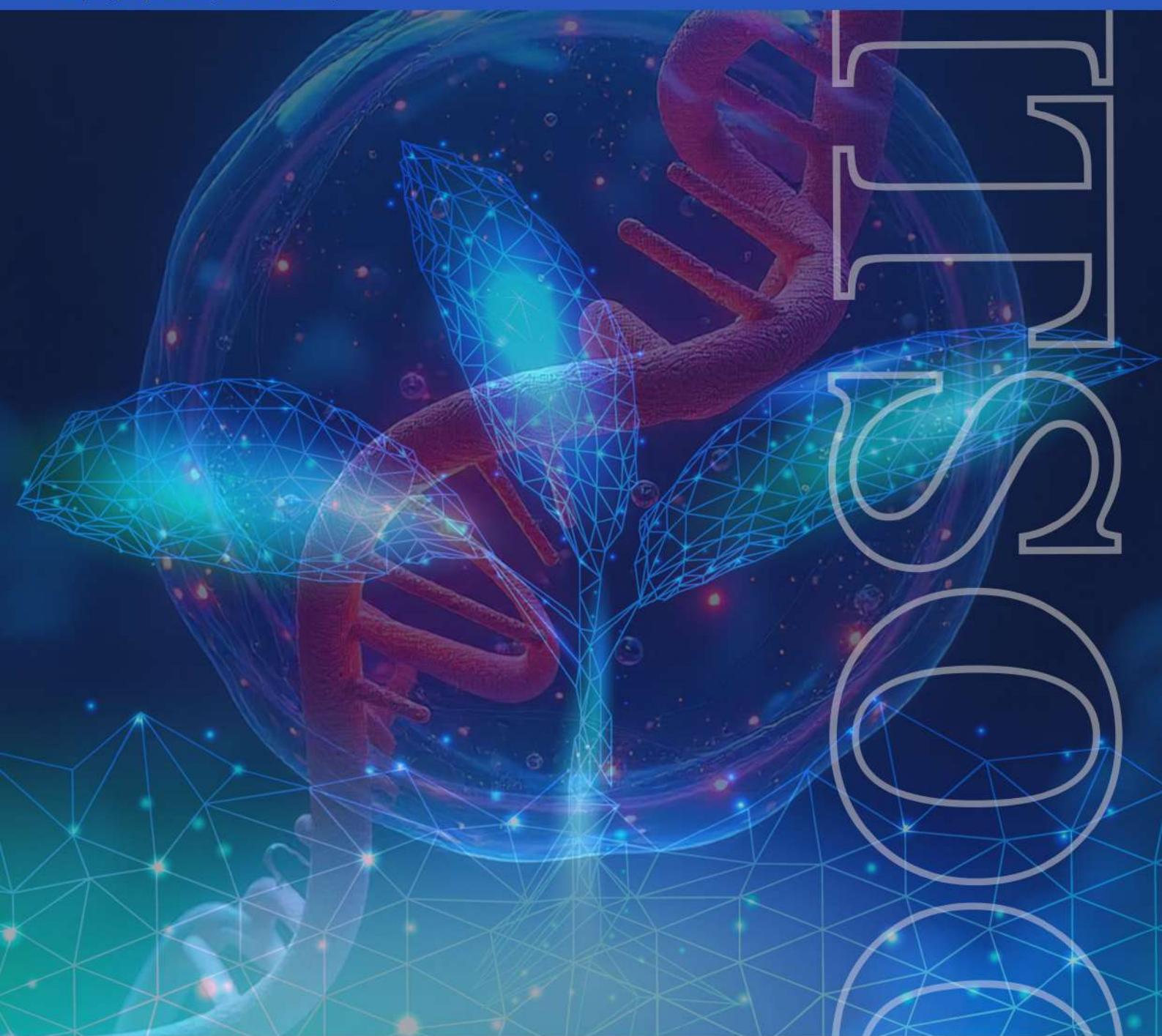


BITSOC NEWS

E - CIRCULATED NEWSLETTER
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OCTOBER 2025



BIOTECHNOLOGY SOCIETY (BITSOC)
DEPARTMENT OF BIOTECHNOLOGY

FACULTY OF AGRICULTURE AND PLANTATION MANAGEMENT
WAYAMBA UNIVERSITY OF SRI LANKA



Message from the New President



I sincerely pay my gratitude to all of you for considering and recognizing me as a capable person for the presidency of the Biotechnology Society (BitSoc) for the year 2025/2026. Your trust in me encourages me a lot to do my best to achieve the goals of society. I am very confident, excited, and ready to face the challenges of the upcoming year. I would like to appreciate the excellent service done by our previous BitSoc Executive Committee and all the members, which I hope to continue during my tenure as president.

Mr J.W.J.S. Jayasiri
President- BitSoc 2025/2026

Annual General Meeting of BitSoc 2025

The 16th Annual General Meeting was held on 31st October 2025 via Zoom with the participation of the academic staff members of the Department of Biotechnology and students representing all four batches. New office bearers were appointed for the year 2025/ 2026. The outgoing committee, led by the former president Mr R.D.K. Dilshan, was appreciated for their immense cooperation towards the continuation of BitSoc activities.

The Steering Committee Members (Year 2025/2026)

| | |
|-----------------------|---------------------------|
| President : | Mr J.W.J.S. Jayasiri |
| Secretary : | Ms K.L.S. Niwarthana |
| Vice President : | Ms R.A.H. Prabha |
| Assistant Secretary : | Ms M.G.S.S. Egodawaththa |
| Senior Treasurer : | Dr M.J.M.S. Kurera |
| Junior Treasurer : | Ms W.D.G.P.V. Weerasingha |
| Editor : | Dr (Ms) P.S. Warakagoda |
| Advisor : | Dr (Ms) P.S. Warakagoda |

Executive Committee Members (Year 2025/2026) :

| |
|---|
| Prof. (Mrs) N.S. Kottearachchi |
| Dr (Mrs) D.R. Gimhani |
| Mr R.D.K. Dilshan - 4 th Year |
| Ms M.A.H.I.M. Perera - 4 th Year |
| Ms G.D.H.D. Amarasiri - 3 rd Year |
| Ms L.K.L. Champani - 3 rd Year |
| Mr A.W.T.K. Somaratnha - 2 nd Year |
| Mr M.M.K.H. Ranasinghe - 1 st Year |



President



Secretary



Vice President



Assistant Secretary



Junior Treasurer



Executive committee member
4th Year



Executive committee member
4th Year



Executive committee member
3rd Year



Executive committee member
3rd Year



Executive committee member
2nd Year



Executive committee member
1st Year

BitSoc Events

BIOTECHNOLOGY DAY 2025

Biotechnology Day 2025, organized by the BitSoc Society, was successfully held on 22nd October 2025 at the Faculty of Agriculture and Plantation Management, Makandura premises to celebrate innovation, knowledge-sharing, and student excellence in the field of biotechnology. Prof. J.C. Edirisinghe, Dean, FAPM coloured the event as the Chief Guest inspiring the audience with his thoughts on new trends in Biotechnology. The keynote speaker of the day was Dr Deishini Herath, Senior Scientist at the National Aquatic Resources Research and Development Agency (NARA). Her insightful session on "Marine Biotechnology" highlighted the vast potential of ocean-based innovations in building a sustainable future. An Industrial Awareness Session was conducted by Avon Pharmo Chem (Pvt) Ltd, which provided participants with valuable insights into real-world biotechnological applications and the transition from research to practice. Further, a Student's Research Awareness Program was featured by the final-year undergraduates of the Department of Biotechnology, presenting their ongoing and completed research activities, reflecting the dedication and scientific curiosity of the department's emerging researchers.



Adding excitement to the day, two competitive segments were held as:

Bio Battles: Team-Based Knowledge Championship

This was a thrilling team-based quiz competition with rounds consisting questions based on General Knowledge, Science, and Agriculture. Four enthusiastic teams from the 2023/2024 (1st Year) batch participated in the event with the group titles, BioMariners, BioStars, BioTentacles, and BioShells. Among them, the team BioMariners was awarded the championship title, BioStars became the First Runner-Up, and BioTentacles secured the Second Runner-Up positions. The champions (BioMariners) were awarded with gold medals, certificates of achievement, and the Bio Battles Championship Trophy. The First Runner-Up team (BioStars) received silver medals and certificates of achievement. The Second Runner-Up team (BioTentacles) received bronze medals and certificates of achievement. All participants were also awarded certificates of participation in recognition of their preparation, dedication, and competitive spirit.



Bio Blitz Online Quiz: Speed and Accuracy Challenge

This was a biology and agriculture based quiz where participants competed by answering timed questions through an online platform. First ten participants completed the quiz providing correct answers were selected as the winners and their names are as follows,

| | |
|--|---|
| 1. T.P.M. Wijerathna - 3 rd Year | 6. K.N.M. Sakiyya - 3 rd Year |
| 2. A.N. Perera - 3 rd Year | 7. K.Y.D. De Silva - 3 rd Year |
| 3. G.D.H.D. Amarasiri - 3 rd Year | 8. D.M. Gamage - 3 rd Year |
| 4. I.C. Thalgasduwa - 1 st Year | 9. R.M.M.K.H. Ranasinghe - 1 st Year |
| 5. W.K.A.K. Kavindi - 1 st Year | 10. S. Rasanjali - 1 st Year |

They received Certificates of Excellence recognizing their outstanding performance during the closing ceremony.

The event successfully brought together students, academic staff, industry professionals, and science enthusiasts, fostering a spirit of collaboration, innovation, and appreciation for the evolving world of biotechnology. A special note of gratitude is extended to Dr M.J.M.S. Kurera, Lecturer, Department of Biotechnology, whose continuous guidance and encouragement played a pivotal role in making Biotechnology Day 2025 a resounding success. His dedication and support truly motivated the organizing committee to bring out their best.



T.P.M. Wijerathna



A.N. Perera



G.D.H.D. Amarasiri



I.C. Thalgasduwa



W.K.A.K. Kavindi



K.N.M. Sakiyya



K.Y.D. De Silva



D.M. Gamage



R.M.M.K.H. Ranasinghe



S. Rasanjali

Webinar on - Fueling Your Future

BitSoc successfully conducted an inspiring webinar titled “Fueling Your Future: Insights from Biotech Trailblazers” on August 16, 2025, via Zoom. The session featured prominent alumni of the Department of Biotechnology, who shared their academic and professional journeys, offering valuable insights into research, higher studies, and global career opportunities in the field of biotechnology. The guest speakers invited were Mr Chanuka Hanchpola, Ph.D. Candidate in Marine Molecular Genetics and Genomics, Jeju National University, South Korea, Ms Thilini Dinishka, Research Officer at Sri Lanka Council for Agricultural Research Policy, Ms Raveena Bulugoda Arachchi, MSc. Candidate at the University of Bonn, Germany, Ms Savini Ekanayake, Research Assistant, Department of Bioprocess Technology, Faculty of Technology, Rajarata University of Sri Lanka, Ms Himasha Vithana, MSc. Candidate in International Farm Management, Weihenstephan, Triesdorf University of Applied Sciences, Germany, Mr Vimukthi Viduranga, MSc. Candidate in Agricultural Biosciences, Technical University of Munich, Germany.



BitSoc Fundraising Activities

BitSoc society members successfully organized a series of fundraising activities aimed at enhancing BitSoc funds to support future extracurricular initiatives. A variety of food stalls were set up, including manioc, corn, popcorn, and other refreshments, which attracted enthusiastic participation from both students and staff. These activities not only served as an effective means of raising funds but also provided an excellent opportunity for students to enhance their teamwork, leadership, and organizational skills. The success of these initiatives reflected the dedication and enthusiasm of the BitSoc members in contributing to the growth and development of the BitSoc society.



Re-opening of the BT Cafe

The BT Cafe, run by a student committee of 3rd-year BT specializing students, was recently reconstructed and reopened at the faculty premises, marking a new chapter in supporting student initiatives. The renovated cafe is not only a space for students and staff to enjoy refreshments but also serves as a platform to promote undergraduate entrepreneurship. The cafe provides opportunities for students who are running food-related entrepreneurial ventures to showcase and sell their products, gaining practical experience in business management and customer engagement.



BitSoc “Padura” – 2025

“Padura”, the annual social event of the Biotechnology Society (BitSoc), was held on 31st October 2025 at the faculty auditorium. This colorful and joyful event is organized every year to warmly welcome 3rd year students enrolled in the Department of Biotechnology and to interact with 4th year BT specializing students and the staff.

The event was organized by the BitSoc together with all final-year students, with the aim of creating a friendly and memorable atmosphere for the new batch. Students beautifully showcased their creative abilities through melodious singing, dancing, acting, etc. proving that they are talented not only in academic learning but also in the arts. In addition, several interactive games were included to strengthen teamwork and build closer relationships among students.

The event was graced by Dr P.S. Warakagoda, Head of the Department of Biotechnology, Prof. N.S. Kottearachchi, Prof. B.L.W.K. Balasooriya, Dr D.R. Gimhani, and Dr M.J.M.S. Kurera. They greatly admired the collaborative effort of the students and appreciated the lively and well-organized nature of the event. The presence of non-academic and academic supportive staff members of the Department of Biotechnology further added warmth and joy to the occasion.



Achievements of BT Academic Staff

National Awards for Excellence in Agricultural Research 2023 & 2025



Researchers from the Department of Biotechnology received multiple national recognitions at the National Awards for Excellence in Agricultural Research 2023 and 2025, organized by the Sri Lanka Council for Agricultural Research Policy (SLCARP). The awards ceremony was held on 23rd October 2025 at the BMICH, Colombo, under the distinguished patronage of His Excellency President Anura Kumara Dissanayake.

- Prof. N.S. Kottearachchi, Senior Professor, Department of Biotechnology, was awarded 1st Place in the National Awards for Excellence in Agricultural Research 2023 for the Most Outstanding Research in the Non-Plantation Sector (2023) as a Co-Investigator of the project titled: "Assessment of Pathogeography of the Blast and Brown Spot Disease in Rice (*Oryza sativa*) Using Phenetic, Molecular, and Digital Image Sensing Approaches." This is a collaborative project conducted in the University of Colombo with Prof. O.V.D.S.J Weerasena, Dr S. Terensan (PI and PhD Student), Dr S. Salgadoe, Prof. S.A.C.N. Perera, Ms N. Silva and Ms J.N. Silva.
- Prof. B.L.W.K. Balasooriya, Professor, Department of Biotechnology, was awarded 1st Place in the National Awards for Excellence in Agricultural Research 2025 for the Most Outstanding Research in the Non-Plantation Sector (2025) as a Co-Investigator of the project titled: "Development of Eco-Friendly Farming Technologies to Minimize Inorganic Fertilizer Usage While Maintaining Adequate Productivity and Improving Soil Fertility". This is a multi-institute project conducted with a theme oriented research grant by the NRC, joining University of Peradeniya (PI: Prof. S. Dharmakeerthi, Prof. W. Dandeniya, Prof. U. Vitharana, Prof. D. De Costa, Dr A. Karunaratna, Dr C. Attanayake), Wayamba University of Sri Lanka (Prof. U.K. Jayasinghe, Prof. B.L.W.K. Balasooriya), Department of Agriculture (Dr U. Rathnayake, Mr D. Sirisena), University of Winnipeg, Canada (Prof. D. Kumaragamage), and the International Plant Nutrition Institute, India (Dr T. Satyanarayana). Ms I. Amarawansa (MPhil) and several undergraduate research students supported the project at the Department of Biotechnology from 2016 - 2022.
- In addition, Prof. N.S. Kottearachchi (Principal Investigator), Dr D.R. Gimhani (Co-Investigator), Dr B.P. Abhayawickrama (Co-Investigator), and Dr D.S. Liyanage (Collaborator) from the Department of Biotechnology received a Certificate of Commendation under the Most Outstanding Research in the Non-Plantation Sector (2025) category for their project titled: "QTL Mapping and Next-Generation Sequencing-Based Allele Mining for Salinity Tolerance in Rice."
- Furthermore, Prof. D.P.S.T.G. Attanayake, former Chair Professor, Department of Biotechnology, was also awarded a Certificate of Commendation under the Most Outstanding Research in the Plantation Sector (2025) category as a Co-Investigator of the project titled: "Selection and Development of Genetically Improved Cashew (*Anacardium occidentale*) Varieties for Planting in Sri Lanka and Development of Rapid Multiplication Techniques for Planting Material Production of Cashew."

These prestigious awards highlight the Department of Biotechnology's outstanding contributions to agricultural innovation and its continued commitment to advancing research for national development.

From Uni to the Globe

Securing a Master Scholarship at the College of Agriculture and Bioresources, University of Saskatchewan, Canada.

Mr Kanchana Madanayake, a graduate (2017/2018 batch) of the Department of Biotechnology and a former president of BitSoc (2021-2022) secured a fully funded postgraduate scholarship at the Department of Food and Bioproduct Sciences, College of Agriculture and Bioresources, University of Saskatchewan, Canada.



Master's studies at the University of Bonn, Germany



Ms Raveena Bulugoda Arachchi, a graduate (2016/2017 batch) of the Department of Biotechnology, has been chosen to pursue her master's study in MSc. in Plant Sciences at the University of Bonn, Germany.

Master's Studies at the University of Pavia, Italy

Ms Chandula Sathsarani, a graduate (2018/2019 batch) of the Department of Biotechnology, has been selected for a Master's Programme in Molecular Biology and Genetics at the University of Pavia, Italy.



Research Presentations

Ms Chamathsara Gimhani, a graduate (2017/2018 batch) of the Department of Biotechnology, has presented her research findings under the topic of "Impact of Magnesium Oxide and Copper Oxide Nanoparticles Dispersion on Surface Sterilization of *Sansevieria trifasciata* L. Micropropagation" at the International Conference of Agriculture and Plantation Management (InCAPM) organized by Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka collaborated with Guizhou University and Central China Normal University, held on 16–18 May 2025 at Makandura, Sri Lanka. The research was conducted under the supervision of Prof. Nisha Kottearachchi and Dr Murthi Kandanapitiye.



Ms Ashani Kaushalya, a graduate (2017/2018 batch) of the Department of Biotechnology, has presented her research findings under the topic of " Development of Butterfly Pea Flower-Enriched Cosmetic Formulation for Industrial Application" at the International Conference of Agriculture and Plantation Management (InCAPM) organized by Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka collaborated with Guizhou University and Central China Normal University, held on 16–18 May 2025 at Makandura, Sri Lanka. The research was conducted under the supervision of Prof. Nisha Kottearachchi and Dr Gavini Liyanaarachchi.

Ms Rusiru Indumini, a graduate (2018/2019 batch) of the Department of Biotechnology, has presented her research findings under the topic of "Isolation, Identification and Characterization of Microalgae *Chlorella* sp. from Palm Oil Mill Effluent (POME) Ponds for Biotreatment of Wastewater" at the International Conference of Agriculture and Plantation Management (InCAPM) organized by Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka, held on 16–18 May 2025 at Makandura, Sri Lanka. The research was conducted under the supervision of Prof. Wajira Balasooriya.



Ms Pabodhi Malshani, a graduate (2018/2019 batch) of the Department of Biotechnology, has presented her research findings under the topic of "Exploring Nucleotide Variants Related to Salt Tolerance Mechanisms in Two Different Indica Rice Varieties" at the International Conference of Agriculture and Plantation Management (InCAPM) organized by Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka collaborated with Guizhou University and Central China Normal University, held on 16-18 May 2025 at Makandura, Sri Lanka. She also won the best presenter award under the track of "Varietal innovations and Seeds". The research was conducted under the supervision of Prof. Nisha Kottearachchi.



A group of research students, Mr Chathura Jathissa, Ms Dinithi Gunawardhana, Ms Isurandhi Senevirathna, Mr Sakuna Jayathilaka of the 2019/2020 batch of the Department of Biotechnology and Ms Sithmi Nimasha, a student from University of Sri Jayewardenepura presented their research findings under the topic of "Farmers' Awareness and Adaptive Crop-Soil Management to Rainfall Variability in Kurunegala Paddy Cultivation" at the International Symposium on Agriculture and Environment (ISAE) - 2025, organized by the Faculty of Agriculture, University of Ruhuna, on 9th February 2025. This study highlighted important findings related to adaptive crop soil management strategies against the rainfall variability.



Ms Kaveesha Kavindi, a student of the 2019/2020 batch, Department of Biotechnology, submitted a sequence of poty virus to the NCBI Genbank database under the research topic of "Molecular Detection of Viral Diseases of *Passiflora edulis* and Identification of Virus Transmission Methods." She achieved a unique Accession number for her sequence (Accession number PV861824.1) on 07th July 2025. This milestone enables global access to the sequence data, facilitating researchers worldwide to retrieve and build upon our sequence. The research was conducted under the supervision of Dr Vindya Basnayake and Dr Mudith Mewan.



Awards

IPMP Gold Medal for the Best Performance in the B.Sc. (Hons.) Agriculture Degree Program and Dr Dharmawansa Senadhira Gold Medal



Ms Pabodhi Malshani of the 2018/2019 batch was honored with the esteemed IPMP Gold Medal for the Best Overall Performance in the BSc (Hons) Agriculture Degree Program 2018/19 Batch, along with the prestigious Dr Dharmawansa Senadhira Gold Medal in recognition of her outstanding academic achievement as an undergraduate in the Department of Biotechnology. This momentous acknowledgment took place at the 20th General Convocation held on 27th August 2025, at the Pandith Amaradewa Auditorium, WUSL, Kuliyanpitiya Premises.

CP Awards 2025 – Innovator & Changemaker of the Year

We are proud to share that Mr Akeel Shahan (Founder, PaperHero project, Wayamba University of Sri Lanka), a graduate of the Department of Biotechnology (2018/2019 batch), was recognized with the prestigious “Innovator & Changemaker of the Year” title at the Creative Pool (CP) Awards held on 31st March 2025. This national recognition celebrates individuals who have made significant contributions toward sustainability, innovation, and social impact. Akeel’s remarkable leadership and visionary work in building eco-conscious initiatives have positioned him as a driving force for positive change among young innovators in Sri Lanka.



CP Awards 2025 – Sustainable Initiative of the Year

Ms Chathuni Sooriyapperuma (Co-Founder, PaperHero project, Wayamba University of Sri Lanka), a student of the Department of Biotechnology (2019-2020 batch), was recognized with the prestigious “Sustainable Initiative of the Year” title at the Creative Pool (CP) Awards 2025 for the PaperHero project. Mr Akeel Shahan (Founder), Ms Samanthi Jayakody, and Ms Dehami Samadhi from the Department of Biotechnology were also part of this remarkable achievement. This recognition stands as a testament to PaperHero's continuous efforts in promoting paper recycling and fostering eco-friendly practices for a greener future.



Best Presenters

Mr Sanjula Ariyaratne and Ms Hasinika Chandrasekara awarded as the Best Presenters at the Biotechnology Presentation Sessions (Panel I) of the 23rd Agricultural Research Symposium (AGRES), FAPM, WUSL, held on 1st August 2025. The research title of Mr Sanjula Ariyaratne was “Development of a *Saccharomyces cerevisiae* Based Whole-Cell Biosensor for the Detection of Aflatoxin and Ochratoxin Contamination” while the research title of Ms Hasinika Chandrasekara was “Development of *In Vitro* Culture System for Mass Production of Steviol Glycosides from Green Calli Initiated From Leaf Explants of *Stevia rebaudiana*”.



Mr Dumindu Ariyaratne awarded as the Best Presenter at the Biotechnology Presentation Sessions (Panel II) of the 23rd Agricultural Research Symposium (AGRES), FAPM, WUSL, held on 1st August 2025. The title of his research was “Development and Characterization of Radio-Photo-Autotrophic Biofilms: A Promising Candidate for Sustainable Life Support Systems”



Representing Leading Societies of WUSL

Rotaract Clubs engage in community and International service initiatives, promote professional development among young leaders, and nurture leadership skills while creating opportunities for fellowships and enjoyment within a global network of individuals who share similar values. For the term 2025-2026, Ms Udeshi Sandeepani, (2020/2021 batch) of the Department of Biotechnology, was appointed as the Assistant Secretary for the Rotaract Club of Wayamba University of Sri Lanka. We extend our heartfelt congratulations for a successful and inspiring term ahead.



Sports

Sri Lanka University Games

Mr Chathura Jayathissa, a student of the (2019/2020 batch) of the Department of Biotechnology, was awarded the Sri Lanka University Colours in recognition of his outstanding performance at the Sri Lanka University Games 2024. The SLUSA Colours Awards 2025 ceremony was held on 30th May at the Faculty of Computing and Technology, University of Kelaniya, celebrating excellence in university sports across the nation.



Inter University Sport Games – 2025

Mr Chathura Jayathissa, a student of (2019/2020 batch) Department of Biotechnology, played Rugby for the Sri Lanka University Games - 2025 (SLUG) held on 30th July 2025 at the University of Colombo playground and secured the top eight positions out of all Sri Lankan Universities.

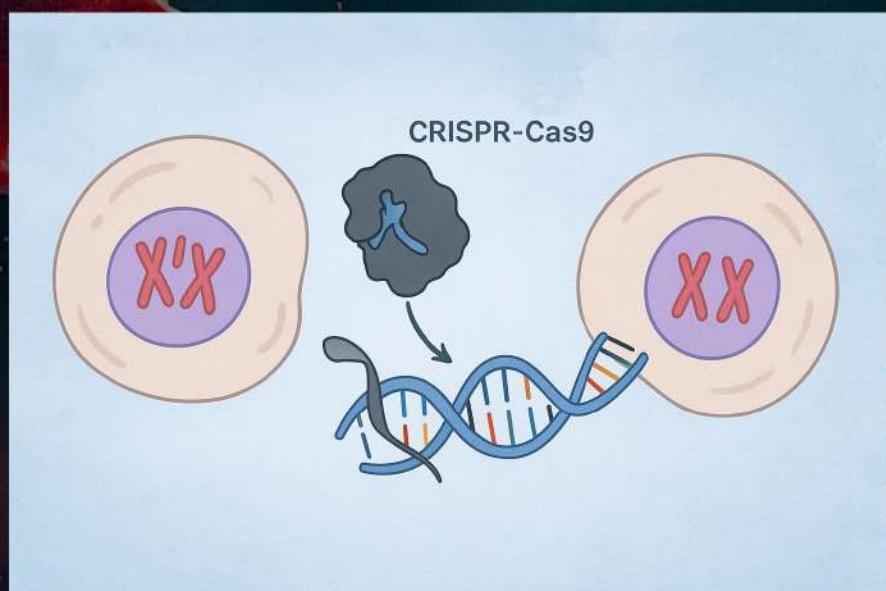


Editing Hope: A New Chapter in Down Syndrome Research

In early 2025, a groundbreaking study by scientists at Mie University, Japan, quietly reshaped the future of genetic medicine. Using the powerful CRISPR-Cas9 gene-editing tool, researchers successfully removed the extra copy of chromosome 21, the genetic basis of Down syndrome, from human cells grown in the laboratory. Working entirely in vitro with induced pluripotent stem cells and fibroblasts from individuals with Down syndrome, the team used a precise, allele-specific method that corrected the extra chromosome while preserving the two original parental copies. Once corrected, the cells began to behave differently more like typical human cells. Gene expression normalized, neurodevelopmental pathways improved, cellular stress decreased, and energy-producing mitochondria functioned more efficiently.

While the success rate ranged between 13% and 30%, the implications were profound. Though far from clinical use and surrounded by ethical and technical challenges, this research opens a new frontier in chromosomal therapy offering not a promise of erasure, but a future where science seeks to ease biological burden while honoring human dignity. Sometimes, the greatest breakthroughs are not about changing who we are, but about understanding how gently we might help life flourish.

(https://academic.oup.com/pnasnexus/article/4/2/pgaf022/8016019?login=false&utm_source)



“Biotech Brain Teaser”

Test your biotech knowledge by finding all the hidden words in the grid below. Words can appear horizontally, vertically, or diagonally, and may be forward or backwards.

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| G | Q | I | R | P | S | I | R | C | E | A | T | L | C | H |
| L | J | F | O | R | N | S | N | P | W | N | R | J | T | Z |
| U | Q | N | A | V | O | E | A | C | R | T | A | J | V | D |
| E | I | I | G | D | I | Q | E | R | D | I | N | X | R | E |
| I | A | E | N | J | T | U | M | T | G | B | S | W | K | G |
| V | N | T | I | L | A | E | Y | U | I | O | C | Q | B | P |
| I | D | O | N | L | T | N | Z | B | C | D | R | U | I | N |
| I | B | R | O | E | N | C | N | A | K | Y | I | G | O | Y |
| E | U | P | L | C | E | I | E | I | D | F | P | E | R | X |
| O | V | R | C | M | M | N | W | N | I | R | T | N | E | A |
| D | E | C | W | E | R | G | E | R | M | B | O | O | A | L |
| S | C | R | E | T | E | N | E | B | S | J | M | M | C | L |
| Z | T | B | L | S | F | G | V | H | A | V | E | E | T | D |
| L | O | Y | R | N | T | X | E | H | L | F | Z | Z | O | F |
| N | R | A | F | X | K | Z | N | Z | P | V | X | Z | R | H |

Word Clues:

- A Y-shaped defender that the immune system makes to spot invaders.
- A tank with a controlled environment where cells or microbes are grown at scale.
- Making an identical genetic copy of a cell or organism.
- A molecular “scissors” used to edit DNA precisely.
- The ladder-like molecule that carries the genetic code.
- A biological catalyst that speeds up chemical reactions.
- A microbial process converts sugars into alcohol or acids.
- The complete set of an organism’s genetic instructions.

- A lab method that makes millions of copies of a DNA segment.
- A small, circular DNA piece often used to carry genes.
- The name given to a chain of amino acids.
- The single-stranded messenger that helps make proteins.
- The process of reading the order of nucleotide bases.
- A flexible cell that can become many different cell types.
- All RNA messages expressed by a cell at once.
- A carrier used to deliver genes into cells (virus or plasmid).



**Technical Editing: Dr P.S. Warakagoda,
Senior Lecturer, Department of Biotechnology,
FAPM, WUSL**

**Editorial Assistance: Ms R.M.G.R. Rathnayaka,
Temporary Demonstrator, Department of Biotechnology,
FAPM, WUSL**

**Design and Typesetting: Mr A.W.T.K.M. Somarathna
BSc (Agriculture) Undergraduate (2023/2024 Batch),
FAPM, WUSL**

