plastic pollution, the discovery of PETase, an enzyme capable of degrading polyethylene terephthalate (PET), has inspired extensive research into hydrolase-based plastic degradation. Several related hydrolases such as FcC, TfCut2, LCC, HiC, and Thc_cut1 have also been shown to hydrolyze polyester plastics into their monomeric components. This enzymatic process not only offers a sustainable solution to the growing plastic waste problem but also provides potential economic benefits, making it a green and promising alternative to conventional recycling methods. Recently, a highly efficient PETase variant, FAST-PETase, was engineered using machine learning (ML) techniques, achieving the highest PET degradation rate reported to date and showcasing the potential of computational tools in enzyme design. Consequently, further research in protein engineering of hydrolases is crucial for developing more effective

PET-degrading enzymes. The hydrolase superfamily includes approximately 250 enzymes, yet only a few have been explored for plastic degradation. Experimentally evaluating all hydrolases against diverse plastic substrates is impractical, emphasizing the need for a molecular-level understanding of the interactions governing polyester hydrolysis. This challenge can be effectively addressed using deep learning models capable of predicting the binding free energy (BFE) between enzyme–plastic pairs. With accurate free energy datasets integrated into ML frameworks, it becomes possible to design efficient, substrate-specific enzymes for the degradation of various plastic types. ML approaches can predict BFEs of unknown enzyme-plastic pairs by learning the correlation between computed BFE from all-atom MDs and descriptors given by structural metrics such as atomic coordinates, distances between atoms, and amino acid sequences and energetic metrics from known enzyme-plastic pairs.

Publications related to the project

Be 2+ Causes Hypersensitivity but Mg 2+ and Ca 2+ Do Not-Favorable Metal Coordination Is the Key for Differential Allosteric Modulation and Binding Affinities G. Sabu and S. De, *J. Phys. Chem. B*, 2023, 127, 48, 10326–10337. DOI: <https://doi.org/10.1021/acs.jpcc.3c05461>. Bridging the Gap in the Structure–Function Paradigm of Enzymatic PET Degradation – Aromatic Residue Driven Balanced Interactions with Catalytic and Anchoring Subsite A. James, A. Bhasi and S. De, *ChemBioChem*, 2024, 25, e202400555 Deciphering the Shape Selective Conformational Equilibrium of E- and Z-Locked Azobenzene-Tetraethyl Ammonium Ion in Regulating Photo-switchable K⁺ - ion Channel Blocking R. Cholasseri and S. De, *Phys. Chem. Chem. Phys.*, 2024, 26, 19161-19175. (Invited article for Special Issue Emerging Investigator Series) DOI: 10.1039/D4CP01604A. Bonding and reactivity study of chalcogen adducts of N-heterocyclic Silylene and Germylene: Fisher-carbene like bond polarity in heavier main group adducts L. M. Jose and S. De, *Polyhedron*, 2025, In Press (Invited Article for Special Issue for Birth Centenary of John Pople) Ring Size Dependent Lactam-lactim Tautomeric Equilibrium in Imidazolin-2- chalcogenones and Pyrimidin-2- chalcogenones: A Role of Aromaticity, Linta Mary Jose, Susmita De, *Journal of computational chemistry*, 2025, 46, e70177, (Special Issue to Celebrate Professor Shridhar R. Gadre's 75th Birthday) Dual-Responsive Luminescent Iridium(III) Complex-Based Sensors for Simultaneous and Selective Detection of Fluoride and Aluminium Ions, Sonali Bera, Aryan Gautam, Radhika Narayanan, Gaurank Pal, Susmita De, Puja Prasad, *Chem Asian J.* 2025, 20, e00780.

14. SERB SURE Project

1. Name of the Principal Investigator/Co-ordinator/Director : Dr. Drisya K
2. Department : Physics
3. Name of the funding agency : ANRF (SERB) under SURE Scheme
4. Title of the Project : Probing the metallicity dependence of the i-process: High-resolution spectroscopic analysis of stars enriched with both r- and s-processes
5. Date of implementation of the project : 03 October 2023
6. Sanctioned amount : 18,19,600/-
7. Tenure/Period of the project : Three years till 02 October 2026
8. Objective of the project :
 1. What is the metallicity range where the i-process is efficient?
 2. What is the i-process astrophysical site that best reproduces the observed abundances of rs-enriched stars at higher metallicities?
 3. Is there any particular element/isotope that can be used as an indicator of i-process?
 4. How the abundance of light elements can be used to understand the nature of s-process and i-process?
 5. Are all rs stars binaries?.

Nucleosynthesis of elements began with the Big Bang, producing mainly hydrogen, helium, and traces of lithium. The remaining natural elements in the periodic table were formed in subsequent generations of stars. This project aims to investigate the role of low- to intermediate-mass stars (LIMS; $0.8 < M < 8$ Solar mass) at various metallicities in the production of elements, particularly those heavier than iron—the so-called heavy elements.

When LIMS evolve to the Asymptotic Giant Branch (AGB) phase, they serve as key sites for the slow neutron-capture process (s-process), which accounts for roughly half of the heavy-element production in the universe. Recent studies have identified proton ingestion episodes (PIEs) in very low-mass, low-metallicity ($[Fe/H] < -2.0$) thermally pulsing AGB stars as potential sites for the intermediate neutron-capture process (i-process). The i-process is believed to explain the observed double enrichment of slow- and rapid-neutron capture elements in a subgroup of carbon-enhanced metal-poor stars known as CEMP-r/s stars. Although the i-process has gained significant attention, many of its characteristics remain poorly understood, and current models restrict its occurrence to the low-metallicity regime. This study aims to explore the dependence of i-process nucleosynthesis on key AGB parameters such as metallicity, stellar mass, and mixing processes, and to investigate possible formation channels for doubly enriched stars at higher metallicities. The resulting abundance patterns will be compared with theoretical i-process predictions to refine

existing models. These results will provide crucial insights for Galactic Chemical Evolution (GCE) models, which currently struggle to explain heavy-element abundances at higher metallicities.

Publications related to the project

1. Title: From the s-Process to the i-Process: A New Perspective on the Chemical Enrichment of Extrinsic Stars Journal: *Galaxies*, 2024, 12,89
Authors:
Sophie Van Eck, Riano Giribaldi, Thibault Merle, Lambotte, Adrian, Drisya Karinkuzhi, Stéphane Goriely, Arthur Choplin, Storm, Nicholas, Gerber, Jeffrey, Siess, Lionel, Bergemann, Maria, Jorissen, Alain
2. Title: Abundance of heavy r-process elements in CEMP-rs stars: The role of the i-process
Journal: *Astrophysical Journal*, 2025, arXiv:2510.13339
Authors: Mohammed Riyas, Drisya Karinkuzhi, Sophie Van Eck; Arthur Choplin, Stéphane Goriely, Keerthy M V, Thibault Merle, Alain Jorissen.

15. SERB SURE Project

1. Name of the Principal Investigator/Co-ordinator/Director: Dr. Jos T. Puthur
2. Department: Botany
3. Name of the funding agency : DST SERB SURE
4. Title of the Project : Priming with g-C 3 N 4 doped with essential elements enhances the abiotic stress tolerance potential of *Oryza sativa* L.
5. Date of implementation of the project : 30-10-2023
6. Sanctioned amount : 25,62400/-
7. Tenure/Period of the project : 3 years
8. Objective of the project :
 - a. Preparation of g-C 3 N 4, Zn-(g-C 3 N 4) and Fe-(g-C 3 N 4) nanosheets employing the thermal polycondensation technique using suitable precursors.
 - b. To analyze the dosage of g-C 3 N 4, Zn-(g-C 3 N 4) and Fe-(g-C 3 N 4) nanosheets that can specifically prime *Oryza sativa* L. seeds and seedlings for enhancing performance towards salinity, drought and UV-B.
 - c. To study the effect of nanoscale g-C 3 N 4, Zn-(g-C 3 N 4) and Fe-(g-C 3 N 4) priming on rice seeds and seedlings in imparting tolerance towards different abiotic stresses by analyzing the extend of oxidative stress, antioxidation mechanism, photosynthetic performance and metabolite accumulation.
 - d. Identifying key genes and pathways involved in the priming mechanism by analysing the whole plant gene expression profile using RNA seq analysis.
 - e. Functional analysis of the selected target genes (mainly cross tolerance signal perception and transduction) by creating loss of function and gain of function mutants.
9. Brief description of project

This study aims to synthesize nanosheets of graphitic carbon nitride (g-C 3 N 4), zinc-doped g-C 3 N 4 (Zn-(gC 3 N 4)), and iron-doped g-C 3 N 4 (Fe-(g-C 3 N 4)) using thermal polycondensation of suitable precursors. *Oryza sativa* L. seeds were primed with these nanomaterials and seedlings were analysed to study their tolerance against salinity, drought, and UV-B stress. In both primed and unprimed seedlings, physiological and biochemical analyses will be carried out to assess the extent of oxidative stress, antioxidant defense mechanisms, photosynthetic performance, and metabolite accumulation under different stress conditions. Growth parameters, pigment composition, osmotic potential, photosystem activity and gene expression responses were analysed. Polyhouse studies were also conducted to analyse the yield related traits including culm length, number of tillers, flag leaf length, flag leaf width, 100 grain weight, maximum quantum yield of PS II, electron transport flux of PS II. These integrated analysis aims to validate the ability of (g-C 3 N 4) nano priming in enhancing abiotic stress tolerance and improving agronomic performance.

16. SERB SURE Project

1. Name of the Principal Investigator : Dr. Sebastian C. D.
2. Department : Zoology
3. Name of the funding agency : DST SERB SURE
4. Title of Project : Novel yeast strain from mangrove sediments as single cell protein and process optimization for mass production as a nutraceutical
5. Date of implementation : 19/10/2023

6. Sanctioned amount : Rs. 28,93,260/-
7. Tenure/Period of project : 3 Years
8. Objective of the project :
 - ? Screening of mangrove yeasts based on growth rate, morphology, and secondary metabolite production for the selection of a suitable strain for biomass production
 - ? Determine the nutritional quality of selected yeast strains
 - ? Testing efficacy of the selected yeast strains as SCP for its possible utilization as probiotic, immunostimulant, antiviral and antioxidant
 - ? Optimization of salinity, temperature and pH for biomass production by the selected marine yeast
 - ? Optimization of media composition for yeast biomass production using defined and complex media
 - ? Scale up and testing the efficacy of defined and complex media in yeast biomass production

9. Brief description of project :

The major source of protein for human consumption is from the agricultural sector, where the production is vulnerable to environmental conditions. Therefore, Single Cell Protein (SCP) production has evolved as an excellent alternative. Among all sources of microbial protein, yeast has attained global acceptability and has been preferred for SCP production due to the presence of almost all amino acids, fatty acids, β -glucan, protein etc.

Yeast has been preferred over bacteria for SCP production, especially for human, because they are more familiar to humans in foods like bread or beverages. Yeasts as single cell protein sources have advantages over other microbes due to: (a) their larger size, so easier to harvest; (b) lower nucleic acid content; (c) long history of use as food and so better public acceptance; (d) high vitamin content and (e) ability to grow on substrates of low pH, which reduces bacterial contamination of the medium. Addition to this, the yeasts have faster growth rate and high level of osmotolerance which make them an efficient organism for the mass production of SCPs. The extreme environmental conditions prevailing in mangrove sediments make it a crucial habitat in identifying the potent yeasts strains which produce novel and efficient bioactive metabolites having a wide range of pharmacological, industrial and bioremediation properties. Since studies on mangrove yeasts and their secondary metabolites are meagre, the proposed study is designed to isolate and identify functionally efficient yeast strains, estimate their nutritional quality to be utilised as probiotics, immunostimulants and antioxidants, extract their secondary metabolites, characterise, and understand the properties to make it applicable as SCP, also to screen or their antiviral property final sequencing the whole genome of the potent strain.

17 .DBT Project

1. Name of the Principal Investigator/Co-ordinator/Director : Dr. ANEESH E.M.
2. Department: Zoology
3. Name of the funding agency: Department of Biotechnology (DBT), Govt. of India
4. Title of the Project: Diversity, Molecular Characterisation and GIS Mapping of ticks in Wayanad Wildlife Sanctuary and the role of environmental nature and microbial consortia in Kyasanur Forest Disease (KFD) emergence
5. Date of implementation of the project : 13/6/2023
6. Sanctioned amount: 34,65,203/-
7. Tenure/Period of the project : 3 Years
8. Objective of the project :
 1. Survey of ticks of epidemiological importance in the different geographic locations of Wayanad.
 2. Investigate the species diversity, richness, and abundance of ticks.
 3. To investigate the diversity of ticks in the eco-tone habitat.
 4. Investigate the genetic divergence between the different species of ticks.
 5. Investigate the molecular characterisation of ticks of epidemiological importance.
 6. Identification of ticks up to species level and reporting new species (if any).
 7. Isolation and identification of microbial consortia that reside inside the tick vectors using molecular characterisation
 8. Training of post-graduate students on the taxonomic analysis of ticks with special reference to diversity and molecular characterisation.

Brief description of the project

Ticks are important ectoparasites of both public health and veterinary concern, acting as carriers of many

pathogens that infect humans, livestock, and wild animals. Understanding their diversity, richness, and abundance in different environments is essential to predict and control possible disease outbreaks. Wayanad, with its rich biodiversity and unique eco-tone habitats, provides a suitable region to study the diversity and distribution of ticks and their role in disease transmission. The present study aims to explore the diversity of tick species, their distribution patterns, and host associations, especially in eco-tone areas. Molecular tools will be used for accurate identification and to study genetic variations among species, giving better insights into their evolutionary relationships and transmission dynamics.

The possibility of discovering new or unrecorded species will add value to the existing taxonomic records of tick fauna in Wayanad. Further, the study will focus on isolating and identifying microbial communities present inside tick vectors using molecular methods, to understand their symbiotic and pathogenic roles. As an academic initiative, postgraduate students will be trained in tick taxonomy, diversity studies, and molecular characterization, thereby improving their skills in vector biology and epidemiological research. Overall, this research will provide essential baseline data on tick diversity, molecular taxonomy, and microbial associations, contributing to a better understanding of tick ecology and their public health importance. The outcomes will support public health and veterinary departments in designing effective tick control prevention strategies.

Publications related to the project :

Anoopkumar, A. N., & Aneesh, E. M. (2021). Assessing the importance of Molecular and Genetic perspectives in Prophesying the KFD transmission risk provinces in the Western Ghats, Kerala, INDIA in context with spatial distribution, Extensive genetic Diversity, and phylogeography. *Comparative Immunology, Microbiology and Infectious Diseases*, 76, 101652.

Anoopkumar, A. N., & Aneesh, E. M. (2022). A critical assessment of mosquito control and the influence of climate change on mosquito-borne disease epidemics. *Environment, Development and Sustainability*, 24(6), 8900-8929.

Francis, C. S., & Aneesh, E. M. (2022). Gut bacterium induced pesticide resistance in insects with special emphasis to mosquitoes. *International Journal of Tropical Insect Science*, 42(3), 2051-2064.

Athira, K. K., Anis, K. V., & Aneesh, E. M. (2023). Molecular characterization of *Amblyomma geoemydae* using CO1 mitochondrial gene to validate phenotypic taxonomical evaluation. *Journal of Parasitic Diseases*, 47(2), 376-386.

Jayakrishnan, L., & Aneesh, E. M. (2023). Exploiting mosquito microbiome to combat the epidemic threat posed by *Aedes aegypti*. *International Journal of Tropical Insect Science*, 43(3), 805-817.

Mathachan Aneesh, E., Anoopkumar, A. N., Davis, D. M., Jayakrishnan, L., Rebello, S., Vinu Rajan, P. K., & Pushapalatha, E. (2024). How steadfast is the concept of "Foldscope linked geometric morphometrics" for the identification of *Aedes* and *Armigeres* mosquito vectors?. *International Journal of Tropical Insect Science*, 44(2), 789-800.

Francis, C. S., Sebastian, H., Sudhikumar, A. V., & Aneesh, E. M. (2024). Symbiotic secrets: exploring the gut microbiome of *Aedes aegypti* larvae and its role in mosquito physiology. *International Journal of Tropical Insect Science*, 44(4), 1591-1607.

Sarath, P. K., & Aneesh, E. M. (2025). Lyme disease: A comprehensive perspective on pathogen biology, clinical aspects and epidemiology in India. *Journal of Vector Borne Diseases*, 62(3), 279-286.

18 .KSCSTE Project

1. Name of the Principal Investigator/Co-ordinator/Director : Dr. Aneesh E.M.
2. Department: Zoology
3. Name of the funding agency: KSCSTE
4. Title of the Project: Geospatial distribution and habitat characterization of ticks vectors in Wayanad Wildlife sanctuary in context with Kyasanur Forest Disease emergence
5. Date of implementation of the project : 04-01-2023
6. Sanctioned amount : 16,92,000/-
7. Tenure/Period of the project : 3 Years
8. Objective of the project :
 1. Survey of ticks of epidemiological significance in the different geographic locations of Wayanad with special emphasis on domestic ruminants and their habitat.
 2. Collecting the geospatial information of tick vectors.
 3. Investigate the species diversity, richness, and abundance of ticks using Biodiversity indices.
 4. Identification of ticks up to species level and reporting new species

The ongoing research project aims to understand the distribution, diversity, and habitat preferences of tick vectors associated with the emergence and transmission of Kyasanur Forest Disease (KFD) in the Wayanad Wildlife Sanctuary. Field surveys are being conducted across different geographic locations of Wayanad, with a special focus on domestic ruminants and their surrounding habitats. Ticks of epidemiological importance are being collected from both hosts and vegetation using standard methods such as drag cloth and flagging techniques. Geospatial information, including GPS coordinates and habitat variables, is being recorded to map the distribution of tick vectors using GIS tools. These data will help identify hotspots and ecological factors influencing tick abundance and spread. Collected specimens are being identified up to species level using morphological keys and, where necessary, molecular techniques. Biodiversity indices are being applied to assess species diversity, richness, and abundance in various ecological zones. Preliminary findings indicate significant variations in tick populations between forest fringes, grazing lands, and settlements near wildlife habitats. The project is expected to contribute to understanding the ecology of tick vectors in Wayanad and their potential role in KFD transmission dynamics. It will also aid in early warning and control strategies by linking vector distribution patterns with environmental and host-related factors. Further exploration may lead to the documentation of new or previously unreported tick species from the region.

Publications related to the project

Athira, K. K., Anis, K. V., & Aneesh, E. M. (2023). Molecular characterization of *Amblyomma geoemydae* using CO1 mitochondrial gene to validate phenotypic taxonomical evaluation. *Journal of Parasitic Diseases*, 47(2), 376-386.

Sarath, P. K., & Aneesh, E. M. (2025). Lyme disease: A comprehensive perspective on pathogen biology, clinical aspects and epidemiology in India. *Journal of Vector Borne Diseases*, 62(3), 279-286.

19. ICSSR Project

1. Name of the Principal Investigator : Dr.Sakeer Hussain
2. Department: Physical education
3. Name of the funding agency: ICSSR
4. Title of the Project: "Empowering Young India: A 4 year Physical Literacy Initiative for Global sport Diplomacy and competitive Excellence under special call for collaborative research proposals on longitudinal studies in social and Human science".
5. Date of implementation of the project: 23.09.2024
6. Sanctioned amount: 1,50,00,000/-
7. Tenure/Period of the project : 5 Years

The research project titled "Empowering Young India: A 4-Year Physical Literacy Initiative for Global Sports Diplomacy and Competitive Excellence" (ICSSR Project Scheme No. 0877) has been awarded to the Department of Physical Education, University of Calicut under the leadership of Dr. Sakeer Hussain V.P., Director of the Department, who serves as the Project Coordinator. This prestigious initiative aims to strengthen the foundation of physical literacy among young children across different states of South India, promoting lifelong participation in sports and physical activity. The project focuses on developing a structured physical literacy curriculum and implementing it through teacher training programs and school-based interventions, fostering both competitive excellence and the spirit of global sports diplomacy. The project started in Kerala and Tamil Nadu, where teacher training programs and data collection have been successfully completed (year 1). We have formally requested the Government of Andhra Pradesh for the permission to implement the project within the state, for which the research team has already provided the detailed curriculum and framework. Meanwhile, data collection activities are ongoing in Karnataka, with research assistant and field investigators actively engaging with schools and participants. The outcomes of this multi-state research initiative are expected to offer valuable insights into regional differences in physical literacy development, helping shape future policies and educational strategies for empowering India's youth through sports and physical education.

20. CSIR ASPIRE

1. Name of the Principal Investigator/Co-ordinator/Director : Dr. Drisya K
2. Department : Physics
3. Name of the funding agency : CSIR – Under ASPIRE SCHEME
4. Title of Project : Probing the physical and chemical characteristics of C-J type carbon stars for understanding their origin
5. Date of implementation of the project : 01 July 2024
6. Sanctioned amount : INR 26,70,392
7. Tenure/Period of the project : Three years till 30 June 2027

8. Objective of the project :

1. Understand the evolutionary status, Galactic distribution, and mass distribution of a sample (~300) of C-J type carbon stars in our Galaxy using recent data releases of GAIA astrometric survey. These C-J type stars are identified from low to medium-resolution spectroscopic surveys such as LAMOST and SDSS.
2. High-resolution spectroscopic analysis of a sub-sample of 50 C-J stars, to derive the complete abundance pattern for understanding their origin. These 50 stars are selected in such a way that C-J stars of various luminosities are included in this sample. The binarity of the sample stars will also be investigated.
3. The derived abundance pattern will then be compared with predictions from AGB models (STAREVOL) to explore the AGB origin of the abundance pattern in them. The necessary modifications of the model parameters will also be done for better explaining the observed abundances.

9. Brief description of the project :

Carbon stars, characterized by carbon-to-oxygen ratios greater than unity ($C/O > 1$), serve as key tracers of late-stage stellar evolution and nucleosynthesis. Among them, C-J-type carbon stars form a peculiar and less understood subgroup, notable for their unusually low carbon isotopic ratios. In this project, we investigate the origin and evolutionary status of C-J-type carbon stars by selecting a sample of 300 objects from the LAMOST DR4 catalog. Their kinematic properties were analyzed using Gaia and 2MASS data, while binarity was assessed through Gaia RUWE values. For a selected subset, stellar parameters such as effective temperature, surface gravity, and metallicity were determined, along with chemical abundances of C, N, O, and heavy elements including Ba, Sr, Zr, La, Eu, Ce, and Nb. Interestingly, these stars show no significant enhancement in s-process elements, suggesting that their evolution may involve non-standard mixing processes or binary interactions rather than classical AGB nucleosynthesis. A strong presence of the lithium line is also observed, possibly linked to mechanisms such as cool bottom processing or other forms of extra mixing, which may additionally explain the low isotopic ratios. Given that some AGB stars exhibit variability associated with thermal pulses and mass loss, it is plausible that the distinct properties of C-J-type stars arise from similar variability effects. Future work will explore their variability characteristics using multi-epoch photometric data from surveys such as ZTF and Gaia. Akhil Ramesh, M M Musthafa, Midhun C V, Shaima Akbar, S S Ghugre, DAE Symp. on Nucl. Phys, 2024

21. UGC DAE Project

1. Name of the Principal Investigator/Co-ordinator/Director : Dr. Fazalurahman K
2. Department : Department of Chemistry
3. Name of the funding agency : UGC - DAE
4. Title of the Project : Probing the water splitting mechanism on metalloporphyrins using x-ray absorption spectroscopy
5. Date of implementation of the project : 31/03/2025
6. Sanctioned amount : 45,000/-
7. Tenure/Period of the project : 1 Years
8. Objective of the project : Systemization of efficient harvesting molecular-semiconductor hybrids for solar fuel generation

Brief description of the project :

Different metalloporphyrins and their hybrid assemblies has been developed for solar fuel production. X-ray absorption studies of various systems by using Indus beam line at UGC –DAE facility at Indore is currently under investigation.

22. WAHEI Project

1. Name of the Principal Investigator/Co-ordinator/Director(State Research Team Leader) : Prof. Abdul Gafoor K
2. Department: Department of Education
3. Name of the funding agency: National Institute of Educational Planning and Administration (NIEPA), New Delhi / University of Warwick, UK
4. Title of the Project: Widening Access to Higher Education in India (WAHEI) – Kerala State Research Team
5. Date of implementation of the project: 19/02/2024
6. Sanctioned amount: Rs. 6,60,000 (First Installment of Rs. 3,30,000 received; Second Installment of Rs. 3,30,000 expected)
7. Tenure/Period of the project: 4 years
8. Objective of the project: To investigate the current and potential roles of higher education institutions (HEIs),

their faculty members (FMs), and institutional leaders (ILs) in rural and semi-urban Kerala in promoting gender- equitable and socially just access to higher education (HE).

The WAHEI (Widening Access to Higher Education in India) project is a collaborative international research initiative involving the University of Warwick and NIEPA. The Kerala State Research Team (SRT) is responsible for conducting region-specific qualitative and quantitative research to map the state's unique higher education dynamics.

During the reporting period, the project focused on the preparation and finalisation of the State Research Team (SRT) report chapters. The team engaged in extensive data analysis and writing to document findings related to student diversity, institutional inclusivity, and the impact of state policies on access. The project operates in phases, coordinating closely with national teams to ensure a comprehensive understanding of the challenges in widening access across different Indian states.

23. UGC BSR Start UP Grant Project

1. Name of the Principal Investigator: Dr. Kishore Sridharan
2. Department : Nanoscience and Technology
3. Name of the funding agency : University Grants Commission
4. Title of the Project : Start-Up Grant on "Development of Visible-Light-Active Bismuth Oxyhalide-Based Photocatalysts for Environmental Remediation"
5. Date of implementation of the project : 06/12/2024
6. Sanctioned amount : Rs.10,00,000 (80% disbursed)
7. Tenure/Period of the project: 24 months (December 2024 – November 2026)
8. Objective of the project : The primary objective of this project is to design, synthesize, and investigate advanced bismuth oxyhalide-based photocatalysts with tailored electronic structures for efficient visible-light- driven organic oxidation reactions and pollutant degradation. The study aims to establish clear structure-property-performance correlations to enable sustainable photocatalytic processes relevant to environmental remediation.

This project focuses on the rational development of layered bismuth oxyhalide (BiOX, X = Cl, Br, I) and bismuth-rich non- stoichiometric derivatives as visible-light-active photocatalysts. Owing to their unique internal electric field, tunable band structures, and excellent stability, bismuth oxyhalides represent promising candidates for photocatalytic organic transformation reactions. The proposed research involves controlled synthesis of stoichiometric and non-stoichiometric bismuth oxyhalides using solution-based and hydrothermal methods, followed by systematic structural, morphological, and electronic characterization. Special emphasis will be placed on defect engineering and compositional modulation to enhance charge separation and redox activity under visible-light irradiation. The photocatalytic performance will be evaluated by the degradation of persistent organic pollutants and harmful algal blooms, with mechanistic insights obtained through reactive species trapping and spectroscopic investigations. The outcomes are expected to contribute fundamental understanding of photocatalytic reaction pathways while advancing practical catalyst design strategies aligned with sustainable chemical synthesis. The project also aims to generate high-quality publications and foster early-stage laboratory infrastructure development.

RESEARCH PROMOTION GRANT FUNDED BY UNIVERSITY

1. Name of the Principal Investigator/Co-ordinator/Director : Dr. Renuka N K
2. Department : Department of Chemistry
3. Name of the funding agency : Calicut University
4. Title of the Project : Development of Cabon Nanodots for Sustainable Agriculture
5. Date of implementation of the project : 06/11/2025
6. Sanctioned amount : 3,00,000/-
7. Tenure/Period of the project : 1 Year

Development of Cabon Nanodots for Sustainable Agriculture Nano-enabled agriculture is now receiving increased attention. Recently, carbon nanodots (CNDs), carbon particles of size < 10 nm with inherent luminescence, blessed with biocompatibility, non-toxicity, inherent luminescence, high water solubility, etc. have attracted much interest in agriculture.

Carbon Nanodots can boost the health and growth of plants through augmenting photosynthesis, by extending the light absorption into UV and IR part of the electromagnetic spectrum, which otherwise is limited mainly to visible

region. Micronutrients doped CNDs perform as nanofertilizers and/or a tool to deliver nutrients and genetic materials enabling slow and targeted delivery into plants. Increased disease resistance and production are also observed. The inherent luminescence of these particles can also be utilised for developing optical sensors for analytes of agricultural significance.

Objectives

The project aims at developing Carbon Nanodots doped with micronutrients using hetero atom doped organic molecules as well as biomass containing micronutrients. Identification of suitable CNDs with improved micronutrient presence, biocompatibility, non-toxicity, and oxygen content will be done to find the optimum nanofertiliser system. The impact of CNDs on growth, and productivity of crops will be monitored using the plant parameters and photosynthesis rate measurements. The luminescence of these particles will be used for tracing analytes like pesticides, preservatives and food adulterants. (v) Work plan and targets to be achieved 1-3 months : Purchase of chemicals (Carbon Dot precursors and analyte molecules). Synthesis of Carbon Dots and modification 4-6 months : Screening the sensing ability of carbon dots for agriculturally relevant analytes. 6-12 months : Analyse the role of carbon dots in plants as photosensitiser, nanofertiliser and drug carrier, Data Analysis and identification of the optimum systems.

Publication of worthy results.

1. Name of Principal Investigator/Co-ordinator/Director : Dr. E Pushpalatha
2. Department : Department of Zoology
3. Name of funding agency : Calicut University
4. Title of Project : Assessment of Diversity and Abundance: Butterflies
5. Date of implementation of the project : 06/11/2025
6. Sanctioned amount : 3,00,000/-
7. Tenure/Period of project : 1 Year

Butterflies are colourful winged insects that belong to the order Lepidoptera. They play crucial role in pollination and helping plants to reproduce and there are over 20,000 known species of butterflies worldwide. Kerala has rich and diverse butterfly fauna because of the availability of wide range of habitats. The project is designed to study the diversity and abundance of the butterfly species of the Campus of the University of Calicut. As the campus of the University is unique in their greenery and biodiversity rich environment, invite many butterflies inhabiting variety of ecosystems. The present study was proposed to carry out in order to assess the species richness and diversity of butterflies of University of Calicut, Campus. Digitization and detailed database preparation is also taken care during the project and planning prepare faunal checklist of Butterfly diversity in the campus.

1. Name of Principal Investigator/Co-ordinator/Director : Dr. R Vineeth
2. Department : Department of History
3. Name of funding agency : Calicut University
4. Title of Project : Political Geography of Kottakkal Region, Kerala
5. Date of implementation of the project : 06/11/2025
6. Sanctioned amount : 2 ,00,000/-
7. Tenure/Period of project : 1 Year

The Kottakkal region, known for its historical significance and socio-economic dynamism, underwent profound transformations during the late 19th and early 20th centuries. Situated in the South Malabar region of present Kerala, Kottakkal has been a site of cultural exchange, economic evolution, and political engagement. This study examines the political geography of Kottakkal by exploring its social transition, the emergence of an educated intelligentsia, institutional developments, and ideological influences. The interaction between the colonial administrative framework and local socio-economic structures led to the rise of a new educated class that challenged traditional hierarchies, particularly in land revenue systems and power relations. One of the most defining institutions of the region, the Kottakkal Arya Vaidya Sala, played a crucial role in reshaping the local economy and social fabric, linking traditional medicine with modern entrepreneurship. Simultaneously, the rise of nationalist, socialist, and Marxist ideologies influenced Kottakkal's political landscape, intersecting with its evolving socio-economic structures. These ideological currents shaped political consciousness and regional movements, contributing to broader shifts in Kerala's political trajectory. By analyzing these aspects, this research aims to offer a nuanced understanding of Kottakkal's historical and political geography, situating it within the larger framework of Kerala's socio-political evolution. The study will rely on historical records, archival sources, and local narratives to trace the intricate interplay between socio- economic change, political thought, and institutional transformations in the region.

Objectives of the study

1. Social Transition in Kottakkal: Late 19th and Early 20th Century

- ? Examine the socio-economic transformations in the Kottakkal region during the late 19th and early 20th centuries.
- ? Identify key factors that influenced changes in social structures and community interactions.
- 2. Emergence of an Educated Intelligentsia and Its Impact
 - ? Analyze the role of colonial influence in shaping a new class of educated individuals in Kottakkal.
 - ? Investigate how this emerging intelligentsia challenged the existing land revenue system and socio-economic hierarchies.
- 3. Influence of Kottakkal Arya Vaidya Sala on Society and Economy
 - ? Explore the establishment and growth of Kottakkal Arya Vaidya Sala as a key institution in the region.
 - ? Assess its impact on the local economy, employment patterns, and social mobility.
- 4. Ideological Interactions: Nationalism, Socialism, and Marxism
 - ? Examine how nationalist, socialist, and Marxist ideas influenced Kottakkal's socio-political landscape.
 - ? Analyze the interaction between these ideologies and the evolving social and economic structures.
 - ? Investigate the role of local political movements and intellectual discourses in shaping regional politics.
- (iv) Methodology

This study adopts a multidisciplinary approach, integrating historical, geographical, and political analyses to examine the socio-political transformations of the Kottakkal region. The research methodology is structured around qualitative and archival methods, supplemented by fieldwork and oral histories.

1. Historical Analysis
 - ? Utilize archival sources, including colonial administrative records, revenue documents, and government reports, to trace socio-economic changes.
 - ? Examine historical newspapers, journals, and contemporary writings to understand the intellectual and political discourses of the period.
 - ? Analyze primary sources such as personal memoirs, correspondences, and biographies of key figures involved in the region's transformations.
2. Archival and Literary Sources
 - ? Study documents from local and national archives, including records related to the colonial administration's impact on land revenue systems and governance.
 - ? Analyze the publications of Kottakkal Arya Vaidya Sala to assess its institutional influence on the economy and society.
 - ? Review historical and literary texts discussing the emergence of new social classes and intellectual traditions in the region.
3. Fieldwork and Oral History
 - ? Conduct interviews with historians, scholars, and community elders to collect oral histories and local narratives.
 - ? Engage with descendants of early reformers, political activists, and traditional healers to understand their perspectives on the region's transformations.
 - ? Document folk narratives, local traditions, and memories that offer insights into Kottakkal's socio-political evolution.
4. Political and Socio-Economic Analysis
 - ? Employ political geography frameworks to map the ideological shifts and their spatial manifestations in Kottakkal.
 - ? Analyze the role of nationalist, socialist, and Marxist ideologies in shaping local political movements and socio-economic policies.
 - ? Study the economic transition of the region, focusing on land reforms, labor dynamics, and institutional interventions.
5. Comparative Approach
 - ? Compare Kottakkal's socio-political evolution with similar regions in Kerala and other parts of colonial India to highlight unique and common patterns.
 - ? Examine parallel developments in economic and political transformations in the broader Malabar region.

By combining archival research, fieldwork, and political analysis, this methodology ensures a comprehensive

understanding of the political geography of Kottakkal, offering new insights into its historical and socio-political significance.

1. Name of Principal Investigator/Co-ordinator/Director : Dr. Manogem E M
2. Department : Department of Zoology
3. Name of funding agency : Calicut University
4. Title of Project : Biomarkers of gall induction: Molecular and biochemical mechanisms of gall formation in *Piper nigrum* and *Ficus racemosa*
5. Date of implementation of the project : 06/11/2025
6. Sanctioned amount : 3 ,00,000/-
7. Tenure/Period of project : 1 Year

Gall-inducing insects have co-evolved with their host plants, exhibiting a high degree of specificity in their interactions. These insects can significantly impact the productivity and yield of economically important plants, including edible, medicinal, timber-yielding, ornamental, and agroforestry species. However, there is a lack of research on the molecular interactions between these insects and economically important plants. In the Indian context, research on the molecular interactions between gall-inducing insects and their host plants remains limited. Therefore, the proposed study attempts to explore and provide insights into these interactions, particularly in economically significant host plants. The findings of this research may contribute to sustainable pest management approaches and enhanced agricultural productivity.

1. Name of Principal Investigator/Co-ordinator/Director : Dr. M T Ramesan
2. Department : Department of Chemistry
3. Name of funding agency : Calicut University
4. Title of Project : "Design and Evaluation of Poly (vinyl alcohol-co-ethylene)-Based Nanocomposites for Next-Generation Antimicrobial and High-Performance Materials"
5. Date of implementation of the project : 06/11/2025
6. Sanctioned amount : 3 ,00,000/-
7. Tenure/Period of project : 1 Year

The project focuses on developing multifunctional nanocomposites with superior mechanical, thermal, dielectric, and antibacterial properties. Conventional polymers such as PVA, PEO, PMMA, and PVdF exhibit limitations like low conductivity, poor mechanical strength, and thermal instability, restricting their advanced applications. To overcome these issues, Poly(vinyl alcohol-co-ethylene) (PVA-co-PE), a semicrystalline copolymer combining the hydrophilicity of PVA with the flexibility and chemical resistance of polyethylene was chosen as the base matrix. Bio-based nanofillers, nanocurcumin and nanochitosan, known for their reinforcing and antimicrobial capabilities, were incorporated into the PVA-co-PE matrix. Furthermore, these nanofillers were doped with metal nanoparticles (Ag, Cu, ZnO) to enhance their mechanical, thermal, electrical, and antibacterial efficiency. The nanocomposites were synthesized via solution mixing and solvent casting, ensuring homogeneous dispersion and uniform film formation. Comprehensive characterization (FTIR, XRD, XPS, FE-SEM, HR- TEM, TGA, tensile, UV-Vis, dielectric) confirmed strong polymer–nanofiller interactions, improved structural integrity, thermal stability, dielectric behavior, and optical transparency, along with excellent antibacterial activity against *E. coli* and *S. aureus*, especially in metal- doped systems.

This research establishes PVA-co-PE-based nanocomposites as sustainable, high-performance materials suitable for biomedical, food packaging, and flexible electronic applications, contributing to the development of eco-friendly and next-generation functional polymers.

1. Name of Principal Investigator/Co-ordinator/Director : Dr. Najumul Shahi
2. Department : school of Drama
3. Name of funding agency : Calicut University
4. Title of Project : National Level Children's Theatre Workshop
5. Date of implementation of the project : 06/11/2025
6. Sanctioned amount : 2,00,000/-
7. Tenure/Period of project : 1 Year

This proposal outlines a week-long National Level Children's Theatre Summer Camp to be conducted at the School of Drama & Fine Arts, Thrissur, Kerala during the months of April– May. The School has a long-standing history of conducting CART (Child Art and Recreation Theatre), one of the most established and authentic children's theatre workshops in Kerala, with a participation of 60–90 children annually. While earlier editions emphasized gender-inclusive participation and creative freedom, this year's camp aims to expand the concept into a more immersive,

interdisciplinary, and experiential learning environment.

Concept and Objectives

The campus, spread across approximately 17 acres with natural landscapes, open-air arenas, bamboo groves, historic buildings, and surrounding paddy fields, offers a unique environment for creative exploration. The camp proposes to utilize this diverse space by creating dedicated learning zones:

1. Environmental Play Space
2. Art and Craft Habitat
3. Science Exploration Zone
4. History and Folklore Enclave
5. Cinema and Photography Corner
6. Music, Dance and Child Dramatics Arena (serving as a connecting central space)

These zones are envisioned not merely as subject-based spaces but as interdisciplinary learning environments, where theatre becomes a pedagogic tool to explore knowledge, creativity, collaboration, and emotional expression.

Training Modules

The camp will include foundational and creative training in:

- ? Theatre games and warm-up exercises
- ? Child dramatics and basic child psychology
- ? Sharing circles to reduce inhibitions
- ? Storytelling and story-based improvisation
- ? Theatre exercises, mime, and choreographic movement
- ? Voice modulation and personality development? Creative writing for performance
- ? Group dynamics and collaborative creation
- ? Introduction to stage lighting and sound
- ? Workshop-based performance production

Outcome

The camp will culminate in a demonstration/performance, reflecting the children's creative journey, teamwork, and theatrical understanding, presented in one or more of the campus environmental performance zone.

1. Name of Principal Investigator/Co-ordinator/Director : Dr. Sreejith R
2. Department : school of Drama
3. Name of funding agency : Calicut University
4. Title of Project : Exploring Contemporary Performance Practices: A Community Theatre Initiative with Non-Actors
5. Date of implementation of the project : 06/11/2025
6. Sanctioned amount : 2,00,000/-
7. Tenure/Period of project : 1 Year

Theatre, as an art form, has historically been a platform for creative expression, social critique, and cultural storytelling. However, in contemporary society, theatre training often remains confined to professional actors, limiting accessibility and innovation. This research project aims to break this barrier by working with non-actors and creating a community theatre that explores contemporary performance practices. Through structured training in various acting methodologies, movement practices, and voice techniques, participants will develop a deeper understanding of performance as a creative and transformative process. This project also seeks to challenge the dominance of conventional training methods by integrating influences from Asian classical theatre traditions, martial arts, and experimental theatre approaches.

1. Name of Principal Investigator/Co-ordinator/Director : Prof. M. P. Mujeebu Rehimani
2. Department : History
3. Name of funding agency : Calicut University
4. Title of Project : "Music and Everyday Life: A Social History of the Influence of Hindustani and Sufi Musical Streams on the Musical Tradition of Kerala"
5. Date of implementation of the project : 06/11/2025

6. Sanctioned amount : 2,00,000/-

7. Tenure/Period of project : 1 Year

This research project seeks to explore the impact of Hindustani and Sufi musical traditions on the classical music and folk musical forms of Kerala and South India, particularly in the realms of Carnatic music, Sufi qawwali, mappilappattu, and other folk forms. This exploration will involve in examining historical exchanges, cultural intersections, and the syncretic musical traditions that emerged through these influences. The research will employ a qualitative and historical-comparative approach, blending ethnographic, archival, and analytical methods. The principal investigator will conduct interviews with renowned musicians, musicologists, and scholars in Kerala and North India to gain insights into the influence of Hindustani and Sufi music on Kerala's musical practices. Audio and video recordings of performances from both traditional Kerala musicians and modern artists blending these influences will be analyzed. The Principal Investigator will attend concerts, festivals, and cultural programs to observe and document the influence of these musical streams in contemporary performances. Qualitative analysis will be employed to identify themes and trends from interviews, music performances, and archival materials, with the methodological frame work of History of Everyday Life.

1. Name of Principal Investigator/Co-ordinator/Director : Dr.Sini P

2. Department : Mathematics

3. Name of funding agency : Calicut University

4. Title of Project : 'Structural and Topological Properties of Partially Semi-Well ordered Sets'

5. Date of implementation of the project : 06/11/2025

6. Sanctioned amount : 2,00,000/-

7. Tenure/Period of project : 1 Year

Partially well ordered sets are fundamental structures in mathematics with broad applications in various fields such as theoretical computer science, formal language theory, transition systems, discrete mathematics, combinatorics and mathematical logic. A partially well ordered set $(X, \preceq)$ is a partially ordered set in which every infinite sequence $\{x_n\}$ contains x_i and x_j with $i \leq j$ and $x_i \preceq x_j$. These sets are a natural extension of well ordered sets and have been explored in the context of set theory, combinatorics, logic and topology. Both semi-well ordered sets and partially well ordered sets can be viewed as extensions of well ordered sets. However, it is important to note that a linearly ordered set is partially well ordered if and only if it is well ordered; thus, these two concepts represent distinct extensions of well ordered sets. This distinction provides the motivation for the introduction of a more general class of ordered structures: partially semi-well ordered sets. We proved the Aharoni-Korman conjecture ($k = 1$) for partially semi-well ordered sets and a significant characterization of these sets was utilized to achieve this result. Our main aim is to determine the topological and order properties of partially semi-well ordered sets by using set theoretical, topological, order theoretical and graph theoretical methods.

1. Name of Principal Investigator : Dr. Zabeena Hameed P

2. Department : Economics

3. Name of funding agency : University of Calicut (Research Promotion Grants)

4. Title of Project : "TRACING THE MICRO DIMENSIONS OF SON PREFERENCE IN KERALA: AN INTERGENERATIONAL SOCIO-ECONOMIC ANALYSIS OF HOUSEHOLDS OF THRISSUR DISTRICT"

5. Date of implementation of the project: 06/11/2025

6. Sanctioned amount : Rs.2.00,000/-

7. Tenure/ Period of project: One Year

8. Objective of the project :

From ever married women across 3 generations by socio-economic groups of Thrissur district, this research is carried out with the following objectives:

1. To examine the age at marriage and pregnancy of women belonging to the three generations.

2. To examine the incidence of stillbirths, spontaneous abortions and induced abortions.

3. To ascertain the family size, sex composition of children and Order of Birth across three generations.

4. To explore the attitude towards having boys and girls, expectations from children and, the extent of son preference.

5. To discern the determinants of size of family, sex composition and son preference in Kerala.

ABSTRACT

Historically, women in Kerala are better placed when compared with their counterparts in other states and this, as an outcome, is reflected in the highest sex ratios, often attributed to matrilineal practices that prevailed in some

communities. Kerala was an exception to the phenomena of 'Daughter Deficit' observed throughout the country. Recently, the signs of under-representation of girls among births is visible in Kerala - the state with high female base population and the highest human and gender development. This paradox drives the need to study if an underlying pattern in fertility choices or cause like son preference exists. The district of Thrissur is considered for the study as it registered a considerable decline in the CSR (763 girls/ 1000 boys) in NFHS-5 and has the least CSR in the entire state (Census, 2011). To capture the urban and rural variations, sample will be taken proportionately based on the rural - urban population of the district. The base sample size (second/ current generation) is tentatively fixed as 300 married women in the age group 55 -65 apart from 300 sample each for the first and third generation. To capture the generational differences, three generations of married women across the district will be considered.

The base generation/ second generation will be the cohort of women born between the years 1960 and 1970, i.e., women who are between the age of 55 to 65. The mothers and children of the base generation will form the other two generations, viz, the first and the third generations respectively. Households with at least a female aged between 55 and 65 will be selected as the sample unit. An all-encompassing schedule for the interview of sample women will be prepared in Malayalam and English. General and family details, educational and employment particulars, media exposure, marriage and cohabitation, pregnancy, delivery, reproductive history, family planning and contraception, postnatal care, fertility preference and gender roles and discrimination within the household will be captured.

1. Name of Principal Investigator : Dr. C Gopinathan
2. Department : Biotechnology
3. Name of funding agency : University of Calicut (Research Promotion Grants)
4. Title of Project : ''Cost-effective production of *Bacillus thuringiensis israelensis*-based biopesticide Using rice water and prawn peel'';
5. Date of implementation of the project: 06/11/2025
6. Sanctioned amount : Rs.3.00,000/-

The proposed project aims to develop a cost effective process for the mass Production of *Bacillus thuringiensis israelensis* based biopesticide to control mosquito larvae using abundantly available rice water and fish industry waste prawn peels waste as the main raw materials.

1. Name of Principal Investigator : Dr. N Muhammadali
2. Department : Journalism and Mass Communication
3. Name of funding agency : University of Calicut (Research Promotion Grants)
4. Title of Project : Digital Media Archiving: Mapping Practices, Trends and Challenges
5. Date of implementation of the project: 06/11/2025
6. Sanctioned amount : Rs.2.00,000/-

This scholarly investigation systematically maps contemporary practices in digital media preservation, elucidates emerging global and regional trends in archival technologies and methodologies, and critically examines key challenges, including technological obsolescence, copyright complexities, data authenticity, and infrastructural limitations in the Indian context.

By addressing these dimensions, the project contributes to advancing knowledge in media studies, informing policy frameworks for sustainable digital heritage preservation, and enhancing archival strategies within academic and professional domains.

1. Name of Principal Investigator : Dr. Aparna Sajeev
2. Department : Commerce and Management Studies
3. Name of funding agency : University of Calicut (Research Promotion Grants)
4. Title of Project : Climate Vulnerability Index (CVI) for Assessing Regional Climate Risks and Adaptation Measures
5. Date of implementation of the project: 06/11/2025
6. Sanctioned amount : Rs.2.00,000/-

The study introduces the Climate Vulnerability Index (CVI) as a multidimensional tool to evaluate climate risks and resilience at the regional level. Despite the growing body of research on climate vulnerability, existing assessment models often lack an integrated approach that captures environmental, economic, social, and institutional factors simultaneously. This study employs a survey-based methodology to address this gap, integrating primary data collection with geospatial analysis and statistical modelling to develop the CVI. The innovation of this research lies in its holistic framework, which combines machine learning techniques with vulnerability assessment indicators to enhance predictive accuracy. Expected outcomes include identifying high- risk regions, improving understanding of socio-economic

determinants of vulnerability, and formulating targeted policy recommendations.

1. Name of Principal Investigator: Dr. Preethi Kuttipulackal
2. Department : Mathematics
3. Name of funding agency : : University of Calicut
4. Title of Project : : Matrices Representing Semigraphs and Their Uses
5. Date of implementation of the project : : 06.11.2025
6. Sanctioned amount : Rs.1,20,000/-
7. Tenure/Period of project : 1 year

Matrices representing Semigraphs and Their Uses Introduction Matrix Theory has played a crucial role in the development of Science and Technology, being the most common tool for representing information or data in a more convenient form. The applications spread over all science branches, economics, social studies, engineering and medicine, etc. For example, in many time-sensitive engineering applications, multiplying matrices can give quick but good approximations of much more complicated calculations and in search engine technologies the indexing process uses the matrix representation of data and eigen values of and eigen vectors of matrices. So that, a proper Matrix representation of concepts has become one of the challenging task of the researchers to integrate technology and to apply the findings, in current problems. Graph Theory in Mathematics is the study of graphs which are mathematical structures used to model pairwise relation between objects. All kinds of networks can be regarded as graph-directed or undirected.

The Concept of Semigraph is a generalisation of graphs by considering a sequential relation instead of pairwise relation. Certain networks require such representations - like the authors of an article; there will be first author, second, third, so on. The representation of graphs by various matrices are used in softwares for giving a graph as an input and for obtaining the output diagram. Adjacency Matrix, Incidence Matrix, Laplacian Matrix, Distance and Co-distance Matrices, are some of the important matrices associated with a graph.

As a generalisation of graph, semigraphs can be represented by Various matrices, by generalising all matrices of graphs, but each can be generalised in many ways.

Objectives

to identify and study the most appropriate matrix/matrices obtained by generalising the existing matrices of graphs to study other new matrices by which semigraphs can be represented.

to identify matrix suitable for various applications

to suggest techniques or algorithms for making use of these matrices in data science/AI/ML Methodology

Review the existing literature in this area and related areas

Develop new matrices, their comparative studies, manual and software supported experiments to identify the most appropriate matrices for various applications

1. Name of Principal Investigator: Dr. Sivadasan P
2. Department : History
3. Name of funding agency : : University of Calicut
4. Title of Project : The Historical Geography of Kadalundi River, Kerala
5. Date of implementation of the project : : 06.11.2025
6. Sanctioned amount : Rs.2,00,000/-
7. Tenure/Period of project : 1 year

Dr. Sivadasan. P, Senior Professor, Department of History, University of Calicut. The Kadalundi River, flowing from the Eastern Ghats to the Arabian Sea, has played a significant role in the cultural and historical development of Kerala. Like many rivers in the region, it served as a cradle for early settlements, with evidence of stone-age and megalithic cultures along its banks. Despite its importance, the river has not received extensive scholarly attention, leaving much of its historical geography unexplored. This project seeks to fill that gap by examining the river's role in shaping the South Malabar region across different historical periods. One of the central aspects of the study is the river's connection to maritime activity. Scholars suggest that the mouth of the Kadalundi River may have housed the ancient port of Tyndis, referenced in Roman accounts as a hub for spice trade and international commerce. This highlights the river's importance not only to local communities but also to global trade networks. By investigating such evidence, the project aims better to understand Kerala's role in early international exchanges.

The project also emphasises the river's socio-economic and cultural impact. Throughout ancient, medieval, and modern times, the Kadalundi River acted as a conduit for goods, religious faiths, and people moving across

Kerala and beyond. Its waters shaped political events, agricultural practices, fishing traditions, and community life. Documenting these influences will provide a holistic view of how the river contributed to the evolution of society in the South Malabar region. To achieve these objectives, the study adopts a methodology that departs from conventional historical writing. It relies on oral history to capture lived experiences and memories of local leaders and communities. Field research will gather firsthand data, while an interdisciplinary approach—drawing on geography, anthropology, archaeology, climate studies, and ethnography—will reconstruct the river's historical geography. This combination of methods ensures a comprehensive understanding of both tangible and intangible aspects of the river's past.

Ultimately, the project seeks to document and preserve the historical significance of the Kadalundi River. By integrating archival research, oral narratives, and fieldwork, it will provide valuable insights into the river's role in settlement patterns, trade, socio-economic development, and cultural exchanges. The findings will not only enrich academic scholarship but also help preserve the heritage of Kerala's rivers, which remain vital to understanding the region's historical identity.

1. Name of Principal Investigator: Dr. GAYATHRI DEVI D
2. Department : Life Science
3. Name of funding agency : : University of Calicut
4. Title of Project : EVALUATION OF PHOTODYNAMIC THERAPEUTIC EFFICACY OF FAGOPYRIN F FRACTION FROM FAGOPYRUM TATARICUM ON IN VIVO SKIN CANCER MODELS
5. Date of implementation of the project : 06.11.2025
6. Sanctioned amount : Rs.2,00,000/-
7. Tenure/Period of project : 1 year

Project Title:

Objectives and methodology

Photodynamic therapy (PDT) is a non-invasive clinical strategy for treating localized tumors. It has established its potential in the management of skin cancer. This treatment combines the use of a photosensitizer (PS), proper light exposure, and molecular oxygen.

Previous studies in our laboratory have revealed the potential of Fagopyrin F Containing Fraction (FCF) derived from Fagopyrum tataricum in mediating PDT against skin cancer cells (A431) by producing ROS upon activation with specific light wavelength. The proposed study explores the efficacy of fagopyrin F fraction from Fagopyrum tataricum on in vivo skin cancer models. The methodology includes collection of plant materials and sample preparation, extraction and isolation of FCF using TLC, induction of skin tumor in mice models, photodynamic light treatment and analysis of therapeutic efficacy.

1. Name of Principal Investigator: Dr. K K Abdul Majjed
2. Department : Sanskrit
3. Name of funding agency : : University of Calicut
4. Title of Project : Humanism in the Bhagavadg?ta : A Spiritual Perspective on Human Freedom and Choice
5. Date of implementation of the project : 06.11.2025
6. Sanctioned amount : Rs.2,00,000/-
7. Tenure/Period of project : 1 year

To analyze the Bhagavadg?ta's perspective on human freedom and moral choice. -To explore the implicit humanistic elements in Gita's discourse on duty (dharma), knowledge (jnana), and devotion (bhakti). -To compare the Gita's humanism with Western humanistic thought. -To highlight the relevance of Gita's humanistic teachings in contemporary society. -To establish that spiritual humanism, as presented in the Gita, integrates both transcendence and ethical self-determination.

1. Name of Principal Investigator: Dr. Bindhu C M
2. Department : Education
3. Name of funding agency : : University of Calicut
4. Title of Project : Influence of Big Five Factors of Personality on Social Emotional Learning among Higher Secondary School Students.
5. Date of implementation of the project : 06.11.2025
6. Sanctioned amount : Rs.1,50,000/-
7. Tenure/Period of project : 1 year

The Big Five factor model was developed to represent the variability in the personality of different individuals using only a small set of trait dimensions. It is also important to note that each of the five personality factors represents a range between two extremes. In the real world, most people lie somewhere in between the two polar ends of each dimension. Most of the psychologists agree that its five domains capture the most important basic individual differences in personality traits. Socio-emotional learning is an educational frame work. Big five factors of personality and socio-emotional learning are intertwined in a compels relationship. While personality traits can influence how individuals' approach and benefit from SEL. Socio emotional learning programs can also help individuals develop key skills and behaviours associated with these personality traits and ultimately contributing to personal growth and emotional intelligence. As per NEP 2020, SEL as an integral part of Holistic Education. while the policy does not use the term SEL, explicitly, it high lights the life skills, emotional wellbeing and character development, which are the core dimensions of SEL. The proposed study that aims to promote emotional intelligence, empathy, self-awareness and interpersonal skills. Adolescence is a crucial period in the development of a person. That is why, the researcher decided to will take the adolescent students as sample. The study result will help to change the educational, social and emotional development of adolescent population.

In conclusion, the year 2025 stands as a golden era for the University with respect to funded research activities. For the first time in the history of the University, research projects amounting to a total allocation of Rs.30,16,81,151/- have been successfully implemented with support from various funding agencies. This remarkable achievement reflects the growing research capability and commitment of the University. It is expected that this momentum will continue in the coming years, leading to enhanced research activities and effective translation of research outcomes for the benefit of society, thereby contributing to the improvement of the quality of life of the common public.

