Inspired by Creativity;
Focused on Excellence

AMRITA
VISHWA VIDYAPEETHAM
DEEMED TO BE UNIVERSITY UNDER SECTION 3 OF UGC ACT, 1956

SCHOOL OF BIOTECHNOLOGY

AMRITAPURI CAMPUS

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Amma
Our Chancellor
Inspiration for the World

> “... We all know that the real goal of education is not to create people who can understand only the language of technology. The main purpose of education should be to impart a culture of the heart, a culture based on spiritual values.

Education is not only to help us live a comfortable life of plenty. When our plans fall apart, when we face failure and loss, when we are knocked down, education should help us get back on our feet. Education should help us regain our mental equipoise, self-confidence and positive attitude, so that we can continue forward. In fact, studying is a form of austerity. It is a process, like the bud unfolding into a beautiful flower spreading its fragrance.

Understanding this, we should approach our topic of study with love and patience. The world of knowledge is limitless; the possibilities are as vast as the universe. Therefore, before deciding whether a discovery is beneficial or detrimental, we need to contemplate with a meditative mind. Knowledge is like a river. Its nature is to constantly flow. Wherever it can flow, it does so, nourishing culture. On the other hand, the same knowledge, if devoid of values becomes a source of destruction for the world. When values and knowledge become one, there can be no more powerful instrument for the welfare of humankind. Today, physicists have even begun investigating the possibility that the essential substratum of the manifest universe and the individual are one and the same. We are standing on the threshold of a new era where in material science and spirituality will move forward hand in hand…”

Excerpts from the address of our Chancellor Sri Mata Amritanandamayi Devi upon receiving the Doctorate of Humane letters from State University of New York 25 May 2010

Swami Amritaswarupananda Puri

President
Amrita Vishwa Vidyapeetham

We, the Amrita family welcome you with open arms and open hearts to this great institution of Amma's infinite compassion and love. To become special or extraordinary is the dream of every ambitious student. But how does one become special? Is it only through academic excellence? Of course, that is part of it, but academic brilliance alone is not enough. The most important thing in building your life is your ability to focus on your Inner Self and to realize the inherent abilities within.

When you graduate and enter the practical world of opportunities and challenges, you may find yourself among thousands of competent professionals. What will you have over them? It will be your ability to tap into your inner source and let flow the grace you find there into your work. The extent to which you will be able to do this will depend entirely on how open you are to the beautiful opportunities available at Amrita.

May you ever remain open to Amma's Grace

Ever in Amma,
With Love & Prayers

Swami Amritaswarupananda Puri

Swami Abhayamritananda Puri

Pro Chancellor
Amrita Vishwa Vidyapeetham

We welcome every batch of students with renewed enthusiasm. We have come to be identified for our academic rigor and deep commitments to human values. We strive to lead our students into exemplary models in their chosen profession.

Our Alumni have more than proven what we mean and this has enhanced our confidence and improved our resolve to take up the mission, for which "Amma" has set up these temples of learning, to its logical conclusion.

Come into Amrita to lead an intense life of academics flavored with universal human values. We shall send you out into your field of specialization as our Ambassadors.

I am confident that you are going to enjoy every moment of your presence here.

Swami Abhayamritananda Puri

Dr. P. Venkat Rangan

Vice Chancellor
Amrita Vishwa Vidyapeetham

Amrita Vishwa Vidyapeetham is a rapidly developing world class University, offering Under-graduate, Post-graduate and advanced Doctoral research in wide ranging disciplines like Biotechnology, Management, Engineering, IT, Medicine and Journalism. It is both young and immensely dynamic, with a unique holistic approach to produce leaders in all of its disciplines.

At Amrita Vishwa Vidyapeetham, we have assembled some of the most well- known academicians, entrepreneurs, executives, inventors, philanthropists, researchers and scientists to guide us in this noble endeavor.

A very hearty welcome to you to this sacred temple of learning. We hope you can become a part of this exciting venture. Invoking AMMA's Grace on all of us.

Dr. Venkat Rangan

Vision

Our vision is to be an exemplary institution that thrives on its commitment to the transformative power of value-based education, providing the impetus to develop the expansiveness to harmonize both scientific knowledge and spiritual understanding to harmonize both scientific knowledge and spiritual understanding, so as to utilize knowledge for societal benefit and contribute to a prosperous and sustainable future for all.

Mission

Amma's profound mission of providing education for life, and emphasis on compassion driven research, has shaped Amrita as a unique institution:

Education for Life

There are two types of education: education for living and education for life. Studying to become a professional is education for living, while, education for life requires an understanding of the essential human values. At Amrita, we believe that education should also impart a culture of the heart, based on enduring values and inner strength. Amrita's culture of education helps to inculcate in our students the right ethos to be rooted in the values of Dharma (righteousness), Karuna (Compassion), and Shraddha (Mindfulness). Endowed with qualities of acceptance, patience, self-confidence, perseverance and enthusiasm, the benefit of humanity will become uppermost in the students' thoughts, words and actions. They will then pioneer innovative solutions for the benefit of all humankind, leading to sustainable health and prosperity for all. This resonates with the ancient Sanskrit prayer 'Lokah Samastah Sukhino Bhavantu'. It is a reminder of our deeper connection to the entire world around us. "May our work contribute to the happiness of all beings."

Compassion Driven Research

Our motivation to pursue research is focused on alleviating major global problems related to poverty, starvation, sickness, environmental pollution and contamination. We believe that if we could transform compassion from a mere word into a path of action, we would be able to address most of the world's problems. If we take this step courageously, then our research and its outcomes will have a special impact, spontaneity, and power. This has translated into many latest advancements and innovations that have culminated in greater societal benefit.

Global Impact

At Amrita, we stand united in our mission towards solving globally recognized scientific and societal challenges, including environment, development, and health. Amrita stands at the strategic juncture of two streams of cultures: East and West. It is our vision to bring the two together to bridge the divide through meaningful collaboration with world-class universities and innovative approaches that will benefit the entire planet.

Prof. Bipin Nair, Ph.D.

Dean
Amrita School of Biotechnology

A Trailblazer in the Biotechnology arena since its inception in 2004, with established UG and PG programs in Biotechnology, Microbiology and Bioinformatics, the Amrita School of Biotechnology as part of Amrita Vishwa Vidyapeetham is accredited by NAAC and UGC with A++ and established as a TIFAC Center of Relevance and Excellence (CORE) in Biomedical Technology under the DST Mission REACH program. The School boasts of a stellar (95%) placement record for M.Sc. graduates at all major Biotechnology institutions and companies across the country and globally. Dedicated faculty with extensive research experience in labs across USA and Europe, are now pursuing research projects of immediate societal impact with substantial funding from various government agencies (e.g. DST, DBT, ICMR) and the Bill & Melinda Gates Foundation along with ongoing collaborations with major universities. The School also has a large number of students enrolled for the Ph.D. program with research fellowships (JRF, SRF) from DBT, CSIR, ICMR and guidance from established experts in their respective fields of research. A notable feature of the strength of Amrita School of Biotechnology is the state-of-the-art infrastructure and research facilities with strong industry collaboration facilitating student project internships and successful placements.

Some noteworthy achievements for the School include the honor of being selected for the Bill & Melinda Gates Foundation-DBT-BIRAC Grand Challenge India Award for the project to explore novel approaches to sanitation solutions in India. Another feather in the cap is the signing of a Memorandum of Understanding between the Amrita School of Biotechnology and the Kennedy Institute at Oxford University, UK for research collaboration as well as faculty and student exchange. The School initiated a major Project with Industry leader Wipro Technologies, Bangalore for Development of a ' Low Cost Device and Cloud Enabled Smart Solution for Diabetes Care' funded by BIRAC, Department of Biotechnology, Government of India. The School is also engaged in a Tata Trust, India, funded Project as part of the Tata Institute for Genetics and Society in collaboration with UCSD to study Antimicrobial Resistance (AMR).

In a unique step, Amrita Vishwa Vidyapeetham through the Amrita School of Biotechnology has entered into a dual degree partnership with the University of Arizona through the Department of Cellular and Molecular Medicine at the University of Arizona. With Amma's Grace, there will be ample opportunities for everyone to be a part of the plan. I wish you the very best in all your efforts.

Prof. Bipin Nair, Ph.D.

About **Amrita Vishwa Vidyapeetham**

Amrita University is a multi-disciplinary, research-intensive, private university, educating a vibrant student population of over 24,000 by 1700+ strong faculty. Accredited with the highest possible 'A^{++}' grade by NAAC, Amrita offers more than 250 UG, PG, and Ph.D. programs in Engineering, Management, and Medical Sciences including Ayurveda, Life Sciences, Physical Sciences, Agriculture Sciences, Arts & Humanities, and Social & Behavioral Sciences. With seven campuses at Amaravati, Amritapuri, Bengaluru, Chennai, Coimbatore, Kochi, Mysuru and NCR Delhi (Faridabad) and spread over 1200+ acres with 10 million square feet of built-up space, Amrita is one of India's top-ranked private universities.

Amrita has emerged as the fifth best university in the National Institutional Ranking Framework (NIRF) Rankings 2021.

In The University Impact Rankings 2022, a pioneering initiative to recognise universities around the world for their social and economic impact for sustainable future, Amrita has been ranked among the Top 50 in the world.

In a short span of less than 20 years, Amrita has established 180+ collaborations with Top 500 world-ranked universities as Amrita is emerging as one of the fastest-growing institutions of higher learning in India

World-renowned humanitarian and spiritual leader, Sri Mata Amritanandamayi Devi, AMMA, is the founding Chancellor and guiding light of Amrita Vishwa Vidyapeetham.

Our motivation to pursue research is focused on alleviating major global problems related to poverty, starvation, sickness, environmental pollution, and contamination. We believe that if we could transform compassion from a mere word into a path of action, we would be able to address most of the world's problems. If we take this step courageously, then our research and its outcomes will have a special impact, spontaneity, and power. This has translated into many latest advancements and innovations that have culminated in greater societal benefit.

At Amrita, we stand united in our mission towards solving globally recognized scientific and societal challenges, including environment, development, and health. Amrita stands at the strategic juncture of two streams of cultures: East and West. It is our vision to bring the two together to bridge the divide through meaningful collaborations with world-class universities and innovative approaches that will benefit the entire planet.

INSPIRED BY **CREATIVITY;** FOCUSED ON **EXCELLENCE**

The Amrita School of Biotechnology, with qualified faculty including several Ph.Ds. recruited from academia and industry around the world, is perfectly poised to offer students an opportunity to develop expertise and succeed in building a career in the exciting areas of Biotechnology and related fields. Our cutting-edge curricula with state-of-the-art facilities for teaching and research provides a solid foundation in the biological sciences. With a vibrant academic environment and a unique approach to learning that involves thought-provoking discussions and constant interaction among students and faculty, the Amrita School of Biotechnology provides an ideal setting for all-round development of students to become well-trained in all aspects of the Life Sciences. The excellent placement record of the School stands testimony to our laudable standards of excellence. The School offers undergraduate and post-graduate studies in Biotechnology, Microbiology and Bioinformatics. It is approved by TIFAC (Government of India) as a Center of Relevance and Excellence (CORE) in Biomedical Technology. The School's research program concentrates on preventive and therapeutic innovations.

- A trailblazer in the Biotechnology arena since its inception in 2004.
- Well established UG, PG, and Ph.D. programs in Biotechnology, Microbiology and Bioinformatics.
- Re-accredited in 2021 by National Assessment and Accreditation Council (NAAC), University Grants Commission (UGC) with "A^{++}" Grade.
- Established as a Technology Information, Forecasting & Assessment Council-Center of Relevance and Excellence (TIFAC-CORE) in Biomedical Technology under the DST Mission REACH Program.
- Dedicated faculty with extensive research experience in labs across USA and Europe, now pursuing research projects of immediate societal impact.
- Stellar Placement Record for M.Sc. graduates at all major Biotechnology institutions and companies across the country and globally.
- Substantial funding from DST, DBT, ICMR, CSIR, MHRD, KSCSTEC and the Bill & Melinda Gates Foundation along with collaborations with major universities including Oxford, Cambridge (UK) and the University of California (UCSD, UCR).
- Large number of students enrolled in the Ph.D. program with research fellowships (JRF, SRF) CSIR, DBT, ICMR and guidance from established experts in their respective fields of research.
- State-of-the-art infrastructure and research facilities with strong industry collaboration facilitating student project internships and subsequent placements (e.g. Agilent Technologies, Biocon Limited, Sun Pharmaceutical Industries Limited).
- Research focus spanning a wide spectrum of areas including Antimicrobial Resistance (AMR), Cell Biology, Cancer Biology, Proteomics, Neurophysiology, Phytochemistry, Analytical Chemistry, Phage Biology, RNAi.
- Selected for the Bill & Melinda Gates Foundation-DBT-BIRAC (Biotechnology Industry Research Assistance Council) Grand Challenge India Award for the project to explore novel approaches to sanitation solutions in India.
- Collaboration on Tata Trust funded Project as part of the Tata Institute for Genetics and Society with University of California, San Diego to study the application of Applied Genetics for addressing the problem of Antimicrobial Resistance (AMR).
- Unique flagship dual degree academic program. All eligible students receive the M.Sc. (Biotechnology, Microbiology and Bioinformatics) Degree from Amrita University and MS (Cellular and Molecular Medicine) University of Arizona, USA.

Dr. Victor Nizet
Professor & Vice Chair
UC San Diego School of Medicine, USA change to UC San Diego School of Medicine. San Diego. USA

"The Students and faculty are extraordinary at Amrita and leaders for the future. Look forward to welcoming many to San diego and returning in future."

Kiran Mazumdar Shaw
Chairman, Biocon Ltd.
Bengaluru, India

"A truly inspirational visit to this great conglomerate. I look forward to a meaningful & enduring partnership.
My salutation to this great effort."

Dr. Carol Gregorio
Professor, Icahn School of Medicine at Mount Sinai. Director and Founder, Center for Cardiac Muscle Biology, Cardiovascular Research Institute.
New York, USA

"Collaborating with Amrita School of Biotechnology to build a Dual Degree MS program is a highlight of my career. The leadership, faculty, as well as students are outstanding and they are all committed to excellence."

TESTIMONIALS

Dr. Rustom Mody
Senior VP,
Sun Pharmaceuticals
Ahmedabad, Gujarat

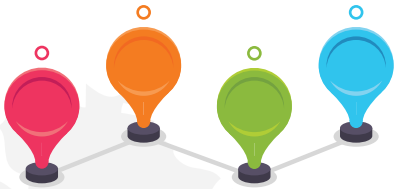
"The path chosen by Amrita School of Biotechnology…..to be one of the best academic centres for Biotechnology in the country as well as globally is remarkable. It exemplifies extraordinary vision, strong leadership, excellent faculty, well recognized curriculum, research infrastructure and global outreach that offers the best for its students."

Dr. Chandrabhas Narayana
Director,
Rajiv Gandhi Centre for Biotechnology
Poojappura, Thiruvananthapuram

"RGCB has been attracting students from Amrita School of Biotechnology. We are delighted to welcome them year after year. The faculty and students of Amrita School of Biotechnology are a great conglomerate. My respects for establishment of such an institution."

Dr. Anand Anandkumar
Founder and CEO,
BUGWORKS Research India Pvt. Ltd
Bellary Road, Bangalore

"I've been deeply impressed by the Management, staff and students at Amrita School of Biotechnology. The overall pedagogy, the values-based approach to imparting knowledge, the industry-relevance built into the program and high quality products/publications that are coming from this department, make it a standout department and biotech program in all of India!"



MILESTONES

2004

SEPTEMBER

- Amrita Vishwa Vidyapeetham establishes Centre for Biotechnology under the School of Applied Sciences.
- Centre initiates B.Sc. Biotechnology, M.Sc. Biotechnology, M.Sc. Bioinformatics programs with total of 75 students and 8 faculty members.

NOVEMBER

- Centre for Biotechnology is identified as a **TIFAC Centre of Relevance and Excellence (CORE) in Biomedical Technology** under the Mission REACH (Relevance and Excellence in Achieving new heights in educational institutions) program of the DST, **Government of India / ₹ 3.41 Crores.**

2005

JANUARY

- Several senior faculty members from the US and Europe join the Centre and initiate active academic and research programs.

JULY

- MoU with Biocon Limited.
- MoU with MDS Pharma Services, USA that provides **$250,000** worth of laboratory equipment to jump start research activities at the School.
- Initiated a new undergraduate program in Microbiology.

2006

AUGUST

- Mascon Global Limited, Delhi recruits all 26 students in the M.Sc. Bioinformatics batch recording **100% placement** of the first batch since the inception of the Centre.

2007

APRIL

- Amrita Vishwa Vidyapeetham receives approval from UGC to establish Centre for Biotechnology as an independent school. The Amrita School of Biotechnology is born!.

2008

NOVEMBER

- First evaluation by the NAAC Evaluation team awards an A grade.
- Research fund from Defence Institute of Physiology & Allied Sciences (DIPAS)-Ministry of Defence, Government. Of India for **Studies on bioactive tannoids and flavonoids of seabuckthorn leaves.**

2009

AUGUST

- School starts a new postgraduate program in Microbiology.
- Research fund from DBT, Government Of. India on **"Value addition to seabukthorn through isolation & characterisation of pharmacologically active compounds" / ₹46.25 Lakhs.**

2010

JANUARY

- New research grant from MHRD, Government Of India to develop **Biotechnology & Biomedical Engineering Virtual Labs** and later selected as the national coordinator for the same along with IIT-Bombay & IIT-Delhi.

2011

SEPTEMBER

- MoU with Agilent Technologies, Germany.
- New Amrita Agilent Research Center, Molecular Biology Lab and Lentiviral Lab inaugurated.
- New research grant from DST, Government of India for **Bio-inspired processor design for cognitive functions via detailed computational modeling of cerebellar granular layer/ ₹ 39.44 Lakhs.**

NOVEMBER

- School receives first **US patent** awarded to Amrita Vishwa Vidyapeetham for **"Development of a prototype of Automated Insulin Pump".**

2004 - 2014

2012

SEPTEMBER

- New Computational Neurobiology & Neurophysiology lab and e-learning lecture theater inaugurated.
- School receives funds from numerous government agencies like DST, DBT and CSIR/ **₹2.25 Crores.**

2013

JANUARY

- School receives funding from FIST (Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions) DST, **Government of India / ₹80 Lakhs.**
- New research fund from DST, Government of India for **Paratopsis: a newer approach to target cancer /₹22 Lakhs.**

MAY

- School receives funding from CSIR for research on Anacardic acid /**₹24.37 Lakhs.**

AUGUST

- Amrita BioQuest 2013, An International conference on Biotechnology for Innovative Applications hosted at the Amritapuri Campus.

2014

MARCH

- School of Biotechnology selected to develop next generation sanitation solutions in India.

JUNE

- School initiates a **new scholarship program** for postgraduate students.

JULY

- MoU with Translational Health Science and Technology Institute (THSTI)-Delhi to work jointly on the sanitation project.
- New research grant from DST, Government of India for **Identification and characterization of the role of Allium sativummicro biome on the production of therapeutic metabolites / ₹ 70 Lakhs**

2015

JANUARY

- BioCrest 2015- An International Symposium on Biotechnology-The Path Ahead commemorating the tenth anniversary of the school.
- Footprints 2015- School organizes the first ever Alumni Meet.
- MoU with Oxford University, UK.
- Amrita Vishwa Vidyapeetham re-accredited with "A" Grade by NAAC.

FEBRUARY

- Inaugurated new state-of-the-art research labs for Cell Biology and Phage Biology.

MARCH

- Induction of Q-TOF MS and Nano-LC for cutting edge Proteomics research.

2016

MAY

- MoU with National Ilan University, Taiwan.

JANUARY

- Biocrest 2017, an International Symposium on Microbial Pathogenesis.

MARCH

- Amrita research "From Waste to Wealth: Traditional Medicine, Natural Products and the Molecular Basis of Therapeutics", has been featured on the United Nations Academic Impact (UNAI) website.

2017

JULY

- A cancer labeling fluorescent probe was designed by Amrita.

2018

FEBRUARY

- Amrita Vishwa Vidyapeetham and Wipro Limited, a leading global information technology, consulting and business process services company, jointly won the Aegis Graham Bell Awards (AGBA) 2017 in the Innovation in mHealth category.

MARCH

- Amrita's Virtual Laboratories and its deployment outcomes won the GOLC Online Lab Award 2018 for visualized experiment category in Germany.

MAY

- MOU with ID Genomics with ARMADA.

NOVEMBER

- Collaboration with Tata Institute of Genetics and Society (TIGS) will focus on developing new tools to reverse antibiotic resistance in pathogens like *Pseudomonas aeruginosa.*

2019

JANUARY

- Inaugurated new lab for Microbial Active Genetics.
- Amrita Vishwa Vidyapeetham is partnering with 14 other institutions from EU, UK, China, Mexico, Mongolia, Paraguay in the 'WeNet-The internet of Us.'
- DataScientia consortium of founding members includes Italy's University of Trento, the National University of Mongolia, India's Amrita Vishwa Vidyapeetham, China's Jilin University, Paraguay's Catholic University of Asunción, South Africa's Tshwane University of Technology and UK's Heriot-Watt University.
- MoU with Indriyam.

JUNE

- MoU with Shukla Ashar Impex Pvt.Ltd.

JULY

- MoU with International Stemcell Services Ltd.

AUGUST

- MoU with NCBS.

2020

JANUARY

- MoU with University of Arizona, USA.

JUNE

- School receives funding from **DST-SERB/ ₹88.45 Lakhs.**

2021

FEBRUARY

- School organised international symposium called **BIOCREST 2021.**

MARCH

- School receives funding from **DST-SERB/ ₹44.8 Lakhs.**

JULY

- Awarded A^{++} **by NAAC.**

AUGUST

- Research collaboration with **GangaGen Biotechnologies Private Ltd.**

SEPTEMBER

- US Patent on Detergent compatible assay for protein estimation was awarded to School of Biotechnology Professors'.

NOVEMBER

- School organised Amrita Legion for Antimicrobial Resistance Management **(ALARM 2021).**

DECEMBER

- Research collaboration with Vitalis Phage Therapy.
- DBT-Skill Vigyan nodal center.

2022

FEBRUARY

- Faculty (Dr. Muralidharan V) received the Young Scientist fellowship Award from Department of Health Research, Indian Council of Medical Research, Govt of India.

MAY

- Dr. Bipin Nair and Dr. Geetha Kumar were invited speakers at the International AMR conference - CARPE DIEM in Berlin, Germany (May 16-17, 2022) hosted by Indo-German Science & Technology Centre (IGSTC).

SEPTEMBER

- Faculty (Dr. Muralidharan V) received extra mural funding from DHR-ICMR **(41.3 Lakhs).**

OCTOBER

- Department of Biotechnology, DBT, Govt of India awarded the Biotechnology Skill Vigyan State Partnership Programme **(Rs. 6.2 Crores)** to Amrita School of Biotechnology in Collaboration with Kerala Biotechnology Commission.
- Conducted World Phage Week on 28th October 2022.
- Faculty (Dr. Vandana Sankar) received extra mural funding from DST-SERB Power Research Grant **(Rs. 30 Lakhs).**

NOVEMBER

- Dr. Bipin Nair, Dean, School of Biotechnology, appointed as Vice Chair of India AMR Innovation Hub's Special Interest Group on AMR in the Environment.
- Organized Hybrid International Symposium - Amrita Legion for Antimicrobial Resistance Management (ALARM) on 23rd & 24th November 2022.

2023

FEBRUARY

- Awarded the Sree Padmavathi Venkateswara Foundation award **(Rs. 1.5 Crores)** for collaborative project with Indian Institute of Science and Madras Diabetes Research Foundation (MDRF).
- Faculty (Dr. Aravind Madhavan) received the Young Scientist award from Kerala State along with Governor's Gold Medal and **Rs. 50,000 cash awards.**
- Faculty (Dr. Nandita Mishra) received extra mural funding from ICMR-ADHOC Grant **(Rs. 30 Lakhs).**
- Conducted National Science Day on 28 February 2023. Dr. Utpal S. Tatu (Professor and chairman of the Department of Biochemistry of the Indian Institute of Science, Bangalore) was the Chief Guest.

2015 - 2023

FACULTY MEMBERS

The Faculty Members at Amrita School of Biotechnology are well known and highly respected in their academic domains. This provides the school with an extensive network that is instrumental in securing collaborative research opportunities, live student projects and industry inputs, which is essential for quality biotechnology education.

Dr. Bipin Nair
Professor & Dean, School of Biotechnology, Dean, Faculty of Life Sciences

Ph.D. Microbiology,
M.S.University of Baroda 1986

Formerly at MDS Pharma Services,USA, as the Research Manager in the Lead Discovery Group.

Areas of Interest: Pharmacology, Lead Discovery, Cell Signaling

bipin@am.amrita.edu

Dr. Geetha Kumar
Professor

Ph.D. Biochemistry, University of Tenneessee, Memphis, USA 1992.

Formerly at Ceptyr Inc., USA.

Areas of Interest: Drug discovery, molecular mechanisms in diabetes and wound-healing, natural products for wound-healing

gkumar@am.amrita.edu

Dr. Sudarslal S.
Professor

Ph.D. in Biophysics, School of Biosciences, M.G.University, Kerala

Formerly Manager at Mass Spectrometry Core Facility, NCBS, Bangalore, India

Areas of Interest: Mass spectrometric characterization of medicinally important peptides and proteins

sudarslal@am.amrita.edu

Dr. Sanjay Pal
Associate Professor

Ph.D. in Biotechnology, IIT Kharagpur, 2004

Formerly at University of Texas Health Science Centre, San Antonio, USA.

Areas of Interest: Sanitation, Microbiome Engineering, Bacteriophage, Extracellular matrix (ECM)

sanjaypal@am.amrita.edu

Dr. Nandita Mishra
Associate Professor

Ph.D. in Biotechnology, IIT Kharagpur, 2005

Formerly at University of Texas Health Science Centre, San Antonio, USA

Areas of Interest: Cell Death Pathways, Proteasomal Inhibition, Mechanism of targeted drug delivery to cancer cells, Toxicity study of Bio-materials

nanditamishra@am.amrita.edu

Dr. Sobha V. Nair
Associate Professor

Ph.D. in Chemistry (Polymer Technology), MG University, 2006.

Formerly at POSTECH, South Korea

Areas of Interest: Biopolymers/Biomaterials

sobhavn@am.amrita.edu

Dr. Nidheesh M.
Associate Professor

Ph.D. in Neuroinformatics, Amrita Vishwa Vidyapeetham, Amritapuri 2019

Areas of Interest: Neuroinformatics, Deep Learning, BioNLP, Bioinformatics

nidheesh@am.amrita.edu

Dr. Ajith M.
Associate Professor

Ph.D. in Microbiology, Bharathiar University, Coimbatore 2021

Areas of Interest: Enzymology, Microbial Fuel Cell, Antimicrobials

ajithm@am.amrita.edu

Dr. Indulekha C. L. Pillai
Associate Professor

Ph.D. in Biotechnology, Rajeev Gandhi Center for Biotechnology, India, 2010

Formerly Postdoctoral Scientist, Cedars Sinai Medical Center, Los Angeles, USA

Areas of interest: Stem cell Biology and Tissue repair, Fibrosis and Calcification, Wound Healing, Notch and Wnt Signaling, Innate Immunity

indulekhacl@am.amrita.edu

Dr. Prashanth N. Suravajhala
Associate Professor / Principal Scientist

Ph.D. in Systems Biology, Aalborg University, Denmark, 2009
Areas of Interest: Systems Biology

prash@am.amrita.edu

Dr. Jayashree G.
Assistant Professor

Ph.D. in Biochemistry, M.G. University, 2001

Formerly at the Indian Institute of Science, Bangalore

Areas of interest: Mycobacterial proteins, identification and characterization of novel lectins, Protein- Protein interactions, isothermal titration calorimetry

jayashreeg@am.amrita.edu

Dr. Jayalekshmi H.
Assistant Professor

Ph.D. in Biotechnology, Amrita Vishwa Vidyapeetham, Amritapuri 2018

Areas of Interest: Medical Bacteriology

jayalekshmih@am.amrita.edu

Dr. Rajaguru Aradhya T. C.
Assistant Professor.

Ph.D. in Development Biology and Genetics, University of Auvergne, France, 2014

Formerly Post-Doctoral Fellow at MSKCC, Rockefeller University, New York, USA

Areas of interest: Developmental Genetics and Cellular Differentiation

rajagurua@am.amrita.edu

Dr. Parvathy Venugopal
Assistant Professor

Ph.D. in Development Biology and Genetics, University of Auvergne, France, 2014

Areas of interest: Epithelial growth and Morphogenesis

parvathyv@am.amrita.edu

Dr. Dalia Vishnudasan
Assistant Professor

Ph.D.in Plant Molecular Biology, Delhi University, 2004

Areas of interest: Plant Biotechnology, Nanobiotechnology

daliav@am.amrita.edu

Dr. Sindhu Shetty K.
Assistant Professor

Ph.D. in Microbiology, Bharathiar University, Coimbatore 2019

Areas of Interest: Enzymology, Microbial Fuel Cell, Actinomycete

sindhushettyk@am.amrita.edu

Dr. Chinchu Bose
Assistant Professor

Ph.D. in Life Sciences, Amrita Vishwa Vidyapeetham, Amritapuri 2019

Areas of Interest: Phytochemistry, Bio-prospection of active principles from Natural Products

chinchubose@am.amrita.edu

Dr. Vidhya Prakash
Assistant Professor

Ph.D. in Life Sciences, Amrita Vishwa Vidyapeetham, Amritapuri 2023

Area of interest: Probiotics and Prebiotics, Gut Microbiome Interactions, Bacteriocins and Antimicrobial Peptides.

vidhyaprakash@am.amrita.edu

Dr. Suja Subhash
Assistant Professor

Ph.D in Life Sciences, Amrita Vishwa Vidyapeetham, Amritapuri 2023

Areas of Interest: Fungal biology, Antimicrobial and antiparasitic agents, Wastewater treatment.

sujasubhash@am.amrita.edu

Dr. Aswathy Alangode
Assistant Professor

Ph.D. in Biotechnology,
Amrita Vishwa Vidyapeetham, Amritapuri, 2021.

Areas of Interest: Snake venom biochemistry; Biomedical applications of snake venom.

aswathya@am.amrita.edu

Dr. Vandana Sankar
Assistant Professor

Ph.D. in Biological Sciences, Sree Chitra Tirunal Institute for Medical Sciences and Technology, 2009

Areas of Interest: Cardiovascular disease biology

vandanasankar@am.amrita.edu

Dr. Renuka Suravajhala
Assistant Professor

Ph.D. in Synthetic Biology, Manipal University, Jaipur, 2022

Areas of Interest: Structural Biology, Drug Discovery, Protein Ligand Interactions

renus@am.amrita.edu

Dr. Muralidharan V.
Assistant Professor

Ph.D. in Biotechnology, Amrita Vishwa Vidyapeetham, Amritapuri 2021

Areas of Interest: Mass Spectrometry and Proteomics in disease biology

muralidharanv@am.amrita.edu

Dr. Aravind Madhavan
Assistant Professor

Ph.D. in Biotechnology, CSIR-National Institute for Interdisciplinary Science and Technology, India, 2016

Formerly ICMR-Young Scientist, Rajiv Gandhi Centre for Biotechnology, India

Area of Interest: Host-pathogen interaction, Antimicrobial resistance, Microbial Cell factory development, Sustainable utilization of bioresources

aravindmi@am.amrita.edu

Dr. Pradeesh Babu
Assistant Professor

Ph.D. in Life Sciences 2022, Amrita School of Biotechnology

Areas of Interest: Antimicrobial Resistance, Phage biology, Metagenomics, Next Generation sequencing, Artificial Intelligence and Bioinformatics

pradeeshbabu@am.amrita.edu

Dr. Anu Rohit Melge
Assistant Professor

Ph.D in Bioinformatics, Amrita Centre for Nanosciences and Molecular Medicine, Amrita Institute of Medical Sciences, Kochi, Kerala

Areas of Interest: Computational Biology, Structure-Based Drug Design, Chemoinformatics, Nanoinformatics

anurm@am.amrita.edu

Ms. Shalini Dinesh
Assistant Professor

M.Phil. Aquatic Biology, Kerala University, 1995 M.Sc. Biology, Kerala University, 1993.

Areas of Interest: Marine Microbiology

shalinidinesh@am.amrita.edu

VISITING/ADJUNCT PROFESSORS

The Academic Programs at Amrita School of Biotechnology are greatly enhanced through the active involvement of reputed scientists as Adjunct Faculty from across the globe

Dr. Walter Schrenk
Professor

Ph.D. Organic Chemistry & Polymer Science, Joh.Gutenberg University, Mainz, 1982, Formerly at the R&D Department of Hewlett Packard/Agilent Technologies, Waldbronn, Germany.

Areas of Interest: Instrumental Analysis as HPLC/MS in Life Science Applications, Microfluidics, Lab & Process Automation. Natural Product Separation and Identification.

Dr. Martin Reick
Professor

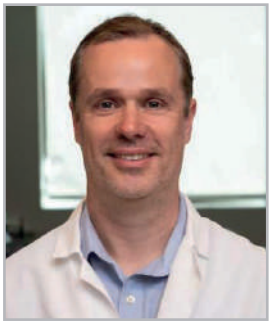
Ph.D. Molecular Biology, MIU, Fairfield, IA,USA, 1996, Formerly at UT Southwestern Medical Center, Dallas, USA

Areas of Interest: Metabolism, diabetes, biological rhythms, peptide-based anti-snake venom therapy

Dr. Victor Nizet
Professor & Vice Chair for Basic Research, Department of Pediatrics

Chief, Division of Host-Microbe Systems & Therapeutics
Professor, Skaggs School of Pharmacy & Pharmaceutical Sciences, University of California, San Diego, USA

Areas of Interest: Antimicrobial Resistance, Pathogenies



Dr. Jeff Perry
Assistant Professor

The City of Hope Medical Center, California, US
Ph.D. Natural Science, University of Cambridge, UK, 2000

Areas of Interest: Structural Biology

Dr. Carol C. Gregorio

Professor, Icahn School of Medicine at Mount Sinai
Cellular and Molecular Medicine

Director and Founder, Center for Cardiac Muscle Biology, Cardiovascular Research Institute, New York, US

Areas of Interest: Cardiovascular Research

Dr. Taslimarif Saiyed

(Director and COO of C-CAMP,
Center for Cellular and Molecular Platforms), Bengaluru

Ph.D. in Neuroscience from Max-Planck Institute for Brain Research, Germany

Areas of Interest: Translation Biology, Breakthrough Innovations, Life science Entrepreneurship

Dr. Shabarinath Subramaniam

Director of Business Development,
Phoenix Bioinformatics, Newark, CA, US

M.Sc. Computational Biology, University of Southern California, USA 2002, M.Sc. Psychiatry, McGill University, Montreal, Canada, 2000

Areas of Interest: Comparative Genomics, Computational Modeling of Biological systems

Dr. Avinash K. Shah

Professor of Biochemical Engineering,
M.S. University, Baroda

Ph.D. Microbiology

Areas of Interest: Research in Product Development, Environment Protection, Effluent treatment, Biological Control of Plant Pathogens, Biodegradable Polymers

Dr. Praveen Nair

Vice President, Translational Pharmacology,
Immuneering Corporation, US

Ph.D. in Medical Microbiology, University of Georgia, USA

Areas of Interest: In Vitro Assay Development, Translational Research

Dr. Prashanth Athri

DGM, Reliance Digital Health /
CEO of Bio-Cube, Bengaluru

Ph.D. in Computational Chemistry (major) and Bioinformatics (minor) from Georgia State University, Atlanta, Georgia, USA

Areas of Interest: Application of statistical pattern recognition /machine learning and genetic algorithms to the field of structure-based molecular design and bioinformatics.

ACADEMIC
PROGRAMS OFFERED

The School follows a credit-based system, which is a systematic way of pursuing an educational program by attaching credits to its components. When enough credits are accrued or earned, the program is completed successfully. The credit-based system makes educational programs easy to understand, comparable and competitive both nationally and internationally. It facilitates mobility, academic flexibility and universality, and helps universities to organize as well as recognize their study programs quickly.

UNDERGRADUATE PROGRAMS

Duration - Three years (six semesters)

B.Sc. Microbiology

SEMESTER 1

Sl. No	COURSE NAME	CREDITS
1	INTRODUCTORY BIOLOGY	3
2	CHEMISTRY	4
3	ENGLISH	3
4	INTRODUCTORY MICROBIOLOGY	3
5	PHYSICS	4
6	CULTURAL EDUCATION-1	2
7	INTRODUCTORY MICROBIOLOGY LAB	2
	TOTAL CREDITS	21

SEMESTER 2

Sl. No	COURSE NAME	CREDITS
1	INFORMATION SYSTEMS	3
2	MICROBIAL ECOLOGY, DIVERSITY & CLASSIFICATION	3
3	BIOCHEMISTRY	3
4	ENGLISH/ CREATIVE WRITING & SOFT SKILLS	3
5	MATHEMATICS	4
6	CULTURAL EDUCATION-2	2
7	PHYSICAL SCIENCES LAB	2
8	BIOCHEMISTRY LAB	2
	TOTAL CREDITS	22

SEMESTER 3

Sl. No	COURSE NAME	CREDITS
1	MOLECULAR BIOLOGY	3
2	MYCOLOGY	3
3	BIOSTATISTICS	3
4	ANALYTICAL BIOCHEMISTRY	3
5	VIROLOGY	3
6	AMRITA VALUES PROGRAMME-I	1
7	GENERAL MICROBIOLOGY LAB	2
8	CELL AND MOLECULAR BIOLOGY LAB	2
	TOTAL CREDITS	20

SEMESTER 4

Sl. No	COURSE NAME	CREDITS
1	CELL BIOLOGY	3
2	INHERITANCE BIOLOGY	3
3	IMMUNOLOGY	3
4	ENZYME TECHNOLOGY	3
5	MICROBIAL PHYSIOLOGY & METABOLISM	4
6	FOOD MICROBIOLOGY	3
7	SOFT SKILLS-I	1
8	AMRITA VALUES PROGRAMME-II	1
9	IMMUNOLOGY LAB	2
10	FOOD MICROBIOLOGY LAB	2
	TOTAL CREDITS	25

SEMESTER 5		
Sl. No	COURSE NAME	CREDITS
1	INDUSTRIAL MICROBIOLOGY	3
2	MEDICAL BACTERIOLOGY	3
3	RECOMBINANT DNA TECHNOLOGY	3
4	ENVIRONMENT & AGRICULTURAL MICROBIOLOGY	3
5	RESEARCH METHODOLOGY	2
6	SOFT SKILLS-II	1
7	LIVE-IN-LABS/OPEN ELECTIVE	3
8	MEDICAL BACTERIOLOGY LAB	2
9	GENETIC ENGINEERING LAB	2
10	INDUSTRIAL MICROBIOLOGY LAB	2
	TOTAL CREDITS	24

SEMESTER 6		
Sl. No	COURSE NAME	CREDITS
1	BRITE PROJECT	7
2	PHARMACOLOGY	4
3	PARASITOLOGY	3
4	INTRODUCTORY BIOINFORMATICS	2
	TOTAL CREDITS	16

TOTAL CREDITS FOR PROGRAM COMPLETION: 128

B.Sc. Biotechnology

SEMESTER 1		
Sl. No	COURSE NAME	CREDITS
1	INTRODUCTORY BIOLOGY	3
2	CHEMISTRY	4
3	ENGLISH	3
4	INTRODUCTORY MICROBIOLOGY	3
5	PHYSICS	4
6	CULTURAL EDUCATION-1	2
7	INTRODUCTORY MICROBIOLOGY LAB	2
	TOTAL CREDITS	21

SEMESTER 2		
Sl. No	COURSE NAME	CREDITS
1	PRINCIPLES OF ECOLOGY AND EVOLUTION	3
2	BIOCHEMISTRY	3
3	ENGLISH/ CREATIVE WRITING & SOFT SKILLS	3
4	INFORMATION SYSTEMS	3
5	MATHEMATICS	4
6	CULTURAL EDUCATION-2	2
7	PHYSICAL SCIENCES LAB	2
8	BIOCHEMISTRY LAB	2
	TOTAL CREDITS	22

SEMESTER 3		
Sl. No	COURSE NAME	CREDITS
1	MOLECULAR BIOLOGY	3
2	BIOSTATISTICS	3
3	PLANT BIOLOGY	4
4	ANALYTICAL BIOCHEMISTRY	3
5	VIROLOGY	3
6	AMRITA VALUES PROGRAMME -I	1
7	GENERAL MICROBIOLOGY LAB	2
8	CELL AND MOLECULAR BIOLOGY LAB	2
	TOTAL CREDITS	21

SEMESTER 4		
Sl. No	COURSE NAME	CREDITS
1	HUMAN PHYSIOLOGY	4
2	GENETICS	3
3	IMMUNOLOGY	3
4	ENZYME TECHNOLOGY	3
5	CELL BIOLOGY	3
6	INTRODUCTORY BIOPHYSICS	2
7	SOFT SKILLS- 1	1
8	AMRITA VALUES PROGRAMME -II	1
9	IMMUNOLOGY LAB	2
10	ENZYMOLOGY LAB	2
	TOTAL CREDITS	24

SEMESTER 5		
Sl. No	COURSE NAME	CREDITS
1	GENETIC ENGINEERING	4
2	OMES AND OMICS	3
3	BIOENERGETICS AND METABOLISM	3
4	INDUSTRIAL & ENVIRONMENTAL BIOTECHNOLOGY	3
5	RESEARCH METHODOLOGY	2
6	INDUSTRIAL BIOTECHNOLOGY LAB	2
7	SOFTSKILLS -II	1
8	LIVE-IN-LABS/OPEN ELECTIVE	3
9	GENETIC ENGINEERING LAB	2
	TOTAL CREDITS	23

SEMESTER 6		
Sl. No	COURSE TITLE	CREDITS
1	BRITE PROJECT	7
2	PHARMACOLOGY	4
3	DEVELOPMENTAL BIOLOGY	3
4	INTRODUCTORY BIOINFORMATICS	2
	TOTAL CREDITS	16

TOTAL CREDITS FOR PROGRAM COMPLETION: 127

POSTGRADUATE PROGRAMS

Duration - Two years (four semesters)

M.Sc. Biotechnology

SEMESTER 1		
Sl. No	COURSE NAME	CREDITS
1	CELL BIOLOGY & STEM CELL BIOLOGY	3
2	MOLECULAR BIOLOGY	3
3	BIOCHEMISTRY	4
4	ETHICS IN RESEARCH & INTELLECTUAL PROPERTY RIGHTS	1
5	MICROBIOLOGY	2
6	BIOSTATISTICS	3
7	CULTURAL EDUCATION	1
8	SOFT SKILLS	1
9	MICROBIOLOGY - LAB	2
10	BIOCHEMISTRY - LAB	2
	TOTAL CREDITS	22

SEMESTER 2		
Sl. No	COURSE NAME	CREDITS
1	MOLECULAR GENETICS	3
2	RESEARCH METHODOLOGY	2
3	RECOMBINANT DNA TECHNOLOGY	3
4	ADVANCED PHARMACEUTICAL BIOTECHNOLOGY	3
5	INDUSTRIAL BIOTECHNOLOGY	3
6	BIOANALYTICAL TECHNIQUES	3
7	RECOMBINANT DNA TECHNOLOGY - LAB	2
8	INDUSTRIAL BIOTECHNOLOGY - LAB	2
9	BT ELECTIVE - 1	3
10	AMRITA VALUES PROGRAMME	1
11	SOFT SKILLS - II	2
	TOTAL CREDITS	27

BT ELECTIVE 1		
1	CANCER BIOLOGY	3
2	PHAGE BIOLOGY	3
3	CELL SIGNALING	3
4	BIOMIMICRY	3
5	MOLECULAR & CELLULAR BIOPHYSICS	3
6	NEUROSCIENCE	3
7	ADVANCED BIOCHEMISTRY	3
8	REGENERATIVE BIOLOGY AND STEM CELLS	3

SEMESTER 3		
Sl. No	COURSE NAME	CREDITS
1	MOLECULAR & CELLULAR IMMUNOLOGY & BIOLOGY OF VACCINES	4
2	ADVANCED DISCOVERY BIOLOGY	3
3	PLANT & ANIMAL BIOTECHNOLOGY	3
4	MASS SPECTROMETRY & PROTEOMICS	3
5	BIOINFORMATICS	3
6	BT ELECTIVE - 2	3
7	IMMUNOLOGY - LAB	2
8	CELL & MOLECULAR BIOLOGY - LAB	2
9	OPEN ELECTIVE	2
	TOTAL CREDITS	25

BT ELECTIVE 2		
1	NANOBIOTECHNOLOGY	3
2	DEVELOPMENTAL BIOLOGY	3
3	MOLECULAR & CELLULAR NEUROSCIENCE	3
4	RECENT TRENDS IN RNA BIOLOGY	3
5	ECOLOGY & EVOLUTION	3
6	GLYCOBIOLOGY	3
7	MATRIX BIOLOGY AND BIOMATERIALS	3

SEMESTER 4		
Sl. No	COURSE NAME	CREDITS
1	DISSERTATION/THESIS	10
	TOTAL CREDITS	10

TOTAL CREDITS FOR THE PROGRAMME: 84

M.Sc. Microbiology

SEMESTER 1		
Sl. No	COURSE NAME	CREDITS
1	CELL BIOLOGY & STEM CELL BIOLOGY	3
2	MOLECULAR BIOLOGY	3
3	BIOCHEMISTRY	4
4	ETHICS IN RESEARCH & INTELLECTUAL PROPERTY RIGHTS	1
5	MICROBIOLOGY	2
6	BIOSTATISTICS	3
7	CULTURAL EDUCATION	1
8	SOFT SKILLS	1
9	MICROBIOLOGY - LAB	2
10	BIOCHEMISTRY - LAB	2
	TOTAL CREDITS	22

SEMESTER 2		
Sl. No	COURSE NAME	CREDITS
1	MOLECULAR GENETICS	3
2	RESEARCH METHODOLOGY	2
3	RECOMBINANT DNA TECHNOLOGY	3
4	ADVANCED PHARMACEUTICAL BIOTECHNOLOGY	3
5	INDUSTRIAL BIOTECHNOLOGY	3
6	BACTERIAL & VIRAL PATHOGENESIS	4
7	RECOMBINANT DNA TECHNOLOGY - LAB	2
8	INDUSTRIAL BIOTECHNOLOGY - LAB	2
9	MB ELECTIVE - 1	3
10	AMRITA VALUES PROGRAMME	1
11	SOFT SKILLS - II	2
	TOTAL CREDITS	28

MB ELECTIVE 1		
1	CANCER BIOLOGY	3
2	PHAGE BIOLOGY	3
3	CELL SIGNALING	3
4	BIOMIMICRY	3
5	BIOANALYTICAL TECHNIQUES	3
6	MOLECULAR & CELLULAR BIOPHYSICS	3
7	NEUROSCIENCE	3
8	ADVANCED BIOCHEMISTRY	3
9	REGENERATIVE BIOLOGY & STEM CELLS	3

SEMESTER 3		
Sl. No	COURSE NAME	CREDITS
1	MOLECULAR AND CELLULAR IMMUNOLOGY & BIOLOGY OF VACCINES	4
2	MICROBIAL PHYSIOLOGY	2
3	FOOD MICROBIOLOGY	2
4	MYCOLOGY	2
5	PARASITOLOGY	2
6	ENVIRONMENTAL & AGRICULTURAL MICROBIOLOGY	3
7	MB ELECTIVE - 2	3
8	IMMUNOLOGY - LAB	2
9	FOOD MICROBIOLOGY - LAB	2
10	OPEN ELECTIVE	2
	TOTAL CREDITS	24

MB ELECTIVE 2		
1	NANOBIOTECHNOLOGY	3
2	DEVELOPMENTAL BIOLOGY	3
3	MOLECULAR & CELLULAR NEUROSCIENCE	3
4	RECENT TRENDS IN RNA BIOLOGY	3
5	MASS SPECTROMETRY & PROTEOMICS	3
6	ECOLOGY & EVOLUTION	3
7	GLYCOBIOLOGY	3
8	MATRIX BIOLOGY AND BIOMATERIALS	3
9	BIOINFORMATICS	3
10	ADVANCED DISCOVERY BIOLOGY	3

SEMESTER 4		
Sl. No	COURSE NAME	CREDITS
1	DISSERTATION/THESIS	10
	TOTAL CREDITS	10

TOTAL CREDITS FOR THE PROGRAMME: 84

M.Sc. Bioinformatics

SEMESTER 1		
Sl. No	COURSE NAME	CREDITS
1	INTRODUCTION TO BIOINFORMATICS	3
2	MOLECULAR BIOLOGY	3
3	CELL BIOLOGY AND STEM CELL BIOLOGY	3
4	DATA ENGINEERING AND ADMINISTRATION	3
5	APPLIED MATHEMATICS FOR BIOINFORMATICS	3
6	PROGRAMMING LANGUAGE CONCEPTS	3
7	BIOINFORMATICS TOOLS (LAB)	1
8	DATA ENGINEERING AND ADMINISTRATION (LAB)	1
9	PROGRAMMING FOR BIOINFORMATICS (LAB)	1
10	CULTURAL EDUCATION	1
11	SOFT SKILLS L	1
12	ER&IPR	1
	TOTAL CREDITS	24

SEMESTER 2		
Sl. No	COURSE NAME	CREDITS
1	STRUCTURAL BIOINFORMATICS	3
2	MOLECULAR SEQUENCE ANALYSIS	2
3	PYTHON FOR BIOINFORMATICS	3
4	R FOR BIOINFORMATICS	2
5	CHEMISTRY OF BIOMOLECULES	3
6	BIOLOGICAL DATA SCIENCES AND MACHINE LEARNING	3
7	BIOSTATISTICS AND RESEARCH METHODOLOGY	2
8	BASICS OF BIOLOGY (LAB)	1
9	PYTHON FOR BIOINFORMATICS (LAB)	1
10	R FOR BIOINFORMATICS (LAB)	1
11	AMRITA VALUES PROGRAMME	1
12	SOFT SKILLS LI	2
	TOTAL CREDITS	24

SEMESTER 3		
Sl. No	COURSE NAME	CREDITS
1	EVOLUTION AND COMPARATIVE GENOMICS	3
2	MATHEMATICAL MODELING FOR BIOLOGICAL SYSTEMS	2
3	BIOINFORMATICS OF HIGH THROUGHPUT ANALYSES	3
4	WEB PROGAMMING USING OBJECT ORIENTED LANGUAGES	3
5	CADD & PHARMACOINFORMATICS	3
6	SYSTEMS BIOLOGY	2
7	BIOINFORMATICS OF HIGH THROUGHPUT ANALYSES (LAB)	1
8	WEB PROGAMMING USING OBJECT ORIENTED LANGUAGES (LAB)	1
9	OPEN ELECTIVE / LIVE-IN-LABS	2
10	NEXT-GENERATION SEQUENCING ANALYSIS	3
	ELECTIVE 1	3
	TOTAL CREDITS	26

SEMESTER 4		
Sl. No	COURSE NAME	CREDITS
1	DISSERTATION/THESIS	10

TOTAL CREDITS FOR THE PROGRAMME: 84

Ph.D. LIFE SCIENCES

A Ph.D. in Life Sciences provides students with advanced training in Biotechnology and related disciplines along with investigative research experiences. The program typically takes four to five years to complete and involves intensive research, coursework, presentations and components for analytical skill development.

During the coursework phase, students learn diverse topics in life sciences, biostatistics, research ethics and experimental design. They also participate in seminars, conferences, journal clubs, and laboratory rotations to develop their research skills.

To be admitted into a Ph.D. in Life Sciences program at the Amrita Vishwa Vidyapeetham, applicants are required to have a master's degree or equivalent in a related field, as well as a solid academic record, and letters of recommendation.

Overall, a Ph.D. in Life Sciences is an excellent option for students interested in pursuing a career in the life sciences and making significant contributions to the field through research and innovation.

AMRITA SCHOOL OF BIOTECHNOLOGY – UNIVERSITY OF ARIZONA, (USA)

DUAL DEGREE PROGRAM

Amrita School of Biotechnology initiates first of its kind Dual Degree program in India in the Life Sciences

In a unique step, Amrita Vishwa Vidyapeetham through the Amrita School of Biotechnology has entered into a dual degree partnership with the University of Arizona through the Department of Cellular and Molecular Medicine at the University of Arizona.

A strategic merger of the strengths of the two well established units of the two universities both in term of academic fervour and research excellence, provides aspiring students the excellent opportunity to tap into the expertise of the renowned and internationally recognised Biomedical Sciences faculty at the University of Arizona while at the same time leveraging the tremendous strength of the well - experienced faculty and the well-established program at the Amrita School of Biotechnology. Besides being given the unique opportunity to receive two degrees - M.Sc. Biotechnology, Microbiology or Bioinformatics from Amrita Vishwa Vidyapeetham and MS Cellular and Molecular Medicine, in a 2 year time frame, students enrolling for this spectacular Dual Degree program would benefit tremendously from this innovative approach of flexible one of its kind modular courses offered by the Cellular and Molecular Medicine Department at the University of Arizona, as well as conduct research within the University of Arizona laboratories, while at the same time being able to harness the experience of the well-established Masters programs in Biotechnology, Microbiology and Bioinformatics at the Amrita School of Biotechnology.

MS IN CELLULAR AND MOLECULAR MEDICINE

SI. NO	COURSE NAME	CREDITS
1	MAXIMIZING UA GRADUATE SCHOOL	1
2	MOLECULAR MEDICINE	1
3	GENOMIC MEDICINE	1
4	THE ART OF SCIENTIFIC DISCOVERY	2
5	CLINICAL CANCER GENETICS	2
6	BRIGHT-FIELD MICROSCOPY	1
7	FLUORESCENCE MICROSCOPY	1
8	DIGITAL IMAGING	1
9	CMM ELECTIVE	1
10	CMM ELECTIVE	1
11	HISTOLOGY BASICS	1
12	HISTOLOGY OF THE DIGESTIVE & RESPIRATORY SYSTEMS	1
13	HISTOLOGY OF THE UROGENITAL & ENDOCRINE SYSTEMS	1
	TOTAL CREDITS	15

THE UNIVERSITY OF ARIZONA®

SHARED COURSES

SI. NO	COURSE NAME	CREDITS
1	INTELLECTUAL PROPERTY RIGHTS	1
2	CELL BIOLOGY & STEM CELL BIOLOGY	3
3	CANCER BIOLOGY	3
4	ELECTIVE	3
5	PROJECT WORK	5
	TOTAL CREDITS	15

University of Arizona, USA

Testimonials from **ALUMNI**

KARTIK DATTANI

[B.Sc. Biotechnology (2017-2020);
M.Sc. Biotechnology & MS in Cellular and Molecular Medicine (2020-2022)]

Ph.D. Student, The University of Arizona, USA (2022 - Present)

"My five years at Amrita School of Biotechnology can be described as nothing short of a life-changing journey. In those years, Amrita School of Biotechnology has not only allowed me to explore my full academic potential, but has also pushed me to broaden my co-curricular and personal horizons. I have had the opportunity to meet people and form connections that would not have been possible if not for this institution. 'I'll be forever grateful for my journey and the opportunities and experiences that studying here has opened up for me."

NISHTHA MANISHKUMAR DESAI

[M.Sc. Biotechnology & MS in Cellular and Molecular Medicine (2019-2021)]

Ph.D. Student, Icahn School of Medicine at Mount Sinai,
USA (2022 - Present)

"To enable myself to be globally competitive, I needed to have the perfect combination of theory and practical knowledge. To do this, I would need to enrich myself with the requisite knowledge that a master's program can serve. I believed the Biotechnology Program at Amrita School of Biotechnology was the right platform to pursue my dreams and achieve my career goals. I have also been fortunate to have an outstanding support system of my professors and colleagues at Amrita that led me to achieve the prestigious Khorana Scholarship, which I'll always be grateful for. Getting the opportunity to be a dual degree student was another milestone I could achieve at ASBT, and that took me to heights I had never imagined. My experience at Amrita has turned into a journey whose destination I know is incredibly magnificent."

RECENT PUBLICATIONS

Selected Publications

1. Pranav, P., Sabarinath, S., Bose, C., Rani, S. and Jyothi, S.N. (2023). Influence of techniques on synthesizing cashew nut shell oil as a prospective biolubricant on its physicochemical, tribological, and thermal behaviors. Journal of Cleaner Production, [online] p.136717.
2. Madhavan, A., Arun, K.B., Sindhu, R., Nair, B.G., Pandey, A., Awasthi, M.K., Szakacs, G. and Binod, P. (2023). Design and genome engineering of microbial cell factories for efficient conversion of lignocellulose to fuel. *Bioresource Technology*, 370, p.128555.
3. Aloor, A., Aradhya, R., Venugopal, P., Gopalakrishnan Nair, B. and Suravajhala, R. (2022). Glycosylation in SARS-CoV-2 Variants: A path to Infection and Recovery. *Biochemical Pharmacology*, p.115335.
4. Salim, A., Madhavan, A., Subhash, S., Prasad, M., Nair, B.G. and Pal, S. (2022). Escherichia coli ST155 as a production-host of three different polyvalent phages and their characterisation with a prospect for wastewater disinfection. *Scientific Reports*, [online] 12(1), p.19406.
5. Prasad, M., Shetty, S.K., Nair, B.G., Pal, S. and Madhavan, A. (2022). A novel and improved selective media for the isolation and enumeration of Klebsiella species. *Applied Microbiology and Biotechnology*, 106(24), pp.8273–8284.
6. Menon, N.D., Penziner, S., Montaño, E.T., Zurich, R., Pride, D.T., Nair, B.G., Kumar, G.B. and Nizet, V. (2022). Increased Innate Immune Susceptibility in Hyperpigmented Bacteriophage-Resistant Mutants of Pseudomonas aeruginosa. *Antimicrobial Agents and Chemotherapy*, 66(8).
7. Shaji, S.K., Drishya, G., Sunilkumar, D., Suravajhala, P., Kumar, G.B. and Nair, B.G. (2022). Systematic understanding of anti-tumor mechanisms of Tamarixetin through network and experimental analyses. *Scientific Reports*, [online] 12, p.3966
8. Pillai, I.C.L., Xu, S., Rau, C.D. and Wang, Z. (2022). Editorial: Epigenetic Regulation in Cardiovascular Diseases. *Frontiers in Cardiovascular Medicine*, 8.
9. Salim, A., Sindhu Shetty, K., Febin, H., Sameed, N., Pal, S., Nair, B.G. and Madhavan, A. (2022). Lytics broadcasting system: A novel approach to disseminate bacteriophages for disinfection and biogenic hydrogen sulphide removal tested in synthetic sewage. *Results in Engineering*, 13, p.100314.
10. Vanuopadath, M., Raveendran, D., Nair, B.G. and Nair, S.S. (2022). Venomics and antivenomics of Indian spectacled cobra (Naja naja) from the Western Ghats. *Acta Tropica*, 228, p.106324.
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RESEARCH

The research focus at the School of Biotechnology spans a wide spectrum of areas including Stem Cell & Regenerative Biology, Developmental Biology, Systems Genomics, Antimicrobial Resistance, Proteomics and Biomarker Discovery, Cancer Biology, Glycobiology, Computational Neuroscience, Natural product Lead Discovery, Bioinformatics, Sanitation Biotechnology, Bioconjugate Chemistry, Biomolecular Chemistry and Venomics.

DST/ TIFAC CENTRE OF RELEVANCE AND EXCELLENCE [CORE]

IN BIOMEDICAL TECHNOLOGY

The Amrita School of Biotechnology in Amritapuri is also approved as a Centre of Relevance and Excellence [CORE} in Biomedical Technology under the Department of Science and Technology, Government of India, TIFAC Mission REACH Program. The Centre aims at excellence in multiple dimensions by pioneering interdisciplinary education, research and industrial collaboration in Biomedical Technology. In doing so, the Centre strives to advance research, generate affordable preventive and therapeutic innovations to stimulate industrial growth and improve the human condition. One of the major projects of the Centre was to develop a low-cost, automated, insulin pump which was awarded a US Patent in October 2011. Further, the development of an amperometric glucose sensor for coupling with the insulin pump, in addition to a lab on a chip, have also resulted in numerous International publications and 6 US Patents.


The United States of America

The Director of the United States Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

David J. Kappos

CELL BIOLOGY AND BIOMEDICAL ENGINEERING

Principal Investigators:
Dr. Bipin Nair, Dr. Geetha Kumar

The focus of the laboratory involves:

1. Development of low cost Biomedical Devices and Diagnostics for the management of Diabetes.
   i. Design and development of an automated insulin pump which has resulted in the award of a US patent (USPTO No: 8,034,019 B2, Oct 11, 2011)
   ii. Development of low-cost non-enzymatic glucose sensors (US Patent)
   iii. Design and development of a Lab-on-a-chip device for simultaneous monitoring of multiple analytics
2. Understanding the molecular mechanisms underlying the regulation of Matrix Metalloproteinases (MMPs) and oncogenic signaling systems by Natural Products and dissecting the regulatory crosstalk between various activators and inhibitors of MMPs.
3. Studying the role of quorum sensing and biofilm formation in microbial pathogenesis and identify natural product inhibitors that block this process.
4. Understanding the link between bacteria and cancer progression.
5. Role of miRNAs in cancer and modulation of oncogenes by natural products.
6. Regulation of inflammation by natural product extracts: role in osteoclastogenesis.
7. Isolation and characterization of primary tumor cells and development of multicellular tumor spheroids.

Ongoing Projects

Project Title

- Centre of Relevance and Excellence (CORE) in Biomedical Technology
- Development of a Non-enzymatic Glucose Sensor and Glucometer
- Development of a Lab-on-a-Chip (LoC) for detection of Glucose, Cholesterol and Kidney Function
- Regulation of inflammation by natural product extracts: role in osteoclastogenesis/ Understanding the molecular mechanisms of inflammasome complex in regulating inflammatory signaling cascade and to identify natural product inhibitors that modulate the process
- Natural Product mediated regulation of MMPs and its implications in anti-cancer lead discovery/ Understanding the link between bacteria and cancer progression
- Quorom Sensing and Microbial Pathogenesis
- Role of miRNAs and natural products in cancer
- Cycloxygenase-1 in cancer and inflammatory diseases
- Isolation and characterization of primary tumor cells and development of multicellular tumor spheroids.

AMRITA-AGILENT ANALYTICAL RESEARCH LAB

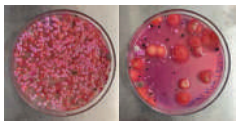
Principal Investigators:
Dr. Bipin Nair, Dr. Sudarslal S., Dr. Muralidharan V.

Co PI: **Dr. Jayashree G.**

Funded by Amrita Vishwa Vidyapeetham Supported by Agilent Technologies, Germany and Agilent Technologies, India

In a unique effort of its kind, School of Biotechnology in collaboration with Agilent Technologies has set up an analytical research lab with the vision to promote development of science education and a scientific mindset in the country. The group mainly focuses on the analytical method development techniques and a wide range of samples from small molecules, like chemical entities in plant extracts, to proteins and peptides are being analyzed and characterized. The center currently has the latest state of the art uHPLC and chromatographic separation system, which covers the range from analytical to semi-preparative scale. To identify a large variety of chemical and biological compounds, detection systems as UV VIS (Ultraviolet to visible spectroscopy), ELSD (Evaporative Light Scattering Detector) and MS/MS capable Mass spectrometry (ESI Ion Trap MS are used.

The latest addition to the lab's instrumentation is an Agilent 6540 Ultra High Definition (UHD) Accurate-Mass Q-TOF LC/MS system allowing up to 500 ppb mass accuracy and femtogram level detection sensitivity. The center provides its instrumentation capabilities and expertise to the in-house and external researchers to solve diverse research problems such as identification, characterization, and quantitation of natural products, metabolic intermediates, and proteome analysis related to various disease indications. The HPLC, the LC/MS, and the UV VIS systems are also used for education and training.



Soil sample from Cashew processing factory

Seeds from *Sesbania grandiflora*

Ongoing Projects

Project Title

- Development of chromatographic separation and detection techniques for natural products
- Mass Spectrometric Characterization of Bioactive Peptides and Proteins
- Isolation and characterization of protease inhibitors from plant seeds using LC-MS
- Biosurfactants of industrial interest from microbes of extreme environment
- Venom proteomics and antivenomics of medically important snake species- Funded by Amrita Vishwa Vidyapeetham and the Department of Health Research, Indian Council of Medical Research
- Identification and characterization of bioactive molecules from snake venom- Funded by Amrita Vishwa Vidyapeetham

ANTIMICROBIAL RESISTANCE (AMR) LAB

Principal Investigator:
Dr. Geetha Kumar

Co-PIs : **Dr. Jayalekshmi H., Dr. Aravind Madhavan., Dr. Pradeesh Babu**

AMR is a global health crisis faced by humanity today, with a significant impact on economy worldwide. Systematic analysis of global antimicrobial resistance (AMR) data from 2019 credits a group of only six bacterial pathogens responsible for 3.57 million of a total 4.95 million deaths associated with antimicrobial resistance globally. Three of these top six pathogens are the Gram-negative bacteria Acinetobacter baumannii, Klebsiella pneumoniae, and Pseudomonas aeruginosa. The need for innovative solutions to combat this silent pandemic are needed more than ever before. The primary research focus of the AMR lab at The AMRITA School of Biotechnology is on combating Antimicrobial Resistance using multiple approaches:

Ongoing Projects

Project Title

- Identification and characterization of novel anti-microbials targeting virulence
- Isolation, characterization and application of bacteriophages or cocktails of phages for environmental as well as potential clinical use – Phage Therapy
- Mutational analysis of the AMR genes of Gram-negative nosocomial pathogens
- Understanding Persistence and its role in antimicrobial resistance (AMR)
- Studying the inter-relationship between virulence and antimicrobial resistance
- Characterization of the filamentous (Pf) phages in regional clinical isolates of P. aeruginosa
- Design and development of Point-of-Care diagnostics for early detection
- Surveillance of sewage samples to study the emergence of antimicrobial resistance patterns using metagenomics, meta transcriptomics and metabolomic approaches coupled to AI/ML tools/algorithms
- Development of host-directed therapies

CANCER BIOLOGY

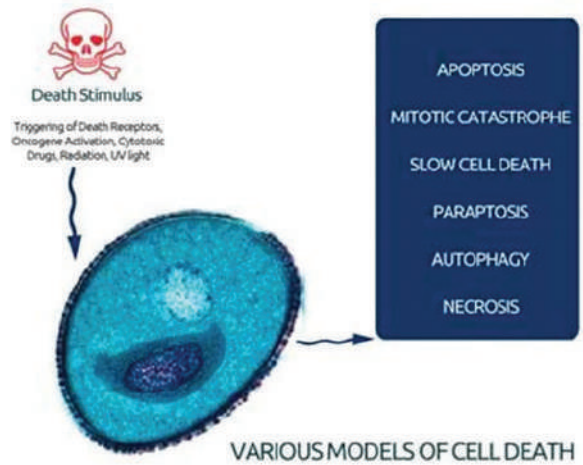
Principal Investigator
Dr. Nandita Mishra

Co PI: **Dr. Prashanth N. Suravajhala**

Paraptosis: a non-apoptotic cell death pathway to target cancer.

Many cancer cells develop resistance to the apoptotic signals and flourish in the system. We are trying to target these defiant cancer cells by inducing an alternative cell death pathway through natural products. There are several types of alternate programmed cell death pathways like Pyroptosis, Ferroptosis, Anoikis, Necroptosis, Paraptosis etc. We are focussing on Paraptosis, a promising casapase-independent programmed cell death for cancer therapy. With an objective to identify novel compounds inducing paraptosis we have screened a library of natural compounds and reported 6-Shogaol, Plumbagin and other compounds that induces paraptosis in different types of cancer cells like breast cancer, lung cancer, cervical cancer etc.

Paraptosis is characterised by extensive cytoplasmic vacuolation and swelling of the endoplasmic reticulum and mitochondria. The morphological and biochemical features of paraptosis are different from apoptosis and other alternate programmed cell death pathways. To find out different factors that trigger or regulate paraptosis, the crosstalk between paraptosis and other death pathways like apoptosis and autophagy and the potential use in clinical settings are our area of interest.

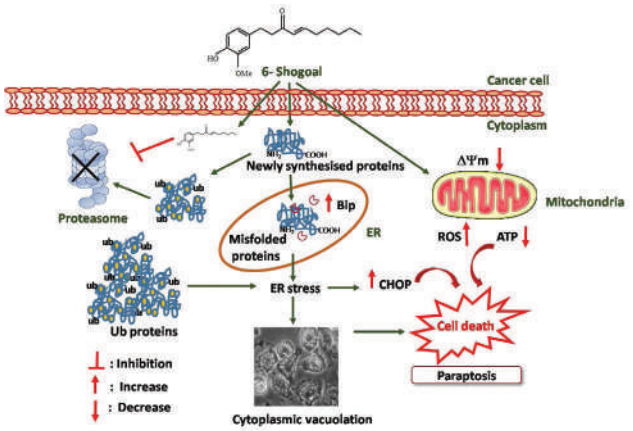


Proteasome inhibitors from natural products

The proteasome is a catalytic protease complex that takes part in the degradation of most cellular proteins including misfolded or damaged proteins to ensure normal cellular function. The ubiquitin-proteasome system (UPS plays an essential role in many cellular processes, including cell cycle progression, proliferation, apoptosis and angiogenesis. As the cancer cells keep dividing very fast, they have a higher rate of protein synthesis making them more sensitive to proteasome inhibition than normal cells. Proteasome inhibitors like Bortezomib (Velcade, PS-341), has been successfully used as anticancer drug. Moreover, inhibiting proteasome is one of the key strategies to induce paraptosis in cancer cells. Thus we also screen for novel proteasomal inhibitors from natural products for potential therapeutic use. We have reported two novel proteasomal inhibitors and their mechanism of action in cancer cells.

Cell proliferation assay on different types of electrospun polymeric nanofibers

In our lab, we have tested the in vitro cell proliferation and studied the growth characteristics of fibroblast cells on different types of electrospun polymer nanofibrous membranes. with potential for wound dressing and controlled anti-bacterial drug release. This is a collaborative study with Dr. Sujith A and his team, Material Research Laboratory, Department of Chemistry, NIT, Calicut



Ongoing Projects:

Project Title

- ***In vitro* assay of theranostic agents and nanoparticles**

Goal: Targeted delivery of drugs exploiting the tumour microenvironment

Most of conventional therapies cannot distinguish between tumour cells and normal cells. This nonspecific effect of various therapeutic agents may lead to the occurrence of varied types of side effects in cancer patients. The design of nanoparticles and nano theranostics that can specifically respond to the tumour microenvironment signal molecules like GSH, H2S or different receptors on the cancer cells can significantly reduce the side effects. This work is This work is in collaboration with Dr. Sankarprasad Bhuniya, Centre for Interdisciplinary Sciences, JISIASR, Kolkata.

- **Regulation of ER-phagy during Paraptosis.**

The endoplasmic reticulum (ER) being a key site for lipid biosynthesis and folding of nascent transmembrane and secretory proteins, maintain the homeostasis within the ER lumen is of utmost importance. ER-phagy is a selective form of autophagy that ensures the timely removal of damaged ER, thereby protecting cells from damage caused by excessive ER stress. What happens to ER phagy within the cell during paraptosis is being studied.

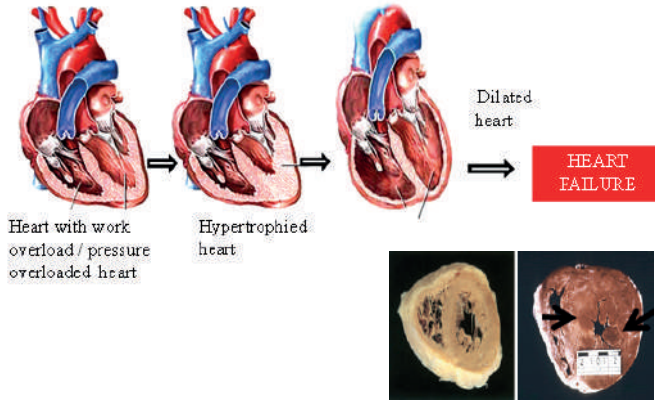
CELL CULTURE LAB

Principal Investigator
Dr. Vandana Sankar

CoPIs: **Dr. Chinchu Bose, Dr. Nandita Mishra**

Cardiovascular disease biology

The team focuses on cellular and molecular mechanisms underlying cardiac hypertrophy to identify various drug targets. Hypertrophy is an adaptive response of the heart which is characterized by an increase in wall thickness of the left ventricle. At the cellular level, it manifests as increase in cardiomyocyte size. Even though an initial adaptive response to sustain cardiac output, hypertrophy leads to heart failure in the long run. Since therapeutic options for cardiac failure are limited, it is appropriate to prevent the progression of hypertrophy to failure. Being a societal challenge, the studies are aimed to deliver possible solutions to address the issue. Studies involving therapeutic interventions using natural products also form an important component of the research. The team focuses on in vitro cell line approaches as well in vivo methods in the experimental designs.



Ongoing project:

Project Title

"Therapeutic targeting of autophagy in hypertrophied myocardium: potential effects of compounds from Desmodium gangeticum".

Funding agency: SERB, Govt.of India [SERB Power Grant (October 2022- October 2025), 30 lakhs]

Autophagy is a cellular homeostatic mechanism that involves lysosome dependent turnover of organelles / proteins. Preliminary work carried out by the PI indicates that efforts to target autophagy will be a logical approach in the treatment of cardiac hypertrophy. The ongoing project focuses on targeting of autophagy using compounds isolated from an indigenous plant, and study the end outcome on cardiac hypertrophy *in vitro.*

SYSTEMS GENOMICS AND STRUCTURAL BIOLOGY LAB

Principal Investigators:
Dr. Prashanth Suravajhala, Dr. Renuka Suravajhala

The core focus of Systems Genomics and Structural biology lab coalesces interests in the areas of bioinformatics aided functional genomics, third generation sequencing technologies with a focal interest on identifying candidate non-coding mutations for causality. The group has developed annotation-based methods in inferring the causal SNPs from sequence data for determining bona fidelity. The lab is interested in exploring the known unknown regions in the human genome, elucidating the mechanisms underpinning small molecular interactions through clinical exomes. The group has benchmarked pipelines and developed methods for systems genomic integration in lieu of the following:

Characterizing the uncharacterized regions in the genome: Develop methods for identifying regulatory regions, elements associated with diseased genes and proteins

Current Projects

Project Title

- Next Generation Sequencing (NGS) of rare disease genomics and CA Prostate.
- Systems Genomics of Vitamin K Pathways.
- LncRNA-protein interactions in ascertaining disease networks.
- Model and Design Drug loaded molecularly imprinted polymers.

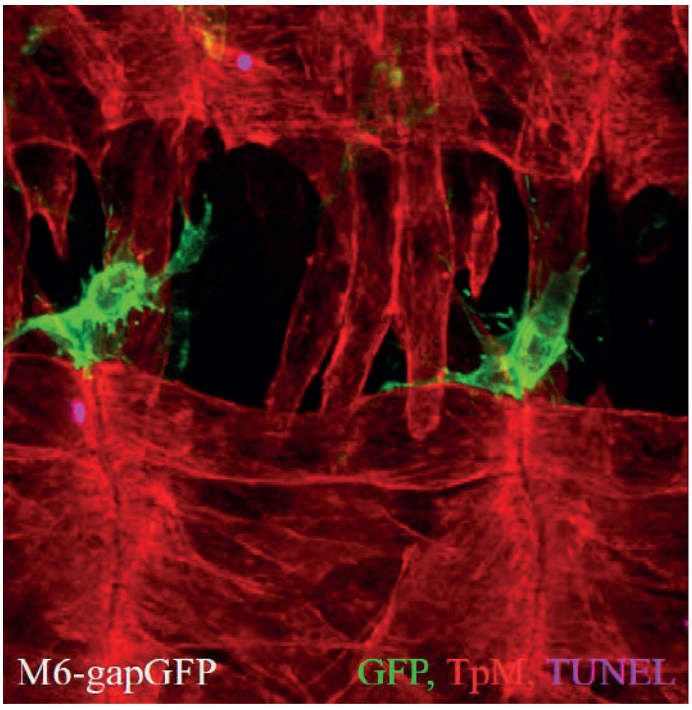
STEM CELL AND REGENERATIVE BIOLOGY LAB

Principal Investigator:
Dr. Indulekha C. L. Pillai

Cardiovascular diseases (CVDs) are the leading cause of morbidity and mortality worldwide. Understanding, managing, and preventing CVDs is, hence a primary unmet need in health science research. In our laboratory, we are working at the interface of interdisciplinary domains such as stem cell biology, immunology, and bioengineering to develop novel therapeutic strategies against CVDs. Injury in the adult heart leads to loss of functional cardiomyocytes (the beating cells). Since the human heart does not have robust regenerative ability, it heals primarily by forming non-functional scar tissue (fibrosis). Excess fibrosis occurs due to the activation of immune response triggered by the loss of cardiomyocytes and leads to progressive heart failure. Studies are ongoing to understand how immune response following an injury modulates regeneration (formation of new functional cardiomyocytes) vs. fibrosis.

Aging, damage, and metabolic diseases can lead to calcification in the cardiovascular system. Calcification is an active cell-mediated process where bone forming cells (osteoblast progenitors), mature and differentiate to induce mineralization. This leads to mechanical or electrical block in the conduction system of the heart, causing arrhythmias. We have recently shown that cardiac fibroblasts in the adult heart adopt an osteoblast-like fate and induce mineralization in the heart (Pillai et al. Cell Stem Cell, 2017). Currently, there are no treatment modalities available to treat cardiac calcification. We are investigating the molecular regulation of cardiovascular calcification to develop better therapeutic options.

Thus, using stem cells, bioengineering principles, and high-resolution imaging, we are exploring the molecular mechanisms modulating regeneration, fibrosis, and calcification in the heart. Our ultimate goal is to augment regeneration of the adult heart to produce a better functional outcome.



Ongoing Projects:

Project Title

- Innate immune regulation of cardiac regeneration
- Molecular Regulation of Cardiac Calcification and fibrosis

ARTIFICIAL INTELLIGENCE FOR BIOSCIENCES LAB (AIBS)

Principal Investigators:
Dr. Nidheesh M.

CoPIs: **Dr. Geetha Kumar, Dr. Pradeesh Babu, Dr. Anu Rohit Melge**

The AIBS Lab at Amrita School of Biotechnology is dedicated to advancing the field of applying the deep learning approaches for drug discovery, bio-entity recognition using BioNLP methods, predictions related to anti-microbial resistance and microbiome analysis. This cutting-edge research lab brings together experts in AI, biotechnology, and medicine to tackle some of the most pressing challenges in healthcare.

Ongoing projects:

Following are some of the projects carried out at AIBS Lab.

Biomedical Named Entity Detection and Relation Detection - BioNERD

This project invovle developing open-source cross-platform application for automated biomedical information extraction for Named entity detection and relation detection. It is a Plug'N'Play state-of-the-art models for extraction of all biological information from open access literature from the web. The is capable of representating extracted information in an easy-to-traversable data structure, such as a knowledge graph.

AI for Drug Discovery - Develop a GNN model that can optimize over multiple parameters simultaneously for drug discovery

The objective of this project is to develop GNN based Deep-QSAR models for predicting various endpoints including ADMET properties, Physicochemical properties, Medicinal Chemistry etc. It involves developing a scoring function for each type of end point to use as discriminator for generative model. In this model, the proposed deep generative model can optimize over multiple parameters simultaneously. This approach has the potential to greatly accelerate the drug discovery process, leading to the development of new treatments more quickly and cost-effectively.

AI for Combating AMR

In addition to drug discovery, the AIBS Lab is also working to address the growing problem of anti-microbial resistance. Antibiotic-resistant bacteria pose a serious threat to global public health, and the lab's researchers are using AI to identify new strategies for fighting these superbugs.

In one of the projects, we intend to develop a deep learning model to predict the antimicrobial phenotypic profiles of salmonella typhi from whole genome data of S.Typhimurium using transfer learning approaches. In one another project related to AMR Surveillance, the objective is to create deep learning model for the prediction of antibiotic emergence with an in-house developed Lab-on-Chip device.

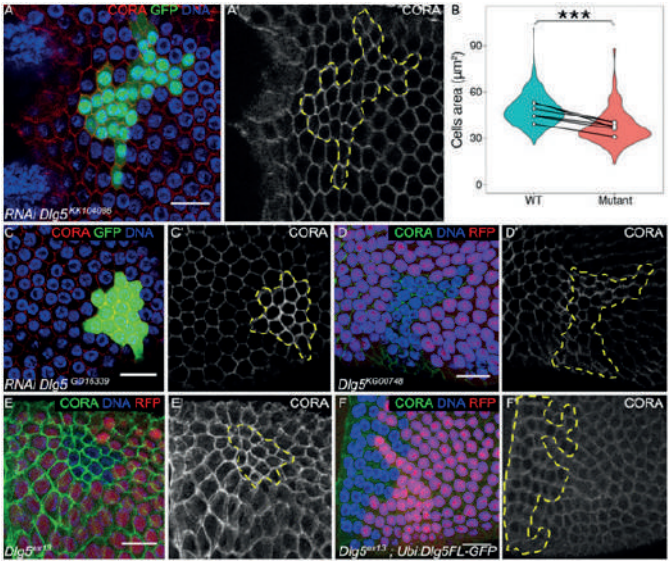
Overall, the AIBS Lab represents a major step forward in the application of AI for Biosciences and medicine, and has the potential to transform the way we approach drug discovery, anti-microbial resistance, and biomedical information extraction.

DEVELOPMENTAL BIOLOGY LAB

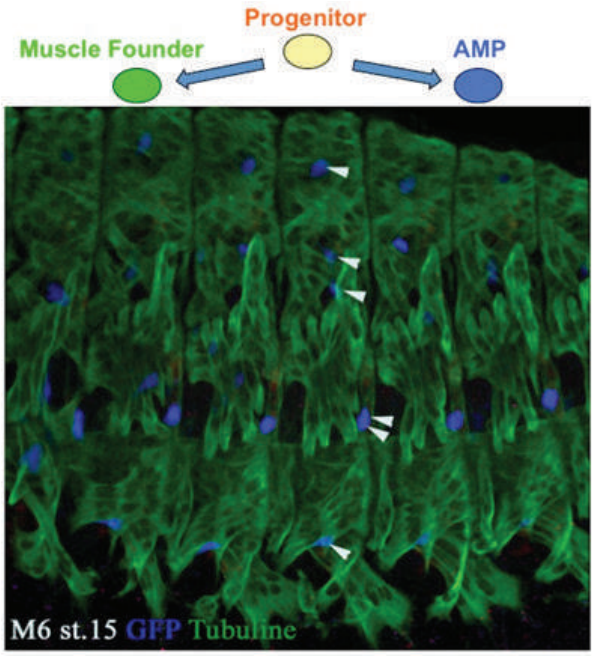
Principal Investigators:
Dr. Rajaguru Aradhya., Dr. Parvathy Venugopal.

We use Drosophila melanogaster commonly known as fruit flies to understand different aspects of developmental biology. We use tools like Developmental Genetics and Transgenic animals for dissecting the molecular processes regulating mesodermal derivatives in Drosophila.

Genes that control epithelial growth and morphogenesis play an important role in normal and cancer development. An epithelial- mesenchymal transition (EMT) allows a polarized epithelial cell to undergo biochemical changes that allow it to assume a mesenchymal phenotype. EMT occurs during normal development and during tumor progression. What are the important differences between normal and pathophysiological EMT. In our lab we aims to understand the signaling machinery within the epithelial cells that coordinates EMT through studying the function of certain genes involved in epithelial growth and polarity in normal and cancer cells.



We are also interested in dissecting the mechanisms regulating the regenerative capacity of adult stem cells. Adult stem cells undifferentiated cells in the different tissues of the adult body and are crucial for repairing the damaging tissue. However the mechanisms that regulate the quiescence, respond to injury, proliferation initiation is poorly understood, and they have not been successfully utilized in regenerative therapy compared to embryonic stem cells. Adult muscle stem cells in Drosophila display similar properties in maintaining quiescence and regeneration of the muscles during metamorphosis. We aim to study the molecular mechanisms governing these processes and get the broader insights in understanding the conditions that regulate the proliferation of muscle stem cells during tissue repair. This would greatly enhance the approaches that we could use to treat the various muscular degenerative diseases in humans. The data obtained from the Drosophila studies will be extended to the stem cell derived in vitro skeletal muscle system, degenerative muscular disease patient samples and mouse models



Ongoing projects:

- Cell polarity and morphogenesis: Cell polarity and adhesion plays key role in maintaining tissue architecture and are fundamental aspects of development. We try to understand the genes that control epithelial growth and morphogenesis that play an important role in normal and disease conditions. For this we use Drosophila and Mammalian cell culture models.
- Stem cell regeneration: Stem cells present in adult body need to be recruited to the site of injury for efficient repair and regeneration. Apart from some tissues like skin, liver, other tissues in humans show very poor regenerative capacity compared to other lower vertebrates. We aim to understand the mechanisms that could enhance regenerative capacity in humans using different adult and embryonic stem cells as in vitro models.

Prof. ASOKE BANERJI ADVANCED PHYTOCHEMISTRY LAB

Principal Investigator:
Dr. Chinchu Bose

The Phytochemistry group is engaged in multidisciplinary research. Molecular diversity is the essence of all drug discovery programs. Natural products are nature's storehouse of molecules with wide range of chemo-diversity. Research in the Laboratory is directed towards the exploration of natural wealth in search of novel bio activities.

A brief account of the activities are given below.

- Bio-prospection of indigenous flora: Bio-prospection of indigenous flora led to the identification of about a dozen plants with remarkable bio activities. The bio assay-directed isolation is followed by molecular characterization. The rich biodiversity of Kerala is extensively quested for obtaining lead compounds with wide ranging activity implication on biological system.
- Value addition to unutilized / underutilized plants: Locally available wide range of underutilized or waste plant products are potential source of nutraceuticals/ phytochemicals. Some of the phytochemicals isolated have commercial value. Studies on cashew nut shell liquid, peels of onion, marigold flowers, coconut shell, Jackfruit seeds, sawdust etc., resulted in isolation of high value bioactive compounds such as anacardic acids, ecdysterone, plumbagin and oxyresveratrol. These compounds provide excellent templates for further elaboration of structural modifications. This approach creates value addition to underutilized and waste products with commercial and social benefit.
- Green and eco-friendly methods for isolation of bioactive compounds: Methods with simple and rapid steps have been developed for purifying compounds from mixtures eg. anacardic acid, cardol, cardanol from cashewnut shell liquid, plumbagin from *Plumbago rosea*, quercetagetin from *Tagates erecta* are some of the compounds isolated and purified using the appropriate methods developed in the lab.

- Indigenous formulation and agro products: The enriched products obtained from the experimental studies are used for indigenous product development. Insect growth regulator (IGR) formulations developed from local plant sources for synchronized moulting of silk worms, Method optimised for obtaining commercially important "SBT flavones" from seabuckthorn leaves, An ecofriendly formulation for patina removal from a local wasted fruit are few examples. Identification of antifungal components against riceblast disease in paddy and *Fusarium oxysporum* which is one of the major pathogen causing soft rot of rhizome in ginger.

Ongoing Projects:

Project Title

- Therapeutic targeting of autophagy in hypertrophied myocardium: potential effects of compounds from *Desmodium gangeticum.*
- Fish feed development from underutilized *Artocarpus heterophyllus* jack fruit seeds.
- Value-addition to Seabuckthorn through isolation and characterization of pharmacologically active compounds
- Pheromones: Hacking into chemical communication. Exploring the possibilities of application of pheromones in various agro and biological challenges (animal human conflicts).
- Exploring the under explored marine natural wealth and their repository development
- Identification of sustainable secondary metabolite sources against common fungal pathogens affecting commercial agriculture crops.
- Phytochemical analysis of plant waste produced from Ayurvedic industries, studies on phytochemical variations in Ayurvedic formulations, Impact of shodhana on Ayurvedic formulations.

BIOMOLECULAR CHEMISTRY LAB

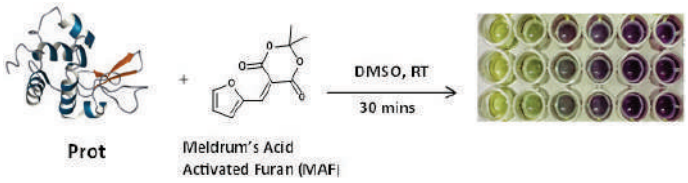
Principal Investigators:
Dr. Sobha. V. Nair, Dr. Jayashree G.

CoPIs: **Dr. Sudarslal S., Dr. Jayalekshmi H.**

Funded by Amrita Vishwa Vidyapeetham

Biomolecular Chemistry group focuses on

- Proteins involved in bacterial pathogenesis.
- Covalent modification of biopolymers for protein chemistry applications
- To evaluate protein chemistry and molecular interactions of biologically important proteins from multiple sources to elucidate their significance in industry/research and to amend the features and quality of these molecules by the use of genetic and protein engineering tools.
- Synthesis of New Chemical Entities and analysis of their efficacy as antimicrobial, antibiofilm, antivirulent and anticancer agents.
- Lectin-sugar biochemistry as a tool for Glycoprotein/ Glycan profiling



Patent No: US 11,125,754 B2

Ongoing Projects:

- Investigating the role of new mycobacterial proteins in pathogenesis
- Bioconjugate chemistry to develop chromatographic resins for protein purification, assays for protein estimation and visualisation.
- Characterising the Marine algal endophytes.
- Synthetic Heterocyclic compounds as antimicrobial/ antiquorum sensing agents.

SANITATION BIOTECHNOLOGY

Principal Investigator:
Dr. Sanjay Pal, Dr. Ajith Madhavan

Sanitation Biotechnology is directed towards developing appropriate strategies to control infection & smell for the safe reuse & valorisation of water & organic wastes. The focus area primarily includes disinfection and malodour mitigation by using bacterial consortium and bacteriophages in wastewater treatment and reuse in decentralised sanitation systems: vertical garden, hydroponics, and aquaponics models.

Ongoing Projects:

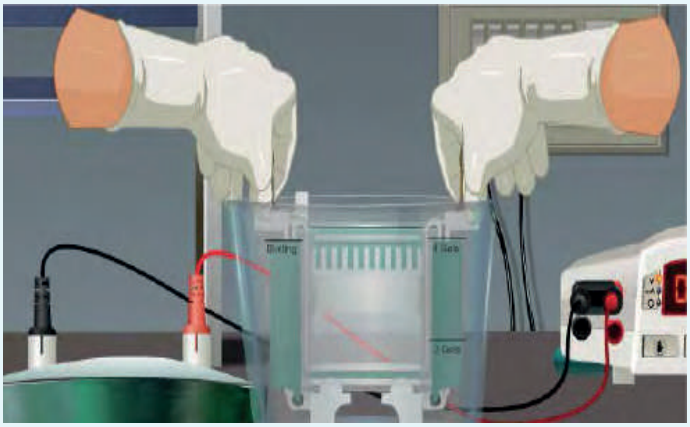
- Bacteriophage-based mitigation of malodour and infection in domestic wastewater
- Fertigation as a strategy for the bioremediation of nutrients and heavy metals from wastewater
- Vertical garden for wastewater treatment and re-use
- Development of sanitary textiles including sanitary napkins and geriatric products
- Sustainable biocontrol agents for management of waterborne pathogens using fungal metabolites
- Synbiotics interaction in improving tolerance regime of probiotic strains
- Valorisation of plant - based biomass waste for animal feed

Advantage **AMRITA**

A premier institution for higher education and research in Life Sciences in India under the aegis of Amrita Vishwa Vidyapeetham

- Faculty members with extensive industry and research experience from India and abroad.
- Curriculum in alignment with the latest NEP guidelines.
- The syllabus with choice-based credit system, also places a significant emphasis on research with societal impact, geared towards academia and industry.
- Unique opportunity to obtain dual degrees from Amrita and University of Arizona, USA simultaneously
- Excellent placement record - Our students have secured positions in premier pharmaceutical and biotechnology companies as well as leading national and international research institutions such as Merck Lifescience, Sun Pharma, Thermofisher Scientific, LabCorp India, Icon PLC, Saint Gobain, Hindustan Unilever.
- Well-equipped laboratories for the different labs are Genetic engineering, Biochemistry and Enzymology, Cell and Molecular biology, Immunology, Industrial Biotechnology, Food Microbiology, and Medical Bacteriology with advanced instrumentation.
- Spacious smart classrooms, auditorium, seminar and conference halls.
- AUMS, an integrated system that enables easy access to data, reports and statistical analysis of student progress along with a parent portal.
- State-of-the-art IT infrastructure with over 5000 computers connected with High-speed 150 Mbps internet, using Wi-Fi mesh network in the campus, along with dedicated email and file server facility for both students and faculty members.
- Library and reading room with access to contemporary online digital libraries, international editions of books and journals.
- Excellent sports facilities including gymnasium, swimming pool, volleyball, basketball and badminton courts.
- Disciplined and serene campus environment set in the midst of famous Kerala backwaters, providing an excellent ambience for learning and overall growth.
- Potential for active collaboration with faculty of top US universities.
- Excellent collaboration with various top Indian Research Institutes facilitates students in carrying out their research projects at internationally reputed organizations / establishments including Biocon Limited, National Centre for Biological Sciences (NCBS), Indian Institutes of Technology (IIT), Institute of Genomics & Integrative Biology (IGIB), Institute of Bioinformatics (IOB), Regional Cancer Centre (RCC), Tata Institute of Fundamental Research (TIFR), Indian Institute of Science (IISc), Agilent Technologies etc.

Virtual Amrita Biotechnology Laboratories **(VALUE @ AMRITA)**



Amrita Virtual Biotechnology laboratories include 300+ online experiments and is a new kind of experimental science that is being established as virtual simulation-based laboratories. In partnership with the Government of India's Sakshat initiative of the Ministry of Human Resource Development, the Amrita Virtual Labs, focus on helping students retain the real feel of a laboratory, while conducting the experiment from an internet-enabled computer terminal, much in the same way as is done, in a real lab. In our current phase of this project that started off in 2009, we are developing two new laboratories for data science and biosignals analysis for students in biosciences, engineering and biotechnology. This is the third phase of this National Mission Project in collaboration with IIT Delhi, IIT Bombay, IIT Kanpur, IIT Kharagpur, IIT Guwahati, IIT Roorkee, IIT madras, IIIT Hyderabad, NIT Karnataka, Dayalbagh Educational Institute and COE Pune.

vlab.amrita.edu

ALUMNI SPEAKS

A. ACHUTHAN

[B.Sc. Microbiology (2014-2017); M.Sc. Microbiology (2017-2019)]

(Post Doctoral Research Associate, Oklahoma State University, USA)

Amrita School of Biotechnology has always been a second home for me. The care and attention given by the faculty and staff to individual students was much unexpected before coming here. ASBT is the place one could find an amalgamation of learning, fun, culture, lore, literature and many such life preaching activities. The school culminates in all of its curricular activities and that might be the reason why the passed-outs being recognized and endorsed when compared to other institution students. The school not only helped me in becoming a good scientist but was also successful in inculcating some good values in me. There are no words to express my gratitude to be a part of this wonderful Institution.

ABHIJITH K.

[B.Sc. Biotechnology (2011-2014); M.Sc. Biotechnology (2014-2016)]

(Post Doctoral Fellow, Princess Margaret Cancer Centre, Toronto, Canada)

Being at Amrita changed my life a lot. I was quite decided on taking Biotechnology for my future studies after my secondary school, but then choosing the right institute was a difficult job. The right decision was made which was proven in the later years. At Amrita, I always felt at home. Amrita while providing the best learning and research experience also gave opportunities for interaction with the experts in different fields of science. Amrita nurtured the enthusiasm for taking my life ahead towards the research world. The handful of experiences that an Amritian gets in his/her life at Amritapuri will pave a strong foundation for their future. Every Amritian will not only be experts in the field that they studied but also will be experts in making a useful life, a great nation and shaping the mankind.

Dr. JYOTSNA NAMBIAR

[M.Sc. Biotechnology (2007-2009); Ph.D. Biotechnology (2010-2016)]

(Post Doc, University of Southern Denmark, Denmark)

At the Amrita School of Biotechnology, I discovered an ideal equilibrium between acquiring knowledge and fostering a sense of purpose and service in life. The school's warm, welcoming atmosphere and a strong sense of community were unparalleled experiences for me. Engaging, thought-stimulating lectures and scientific discussions sparked my passion for pursuing a research career. Amrita served as the roots of my personal and academic growth, providing a solid foundation and stability. The value-based education and various service initiatives offered by Amrita directly contributed to my holistic development. These experiences allowed me to balance my career aspirations with a positive perspective on life and its challenges. In essence, the transformative environment at Amrita has been instrumental in shaping who I am today, instilling in me the importance of giving back to the community through a unique blend of academic excellence and service-oriented experiences.

ANANTHU A I

[B.Sc. Biotechnology (2013-2016); M.Sc. Biotechnology (2016-2018)]

(Scientist, Evotec, London, UK)

Life at Amrita School of Biotechnology is always going to be one of the most cherished memories of my life. The concept of 'Education for Living' and 'Education for Life' followed here is unique and exclusive. There are very less Institutions across the country which can deliver you a real purpose of knowledge along with Quality education. The care & attention provided by the staff and the well-experienced faculty members have facilitated me to grow as a better being both professionally and personally. The peaceful atmosphere and the wonderful infrastructure facility catered here is the best a student can ask for. I always feel the decision I took to join Amrita for studies is providential and I am glad that it turned out to be a right one. I feel proud to say that I belong to this amazing Amrita family

VINEETH V.

[B.Sc. Biotechnology (2011-2014); M.Sc. Biotechnology (2014-2016)]

(PhD Scholar, InStem, NCBS, Bangalore)

First of all, I don't like to be called an alumni of Amrita School of Biotechnology. The very utterance of the word 'alumni' gives me a feeling that I am out of ASBT, that I don't belong here anymore. I still believe that I am a part of ASBT, and thinking otherwise is agonizing. The five years of my ASBT life was an experience, which I would like to cherish forever. It transformed my life and played the most important role in shaping my career. The knowledge, values and above all the friends that I gained from ASBT will always be one of my prized possessions. The highly qualified faculty, along with their friendly nature have instilled a passion for science in me. I am extremely proud to be a part of ASBT family.

VINAYAK A. K.

[B.Sc. Microbiology (2007-2010); M.Sc. Biotechnology (2011-2012)]

(Application Scientist, Agilent Technologies, India)]

Amrita School of Biotechnology is like a second home to me and the faculty members and staff are like family members. One of the most important and valuable lessons that I have learned at Amrita is "How to live in a competitive and stressful corporate world with a smile on your face". Besides providing valuable advice and motivating the students, the teachers at ASBT are well experienced, friendly and approachable. I am extremely lucky to have spent 5 years in such a vibrant learning environment. I would like to express my sincere love and respect to all the faculty members - especially to our Chancellor Amritanandamayi Devi.

Dr. SANU K. SHAJI

[M.Sc. Biotechnology (2010-2012); Ph.D. Biotechnology (2013-2021)]

(Research Associate, Division of Immunology, Department of Pathology, University of Cambridge, UK)

The postgraduate and doctoral programs at ASBT provide a diverse, inclusive, and research-intensive learning environment. When I look back, it is amazing to see how much I have changed during the past ten years of my life in ASBT. Before starting my studies in Amrita, I had no idea about independent academic research. My views towards the research were re-shaped by the training I got in ASBT. I also benefited from a great cohort of supportive and bright colleagues who made the journey even more rewarding. My research benefited immensely from the guidance of my teachers, who supported my interest in this field and encouraged me to develop my critical perspective. I am very thankful for the encouragement and support of the faculty and staff members of ASBT.

IVY ROSE SEBASTIAN

(BSc Biotechnology (2013–2016) MSc Biotechnology (2016–2018)

(Ph.D Researcher at University of Natural Resources and Life Sciences, Vienna, Austria)

When I joined the Amrita School of Biotechnology (ASBT) fresh out of high school, I was unsure of my career prospects as Biotechnology, unlike Medicine or Engineering, was not one of the conventional choices of study. However, over the years that I have spent at ASBT, I can confidently say that choosing this course was one of the best decisions that I have made and I am proud to say that I have pursued it at one of the premier institutions in India. The syllabus and course structure covered for both the Bachelors' and Masters' programs are extensive and up-to-date with the current advancements in the field. Moreover, I was blessed to have faculty who nurtured and paid attention to my growth as a researcher. I had professors who would advise me to read a particular scientific paper or study for a particular exam - in short, they have an avid interest in seeing their students succeed in life. Also, having spent five years at ASBT, my college experience is peppered with memorable instances with friends who have become family.

Studying at ASBT has induced a positively cumulative effect for my future career prospects. During the first year of my Masters', I was selected for an internship at University College Dublin (UCD) due to a Summer Research program between Amrita and UCD and following this, I did my final year project at UCD. The six months I got to spend in Ireland as a result of this program gave me an insightful learning experience, further reaffirming my career choices. I owe all my success till date to Amrita and to my professors who took a special interest in making sure I worked to my full potential.

PLACEMENTS

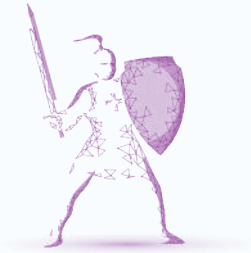
"Well begun is half done", observed the Greek philosopher Aristotle. In consonance with this calling, our graduating students who confidently step out through the portals of our School have consistently been hired into premier research institutions or pharmaceutical/ biotechnology industry. Yet others have been successfully admitted into coveted doctoral programs in India or abroad.

A few examples of our successful placements include positions at the Indian Institutes of Technology (IITs), Indian Institute of Science (IISc), National Centre for Biological Sciences (NCBS), Centre for Cellular and Molecular Biology (CCMB), University of California, Cellworks Research India Private Limited, Biocon Limited, Lupin Limited, Agilent Technologies, Merck, Labcorp, Sun Pharmaceutical Industries Ltd and ThermoFisher Scientific amongst many others. Our highly motivated faculty members are dedicated to training our students to aim for the best in science and in life. Needless to say, this has translated into our School's stellar placement track-record that we are proud of today.

The M.Sc. students spend the last semester in a reputed academic or industrial research laboratory, involved in design and execution of a research project, giving them an added advantage for job opportunities.

BIOCREST

The Amrita School of Biotechnology, Amrita University and CHARM, [Collaborative to Halt Anti-Resistant Microbes] University of California, San Diego [UCSD], along with Bugworks Research, Bangalore and CCAMP, Bangalore, are hosting a three day Online Symposium entitled "Man vs Microbe: AMR— The Race of the Century



CAMPUS **INFRASTRUCTURE & AMENITIES**

Hostel Facilities:

Our hostels, separate for boys and girls, are located within walking distance, a few hundred meters from the School. Students are provided with adequate facilities to make them feel at home. A modern central kitchen operates in the campus, providing pure vegetarian food prepared under hygienic conditions. Hostel life enables them to imbibe a healthy life-style and participate in activities including yoga, meditation, sports, music, etc., which are conducive for leading a balanced life of work and play. Intake of tobacco in any form and any other intoxicants is strictly prohibited. Students learn to take care of their personal needs and grow in a nurturing environment. All students are required to live on campus; however, students staying with their parents within a 30 kms radius of the College may commute to the School.

Laboratories:

Well-equipped Microbiology, Biochemistry and Biotechnology laboratories along with Tissue culture facilities, Microscopy room and a state-of-the-art instrumentation room.

Medical Facility:

Qualified medical and paramedical personnel including doctors, nurses, pharmacists and an ambulance are available in the campus medical clinic. An Ayurveda hospital also functions in the campus.

Transport:

College buses pick-up and drop day-scholars from specified locations within 30 kms from the campus.

Canteen:

Day scholars, staff members and guests can avail themselves of this facility. Students living in the hostels may also make use of this canteen for additional refreshments.

Library:

A large collection of over 8,000 international books and journals is available for reference in the library which is open to staff and students. Students and staff can access the online archives while on campus.

Banking:

An extension counter of the Dhanalakshmi bank is conveniently located in the campus and functions on all working days. Services include personal banking facilities and a 24 hour ATM facility.

ICTS:

Information and Communication Technology Services (ICTS) provides computing and all related facilities including 2000 computers and nearly 20 high end servers, Network implementations and Wi-Fi networks, E-Learning amenities, campus PABX functions and administrative supervision over UPS.

Sports Facilities:

Playgrounds with volleyball, basketball and badminton courts, facilities for indoor games like table tennis and chess are available.

Store:

The General Store caters to requirements for stationary, toiletries, provisions, etc. The store also stocks publications, audio/ video cassettes, herbal/ayurvedic products, etc. produced by the Mata Amritanandamayi Math.

Gymnasium:

An International standard gymnasium equipped with multi-purpose machines for cardio workouts and strength training, coaching for power-lifting, weight lifting and body building. Counselling offered in fitness, weight loss and nutrition.

Yoga:

Yoga and meditation classes are conducted under expert guidance. In addition, the students have the option of attending evening prayers at the Mata Amritanandamayi Math, which is a means for mental relaxation and rejuvenation.

Photocopying Facility:

Photocopying facility is available at a nominal rate.

CO-CURRICULAR / EXTRA CURRICULAR ACTIVITIES -

CREATOME

Most life science students are sure to come across a genome, proteome or metabolome at some point or the other over the course of their studies. But now we at Amrita School of Biotechnology have a new word to add to that list. “CREATOME”, a cornucopia of creativity and ideas. A student driven club that acts as a platform to showcase the fabulous array of talents that the students of our department possess. We have 7 wings – Performing Arts, Non-Performing Arts, Literature, Sports, Multimedia, Science, Values for Life that broadly represent most of the activities that take place at Amrita School of Biotechnology. CREATOME hopes to inspire creativity, ingenuity, team spirit, confidence and individuality in our students and help them prepare to take on the big bad world

Visit
creatome.in
to know more

Extension Activities

Cultural

Amritakalotsavam, our annual arts festival gives tremendous opportunities for students to be creative and exhibit their artistic talent. Cultural festivals like Onam, Vishu, Christmas and Gokulashtami are also celebrated with great élan in the campus.

Science wing

We are committed to bringing out the best in each student. The science club kick-started with the notion of developing young scientists who will be a promise to the future generation. Paper presentations, working models, hypothesis building are a part of the club’s activities. In addition to this, the students are also encouraged to come up with innovative ideas to bring scientific and effective solutions to the major problems plaguing the globe.





Catalyst

Research is an integral part of scientific learning. Creatome aims to expand the research capabilities of our students through the “Catalyst” initiative. As the tagline suggests, we strive to “Hasten Progress”. Launched under the Science WIng of Creatome and inaugurated by our beloved Dean, Dr. Bipin Nair, Catalyst is both a platform and a guide to help the students to expand their wings in the field of research. We provide timely notification of prestigious fellowships and internships across the country and provide first-hand aid to students to successfully apply for the scholarships.

Arts

To instil a deep appreciation for various art forms, to build the cognitive skills and enhance ones emotional quotient, arts have always played a significant role. The club aims to bring up the creative skills of students, to hone their talents and to rediscover their skills. A plethora of activities from doodling, painting, and other varied forms of dance and music will surely be a visual treat.

Sports

The sports clubs aim to bring supple physical development and a deep sense of involvement and team spirit among the participants. In addition to this, the students are taught to remain in a sense of equanimity during success and failures thereby helping them to accept the challenges of life in a calm and composed manner. A wide variety of sports ranging from cricket, football, basketball and athletics are focused on the major run.

Literature

To build the language and communicative skills among students teachers and society, the club aims to bring up and transform one’s skills in literature. It also provides an opportunity to decipher the various forms of culture that a particular country is affiliated with, thereby bringing a deep understanding of various cultures that exist around the world.

Green Initiatives

In ASBT, we are committed to Mother Nature for sustaining our lives. On that note, various innovative ideas, clean-up drives, awareness campaigns are regularly conducted as part of the green initiative campaign to instil the necessity of sustaining Mother Nature, which is not just inevitable for our lives but also for the upcoming generation.

Amrita Yuva Dharma Dhara (AYUDH)

AYUDH, the International youth movement of Mata Amritanandamayi Math, is active in Europe, North America, Asia, Australia and Africa. AYUDH seeks to empower young people to integrate universal values into their daily lives. Starting with themselves, AYUDH wants to help establish a future of hope, peace and social engagement while maintaining an awareness of spiritual principles.

AYUDH stands for Amrita Yuva Dharma Dhara, a Sanskrit term which means “the youth which perpetuates the wheel of dharma (righteousness)”. In Sanskrit AYUDH also means Peace, which is symbolized by the dove in the logo. AYUDH was founded in 1985. AYUDH is currently active in four domains:

Social Service
Personal Development
Intercultural Exchange
Green Initiatives

How to reach **AMRITAPURI**

Amrita School of Biotechnology is situated in the beautiful Amritapuri campus, which is nestled in the picturesque village of Vallikavu beside the scenic backwaters of peninsular India.

TRAIN AND BUS

Kayamkulam (12 km north of Amritapuri) and Karunagapally (10 km south) are the closest towns to reach. Auto-rickshaws can bring you to Amritapuri premises.

There are regular buses from Kayamkulam Railway Station (KYJ) to the foot of the Amrita Setu bridge. From the Trivandrum Transport Bus-Stand, one may board a bus going towards Ernakulam via Kollam and alight at Karunagappally. From Karunagappally, a bus going to Vallickavu Junction can be taken, which is about a five-minute walk from the campus. From the Ernakulam Transport Bus-Stand, one may board a bus going towards Trivandrum via Alappuzha, and alight at Ochira. From Ochira, an autorickshaw can be taken to bring one directly to Amritapuri, which is 6 km away from Ochira. Or one may board a bus going to Vallickavu Junction, which is about a five-minute walk from the campus.

AIR AND TAXI

The two closest airports are in Trivandrum (110 km south of Amritapuri) and in Cochin (140 km north). At the airport you may go to the “Airport Taxi Service” counter and ask for a prepaid taxi to “Mata Amritanandamayi Ashram” at Amritapuri.

The journey from Trivandrum takes about three hours and the journey from Cochin takes about four hours. You can ask to come by the “Beach Road” from Karunagappally. This road crosses the backwaters by a road bridge and brings you directly into the ashram premises. Otherwise you will be dropped off in Vallickavu, from where you can cross the backwaters over Amrita Setu, the ashram’s pedestrian bridge. If you find yourself on the other side of the backwaters with heavy luggage you may also take a hand-poled boat across the backwaters.

BOAT

(The Government of Kerala is operating the boat service the whole year, except June 1 to August 31)

Amritapuri to Aalapuzha : Daily boat
Departure : between 13:00 and 13:30
Arrival : around 18:30
Aalapuzha to Amritapuri : Daily boat
Departure : around 10:30
Arrival : between 15:00 and 15:30
Amritapuri to Kollam : Daily boat
Departure : between 15:00 and 16:00
Arrival : around 18:30

EMBRACING THE WORLD

Embracing the world (ETW) is a global network of regional humanitarian organizations inspired by the India-based humanitarian initiatives of Math Amritanandamayi Math (MAM)

(an NGO with Special Consultative Status to the United Nations)

Empowering Women

Embracing the World has provided more than 100,000 economically vulnerable women throughout India with vocational training, start-up capital, and marketing assistance, as well as access to microcredit loans from government-regulated banks and affordable insurance plans. The women use these assets to form self-help groups, share microsavings accounts, and start their own home-based businesses. For many of the women, it is the first job they have ever had. Empowering women in this way has proven to be one of the most effective strategies for reducing poverty throughout entire communities.

Education for Everyone

Embracing the World places a high priority on guaranteeing the opportunity of education for all ages. From its literacy and vocational training for India's indigenous tribal population to its scholarship program supporting 100,000 of India's poorest children – girls and boys – all the way toward obtaining a university degree, Embracing the World is working to ensure that knowledge remains the birthright of all humankind.

Disaster Relief

Since 2001, Embracing the World has been quick to respond to natural disasters. Most well-known for its $46 million Tsunami-Relief Project, our volunteers have been at ground zero in several of the decade's most devastating natural disasters, from the 2001 Gujarat Earthquake to Hurricane Katrina in the United States to the 2011 Japan Earthquake and Tsunami, where thousands of lives were lost. With a dual focus on rapid response and extensive long-term rehabilitation, Embracing the World has developed a reputation for being first on the scene and the last to leave – long after the spotlight has faded away.

Homes & Slum Renovations

Embracing the World believes that everyone in the world deserves to sleep without fear. It is this belief that has propelled ETW's massive homes for the homeless program. To date ETW has relocated over 1600 families from wretched slums into newly constructed apartment blocks and built more than 45,000 homes for the homeless in over 75 locations across India. ETW has helped more than a quarter of a million people move from the streets or inadequate shelters into the safety and comfort of their very own home.

Fighting Hunger

Embracing the World feeds more than 10 million people annually throughout India, and distributes uncooked rice, milk and other staples to deeply impoverished communities. Along with food distribution, our centers often provide free, specialized medical services. In 50 cities throughout North America, our volunteers prepare and serve 150,000 meals each year for the homeless and hungry. Some groups also collect and distribute clothing, household items or food staples for communities in need.

Foster Homes for Orphans and Disadvantaged Children

Embracing the World has run a care home for 500 orphans and disadvantaged children in Kerala for the last 20 years. The children study at one of the most competitive secondary schools in the state (run by MAM) and win awards in Sanskrit, music, sports and dance. In 2009, Amma inaugurated a second care home in Kenya – this one for more than 100 children from the slums of Nairobi.

Healthcare & Nutrition

Embracing the World's 1,300-bed AIMS Hospital (Kochi, Kerala) is renowned as one of the premier health-care facilities in South Asia. Since its establishment in 1998, AIMS together with its smaller satellite hospitals and medical outreach teams have provided more than $70 million worth of charitable medical care; over three million patients have been treated free of charge. Our telemedicine-enabled medical outreach teams also conduct primary health care training and intervention programs for treatable illness, bringing the best of modern medicine into the most remote areas of rural India.

Amrita Self-Reliant Villages

This is a "village adoption" Program through which the Math (MAM) has selected 101 villages throughout India with the goal that the villages of India should become role models for sustainable development.

With the goal of holistic development, the Amrita SeRVe project will provide assistance to each of the 101 villages in the following focus areas: health, education, water and sanitation, agriculture, eco-friendly infrastructure, income generation and self-empowerment.

AMRITA SeRVe
SELF RELIANT VILLAGE

Community Outreach

Embracing the World wants to see a world where no one slips through the cracks into invisible poverty and despair, and where everyone has a chance to see their dreams come true. With that in mind, ETW runs multiple care homes for the elderly, provides monthly financial aid for 100,000 widows and victims of poverty and disability for throughout India, offers free meditation courses for soldiers, prisoners, and the general public, sponsors weddings for the poor, and has established service oriented youth groups throughout the world.

Research

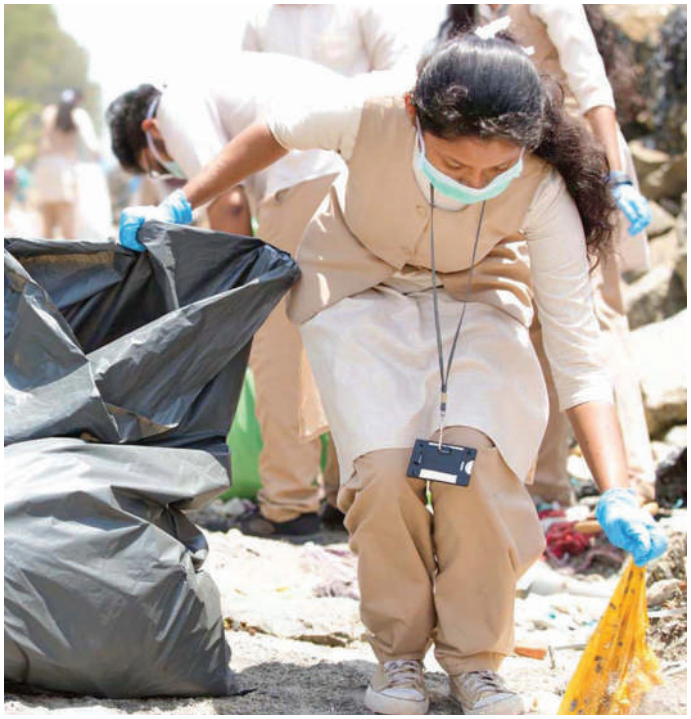
Through Amma's Amrita Vishwa Vidyapeetham, Embracing the World volunteer researchers are breaking new ground in a broad range of highly specialized fields including nanotechnology, biotechnology, robotics, and e-learning software. Projects include tissue engineering, stem cell research, water-purification systems, and low-cost biomedical devices. On the cutting edge of emerging technologies, Embracing the World is developing haptic, biofeedback and virtual reality systems to bring vocational training capabilities into remote areas.

Green Initiatives

The environmental initiatives are aimed at innovating solutions in sustainability defined by simple, practical steps that can be adopted on a large scale. Several of our projects and events have been formally recognized by UNESCO as part of the UN Decade on Education for Sustainable Development. A member of the United Nations Billion Tree Campaign, Embracing the World has planted over a million trees worldwide since 2001, including 30,000 trees along India's shoreline to prevent erosion. Green Friends, our grassroots environmental organization, promotes local participation in conservation efforts around the world.

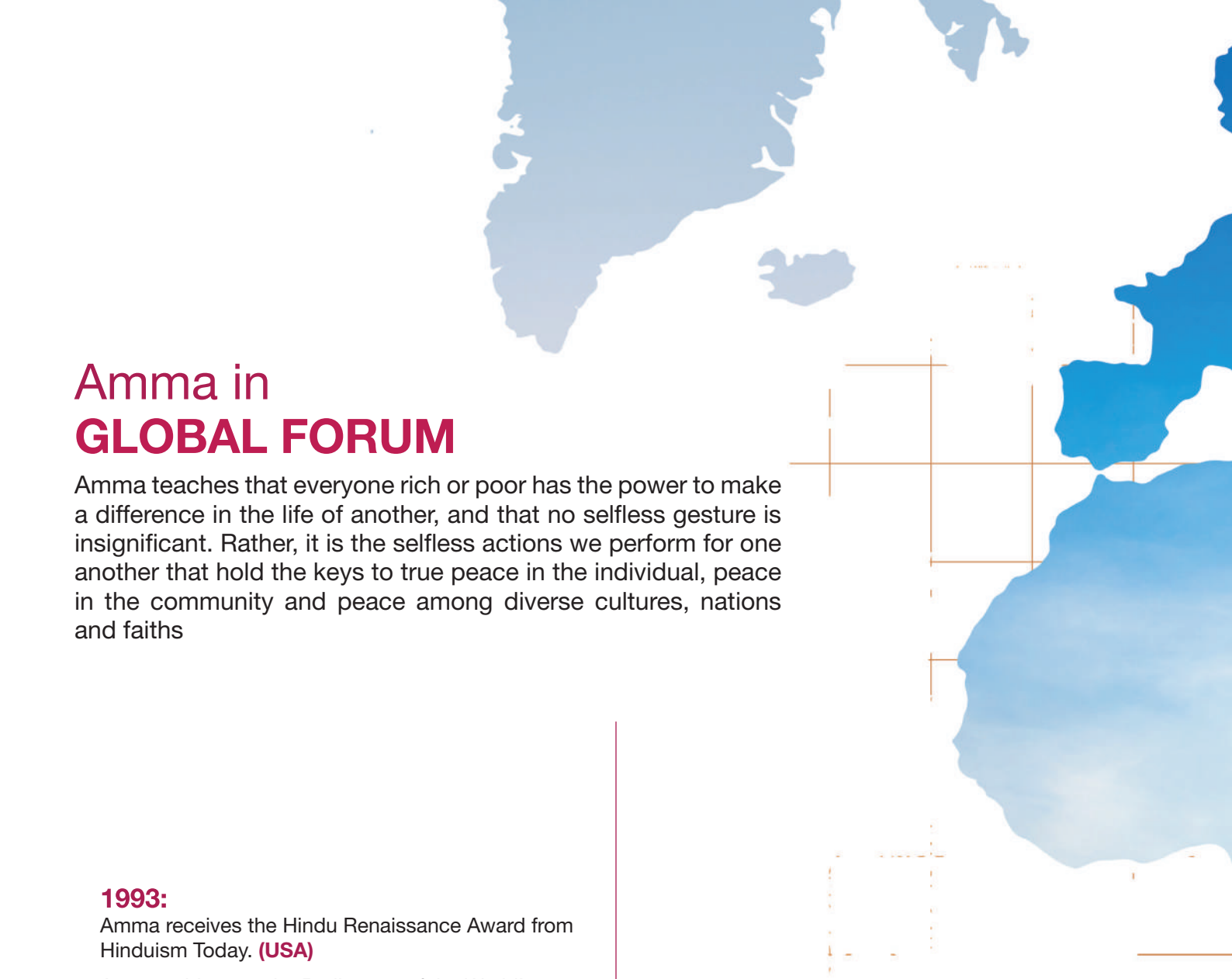
Amala Bharatam Campaign

The Amala Bharatam Campaign (ABC) is a program aimed at improving public health and at restoring India's physical beauty. The project was launched on Amma's 57th birthday celebrations in 2010. Through this campaign, volunteers undertake regular and periodical cleaning of roads, markets, temples, government offices and hospitals along with the sorting of garbage, recycling, proper disposal of waste and constructing public toilets. The campaign is also working to make people more aware of the need to avoid littering, spitting and urinating in public, and to maintain environmental cleanliness. This awareness campaign is ongoing in every language and every state in India, and has already reached millions of people nationwide.



Amma in **GLOBAL FORUM**

Amma teaches that everyone rich or poor has the power to make a difference in the life of another, and that no selfless gesture is insignificant. Rather, it is the selfless actions we perform for one another that hold the keys to true peace in the individual, peace in the community and peace among diverse cultures, nations and faiths



1993:
Amma receives the Hindu Renaissance Award from Hinduism Today. **(USA)**

Amma addresses the Parliament of the World's Religions'100th Anniversary, where she is named President of the Hindu Faith. **(CHICAGO)**

1995:
Amma addresses the Interfaith Celebrations at the 50th anniversary of the UN. **(NEW YORK)**

2000:
Amma is a keynote speaker at the Millennium World Peace Summit, UN General Assembly. **(NEW YORK)**

2002:
Amma is the keynote speaker at the Global Peace Initiative of Women Religious & Spiritual Leaders at the UN. **(GENEVA)**

The World Movement for Nonviolence confers upon Amma the Gandhi-King Award for Non- violence at the UN. **(GENEVA)**

2004:
Amma delivers a keynote address at the 2004 Parliament of the World's Religions. **(BARCELONA)**

2005:
Amma receives Centenary Legendary Award of the Rotary Club International. **(KOCHI)**

Amma receives the Mahavir Mahatma Award. **(LONDON)**

2006:
Amma receives the James Parks Morton Interfaith Award in New York. **(NEW YORK)**

Amma receives the Philosopher Saint Sri Jnaneswara World Peace Prize. **(PUNE)**

2007:
Amma is awarded the Prix CinémaVérité for her humanitarian activities and work for peace at the Cinema Verite Film Festival. **(PARIS)**

2008:
Amma is a keynote speaker at the Summit of the Global Peace Initiative of Women. **(JAIPUR)**

2009:
Amma inaugurates the Vivekananda International Foundation. **(NEW DELHI)**

2010:
Amma receives an honorary Doctorate in Humane Letters from the State University of New York at Buffalo. **(New York)**

2012:
Amma addresses United Nations Alliance of Civilizations' (UNAOC) Regional Consultations for Asia-South Pacific. **(SHANGHAI)**

2014:
Amma joins Pope Francis and 10 other world religious leaders in signing of a declaration against human trafficking and slavery. **(VATICAN)**

2015:
Amma addresses United Nations Academic Impact Conference on Technology for Sustainable Development. **(NEW YORK)**

Amma addresses the Summit of Conscience for the Climate. **(PARIS)**

2019 :
Amma receives Honorary Doctorate of Letters from University of Mysore. **(MYSORE)**

2021:
Amma conferred with a doctorate by Kalinga Institute. **(ODISHA)**

2023:
Amma has been appointed the Chair of the country's Civil 20 (C20), an official engagement group of the Group of 20 (G20), by the union government. **(C20)**

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