

# Inside Biochem Education

FAOBMB Education Newsletter  
ISSUE 1 (JANUARY, 2025)



*[Free download from Unsplash]*

## Editorial

Dear Readers,

Welcome to the inaugural edition of the FAOBMB Education Newsletter! We are excited to launch this Newsletter, which will bring you the latest insights, trends, and tips and tricks from Biochemistry and Molecular Biology Educators from the Asian-Oceania region.

In this issue, we provide a snapshot of the exciting content you can expect in the coming issues. From innovative teaching methods to inspiring student achievements, we aim to share insights into the exciting world of teaching and learning Biochemistry. Three educators; Grace Yu (Philippines), Nuruliza Roslan (Malaysia) and Anoja Attanayake (Sri Lanka) acknowledge biochemistry to be a content-rich, complex discipline and often perceived by students as difficult. As dedicated educators, they revised curricula and developed new and more engaging learning resources. They grappled with lecture delivery and didactic forms of teaching while implementing more learner-centric approaches. Kathryn Jones (New Zealand) demonstrates how she harnessed the power of networking to establish an Education Special Interest Group within the New Zealand Society for Biochemistry and Molecular Biology. She describes this group of like-minded Biochemistry educators as 'my people'. Her write-up underpins our vision for the FAOBMB Education 'Newsletter'.

By creating a platform where educators can share knowledge, and experiences and showcase their work we hope that dedicated and enthusiastic Biochemistry educators come together as a Community of Practice. As articulated by Kathryn Jones, our vision is to create a community of Biochemistry educators who actively share practice and work collaboratively to enhance students' learning outcomes and well-being. We invite our readership to join us on our journey by sharing their insights on teaching and learning Biochemistry. We welcome 500-word write-ups summarising recently published articles in education journals, research projects on teaching and learning that are current or completed, successful teaching innovations, lessons learned from ineffective teaching innovations, experiential pieces sharing educator insights or simply opinions and perspectives on teaching and learning as a Biochemistry educator. We would love to read a short piece from your country. Please send your articles to [nirma.samarawickrema@monash.edu](mailto:nirma.samarawickrema@monash.edu).

We invite you to join us in this endeavour. We strongly believe that together, we can create something truly special. Thank you for being a part of "our community".

Happy Reading!

Nirma



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[\[nirma.samarawickrema@monash.edu\]](mailto:nirma.samarawickrema@monash.edu) is a teaching-intensive academic from Monash University's Biomedicine Discovery Institute. She is also the Chair, of FAOBMB Education (2024-to date).*

## The FAOBMB Education Landscape in 2024.....

### The Pre-Congress Education Workshop (September 2024)

The Pre-Congress Education Workshop, *Publishing High-Quality Higher Education Pedagogical Research to Enhance Your Professional Visibility – Tips and Advice to Authors*, kick-started the conversations about all things Education at the BioMolecular Horizons Congress. The workshop was held the day before the Congress in September 2024.

The FAOBMB together with the Education Special Interest Group of the Australian Society of Biochemistry and Molecular Biology, Monash University's Biomedicine Discovery Institute (Education) and Wiley Publishers co-sponsored this workshop. The 2-hour interactive workshop was co-facilitated by Professor Marilee Benore, (University of Michigan, Dearborn and the Editor-in-Chief of the IUBMB journal *Biochemistry and Molecular Biology Education*), A/Prof Nirma Samarawickrema (Monash University, Chair Education FAOBMB) and Professor Tracey Kuit (University of Wollongong, Chair Education SIG, ASBMB). Forty-four keen educators representing 9 countries from the FAOBMB region, which included Malaysia, Singapore, Philippines, New Zealand, South Korea, India, Pakistan, Indonesia and Australia participated.

The Workshop was received with enthusiasm. It focused on how to formulate a pedagogical research project; use evidence-based scholarly strategies; and develop ethically appropriate data collection instruments and analysis processes. The collaborative workshop space was buzzing with excited discussions with educators keen to share information and plan future collaboration.



*Enthusiastic discussions at Pre-Congress Education Workshop*

The workshop participants conveyed their enthusiasm via the survey; *“It was a great initiative to have the workshop but it feels short and quick, more please in the future!!”*, *“Thanks for putting together the workshop activities and for inviting Marilee”*. As many as 65% indicated they were keen on becoming an author, reviewer or guest editor of the journal.

Thank you again to our sponsors and facilitators and thank you to the participants for your enthusiasm. It could not have been a resounding success if not for everyone's contributions and participation!

## FAOBMB Education Leads Program (November 2024)

Following the FAOBMB Education Committee's call for nominations for Education Leads from the constituent societies, we received nominations from Thailand, Sri Lanka, Malaysia, and China. The Australian and New Zealand Societies already have designated Education Leads. This group now consists of 6 talented and dedicated members. We hope this initiative will drive our mission to create a community of Biochemistry educators who are passionate about teaching and learning biochemistry within the FAOBMB region Education.

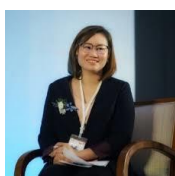
### **Meet our Education Leads:**



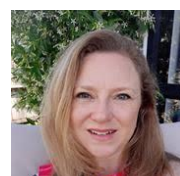
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We invite member countries to send their nominees for the role of Education Lead. These nominees must be passionate educators who will

- champion biochemistry education in their Societies,
- network effectively with society members to exchange ideas, and teaching resources and showcase innovations, and
- actively promote the advancement of Biochemistry education.

# **The Beautiful World of Biochemistry: A Journey Through Molecules and Beyond**

## **Associate Professor Nuruliza Roslan**

Imagine a world where the invisible orchestrates the visible, where tiny molecules dictate the grand performance of life itself. This world, often unnoticed, is the realm of biochemistry—the science that unravels the mysteries of how life operates at its most fundamental level. As a biochemist and educator, my mission has been to make this complex subject not only accessible but also captivating, especially for medical students who rely on this knowledge to understand the human body and its ailments.

### **Unveiling the Magic: Biochemistry in Everyday Life**

Biochemistry is all around us, from the food we eat to the emotions we feel. Have you ever wondered how a slice of bread transforms into energy that powers your every move? Or why does your heart race when you're excited? The answers lie in biochemical pathways that are as intricate as they are elegant. Proteins, lipids, carbohydrates, and nucleic acids—the molecules of life—work in harmony, enabling everything from digestion to DNA replication.

One of the fascinating aspects of biochemistry is its universality. While it underpins life's complexity, it also reveals the shared molecular mechanisms across species, emphasizing our deep connection to the natural world. This shared biochemistry is not just a scientific curiosity; it's a reminder of our place in the web of life.

### **Bridging Education and Innovation: The BLASt.AR Initiative**

Biochemistry is often perceived as a challenging subject, filled with complex pathways and abstract concepts. During my presentation at BMH 2024, I introduced an innovative approach to tackle these challenges: the BLASt.AR (Biochemistry Learning App for Students) framework. This mobile app harnesses augmented reality (AR) technology to make biochemistry education more interactive and engaging.

Imagine using your smartphone to visualize a 3D model of a protein interacting with a ligand or to explore the intricate folds of DNA. BLASt.AR does just that, turning abstract biochemical concepts into tangible, immersive experiences. The app also incorporates culturally sensitive AR elements, such as using food culture to illustrate biochemical pathways, making learning more relatable and enjoyable.

Developed using the open-source Quasar framework with Vue.js, BLASt.AR offers quizzes, discussion forums, and plans for biochemistry-based tournaments. These features cater to diverse learning preferences, ensuring that students not only understand but also appreciate the subject's beauty.

### **The Art of Making Biochemistry Accessible**

Teaching biochemistry is as much about storytelling as it is about science. Every pathway, every molecule, has a story to tell—a story of discovery, of function, and of life itself. For instance, the citric acid cycle, often viewed as a dry series of reactions, can be reimagined as a narrative of energy generation, a hero's journey where each molecule plays a crucial role.

Visual tools like AR and creative analogies can further demystify the subject. For example, explaining enzyme-substrate interactions using a lock-and-key analogy or demonstrating metabolic pathways as intricate city maps can make the learning process both intuitive and enjoyable.

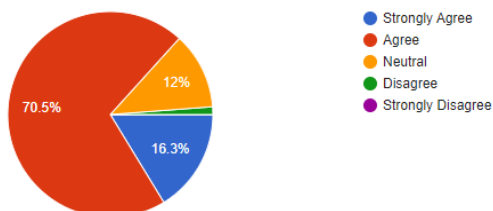


Associate Professor [Nuruliza Roslan](mailto:nuruliza@usim.edu.my) ([nuruliza@usim.edu.my](mailto:nuruliza@usim.edu.my)) is an academic in the Faculty of Medicine and Health Science of the Universiti Sains Islam Malaysia, Malaysia. She is the recipient of the FAOBMB Education Special Travel Fellowship 2024 and presented her work at the [Biomolecular Horizons Conference 2024](#)

## The challenges of incorporating new teaching and learning methods into the Medical Biochemistry curriculum in Sri Lanka

### Professor Anoja Attanayake

Biochemistry is generally assumed to be a difficult discipline by undergraduates in Sri Lankan medical schools. Most medical faculties in Sri Lankan state universities confirm that teaching and learning must move away from simply delivering knowledge via standard lectures. Why do medical undergraduates dislike learning Biochemistry as a preclinical subject? 178 undergraduates (representing 92%) of Biochemistry undergraduates at the Faculty of Medicine, University of Ruhuna, Sri Lanka responded to this question. A majority of the responses indicated that the subject required memorization they were unable to find links to and integrate information with the other pre-clinical subjects such as Anatomy and Physiology. A few struggled to connect learning materials and their direct medical relevance. However, students were pleased with topics such as nucleotides and nucleoproteins, lipid metabolism, food and diets, and principles of nutrition.



*Assessment of the overall quality of lectures on Biochemistry at the Faculty of Medicine, University of Ruhuna, Sri Lanka in 2021/2022*

The overall quality of the lectures was assessed through the quality of teaching materials, audibility, speed, clearness, emphasis on teaching important biochemistry concepts, and clinically relevant teaching.

The study revealed the importance of teaching Medical Biochemistry in a clinically relevant way through critical thinking, reasoning, developing interactive skills, and lifelong learning toward attaining the goal of an ideal medical officer serving the nation. Early clinical exposure was also confirmed as important. The ensuing curriculum revisions included student-centred approaches including problem-based learning, case-based learning, small group discussions, etc. Animated digital technologies introduced concepts that are difficult to understand through traditional lectures. These included oxidative phosphorylation and structure-function relationships of biomolecules such as proteins and nucleic acids. Each topic used a combination of teaching tools. Interactions via Zoom and e-books were integrated to improve learning and student engagement. All teaching and learning activities in the new curriculum are also peer-reviewed.

We are aware that much work is still needed. In the short term, we must determine the impact of recently introduced teaching-learning approaches. We must improve the operational strength of the working environment with enhanced resources supporting the Medical Biochemistry curriculum in Sri Lanka.

Nevertheless, our challenges continue. We are aware that curricula need to keep pace with the latest advances in the field and include new developments relevant to the new medical practitioner. While we focus on theoretical aspects, our curriculum must not neglect practical training and research skills. Biochemistry is intrinsically linked to biology, chemistry, and molecular biology and our programs must provide a truly interdisciplinary curriculum enabling our students to successfully practice upon graduation.



Professor [Anoja Attanayake](mailto:anojaattanayake@med.ruh.ac.lk) [[anojaattanayake@med.ruh.ac.lk](mailto:anojaattanayake@med.ruh.ac.lk)] is from the Department of Biochemistry, Faculty of Medicine, University of Ruhuna, Sri Lanka. She was the recipient of the FAOBMB Education Special Travel Fellowship 2023 and presented her work at the [FAOBMB Conference](#) in Bangkok, Thailand.

## **A simple twist on Teaching Nutritional Biochemistry**

**Professor Gracia Fe Yu**

Biochemistry education serves as a foundation for understanding the molecular mechanisms underlying healthy and diseased states. Thus, biochemistry is crucial in understanding medical sciences and in driving medical innovations and breakthroughs. Integrating principles from both biology and chemistry, biochemistry seeks to understand the trifecta: the structure and the corresponding function of biological molecules, their chemical reactions in the cell and how they relate to each other (or as we in the field affectionately call it, metabolism). It is perhaps the complexity of the subject that gives students the perception that biochemistry is a difficult subject to learn. Several teaching techniques were developed

and modified to make biochemistry easier to learn. Lectures were aided by flowcharts, figures, and case studies that sought to show the correlation between a disease and a corresponding biochemical pathway. Moreover, small group discussions on given problem sets or case studies were conducted to deepen the students' perception of the subject. However, the teaching modality—mostly in the lecture format—remained teacher-centric; thus, the subject remained abstract to most students who had difficulty integrating the material. Comments such as, “It i[Biochemistry] is my Waterloo” often come up. Which makes me think sometimes when Biochemistry is such an interesting topic.

I was challenged when graduate courses in Nutritional Biochemistry (Biochem 230 and Biochem 330) were assigned to me. Both students and educators alike thought that Nutritional Biochemistry was boring. To address this, our team reviewed the syllabi for these subjects. We found that these subjects entailed memory work on the roles of the biological molecules, without being able to understand the basics. This was reflected in the Course Objectives. Thus, we decided to integrate chemistry, biochemistry, and nutrition in the hopes that this interdisciplinary approach could help them understand the subject matter better. However, I thought that this might not be enough to motivate our students. One approach I took was, instead of delivering a conventional lecture, I told them stories of how metabolic pathways, the interaction of macro- and micronutrients and their roles as antioxidants, and the theory behind the function of metabolites in preventing diseases related to each other. With this approach, students gained understanding and motivation and even promoted the course to other graduate students. After gaining a good understanding of the basic function of each nutrient, the students were given a session to report on a special topic on nutrition of interest to the student. This was followed by the Clinical Nutrition Sessions on diabetes, hypertension, obesity, and other diseases, conducted by our medical doctor lecturers. The final activity was a case study on a malnourished child. The students were given guide questions to help them answer holistically with social implications. As a result of our modifications, our students consistently gave outstanding evaluations to the course and the course lecturers.

A more advanced subject, Biochem 330 deals with advances in nutritional biochemistry. We reformulated the objectives to integrate knowledge on the biological roles of macro- and micronutrients and their metabolism using basic knowledge in biochemistry, molecular biology, and cell biology on their relationship to genetic makeup. In this course, a short lecture, case presentation, or oral reporting to initiate an open gadgets roundtable discussion was conducted. At the end of the discussion, the students were required to write a position paper on a controversial topic. The culminating activity was to present a research proposal on Nutritional Biochemistry. This activity prepared them for their comprehensive examination. Our graduates who took these courses—some of them now members of the faculty of other universities—apply our teaching approach to their students.



Professor [Gracia \(Grace\) Fe Yu \[grafeyu@gmail.com\]](mailto:grafeyu@gmail.com) worked at the Health Science Centre at the University of the Philippines Manila. Grace served as The Chair of Education of the FAOBMB for 6 outstanding years before stepping away from the role.



# Bringing together Aotearoa New Zealand's Biochemistry and Molecular Biology Educators in a Special Interest Group

**Dr Kathryn Jones**

Kia ora! I am an education-focused academic from New Zealand and a member of the New Zealand Society for Biochemists and Molecular Biologists (NZSBMB). Back in 2022 I attended the ComBio conference in Melbourne, Australia and was lucky to be selected to present in one of the education sessions. I presented work focused on developing student metacognition in my large second-year biochemistry course, and as I did so was thrilled to see a full room of others excited by biochemistry education. I had not presented an education talk to a crowded room before, and it felt like I had found 'my people'. Inspired by the experience when I arrived home I wondered how we could recreate the feeling of community for BMB educations here in New Zealand.

I discovered when talking to the session Chairs, Associate Professor Nirma Samarawickrema and Professor Tracey Kuit, that the Australian Society for Biochemistry and Molecular Biology had a dedicated education special interest group (SIG). Led by Tracey, the group met regularly over Zoom, organised events shared resources and championed excellence in biochemistry and molecular biology education. I was asked to be the education lead in our NZSBMB at this time and decided in the new role I would try to emulate the success of our Australian counterparts.

To raise the profile of education, educators, teaching practice and scholarship of teaching and learning first need to be visible, so the first initiative was to introduce education presentations to our national conference. The 2023 conference was celebrating NZSBMB's 50<sup>th</sup> anniversary and had wide interest from across the country with 250 registered attendees. For the first time, an education plenary was held and education talks were interspersed with research talks throughout the programme, in the same sessions rather than in a separate parallel session. This resulted in the majority of conference attendees learning about innovations in teaching practice and educational technology. The scheduling felt like a risky move, but the feedback was overwhelmingly positive and opened up conversations on teaching after sessions that otherwise may not have happened. One biochemistry professor commented, *"I never thought I would be discussing teaching with the invited (international, research) plenary speaker at the bar!"* Plans are in place to retain education talks in our next conference in 2025.

The second initiative was to bring together educators into a NZSBMB special interest group to form a community. The inaugural meeting of the SIG was at the 2023 conference (photo below) where academic and professional staff and graduate students from across the country met to talk about educational challenges in our field and institutions. The main takeaway was that a community, a way to share practice and collaborate was desired. While still in the early days of the SIG, a twice-yearly newsletter to the SIG shares information on conferences, prizes and service opportunities, and

members of the SIG have teaching visits to other universities planned. Regular Zoom networking meetings will be set up for next year to retain momentum and connection - a community is growing!



*The Inaugural NZSBMB SIG meeting at the 50th-anniversary conference of the society, November 2023. (Photo Credit: Wayne Patrick)*



*[Dr Kathryn Jones \[ks.jones@auckland.ac.nz\]](mailto:ks.jones@auckland.ac.nz) is a Professional Teaching Fellow at the School of Biological Sciences, University of Auckland, New Zealand. She is the inaugural Chair of the NZSBMB Society's Education Special Interest Group*

# Biochemistry and the Future

## Associate Professor Nuruliza Roslan

The applications of biochemistry extend far beyond the classroom. From developing life-saving drugs to understanding the molecular basis of diseases, biochemists are at the forefront of scientific innovation. Advances in biomolecular sciences, such as RNA-based therapeutics and CRISPR gene editing, promise to revolutionize medicine and improve countless lives.

As educators, we prepare the next generation of scientists, doctors, and researchers to navigate and contribute to this rapidly evolving field. Our role is to make biochemistry accessible and engaging and inspire students to explore its potential and pursue careers that make a difference.



*Nuruliza (far left) inspires the next generation of Biochemists with her enthusiasm for teaching Biochemistry*

### A Call to Explore the Molecular World

Biochemistry is not just a subject; it's a lens through which we can understand life's intricacies. Whether you're a student, a professional, or simply a curious individual, I invite you to explore this fascinating world. Pick up a book on molecular biology, watch a documentary on biochemical processes, or simply marvel at the complexity of the world around you. The molecules are waiting to tell their stories.

My recent experience at the Biomolecular Horizons 2024 (BMH 2024) conference in Melbourne, Australia, reaffirmed my belief in the power of biochemistry to inspire and educate. It has further inspired me to share the wonders of biochemistry with a broader audience.

As I continue my journey as a researcher and educator, I am committed to finding innovative ways to share this beautiful science with others. Together, let's celebrate the molecular symphony that is life.

I am currently a columnist for *The Malaysian Medical Gazette* ([The MMG Team - Columnists](#)) and just started a 6-episode podcast focusing on *The Wonderful World of Cells* on the USIM Podcast platform ([USIM Podcasts](#)). Additionally, I am a certified UNESCO CBPR Mentor (Community-Based Participatory Research). My role as a science communicator, which involves engaging with communities to share scientific knowledge, provides a unique and enriching perspective on the relationship between science and society.



Associate Professor [Nuruliza Roslan](#) ([nuruliza@usim.edu.my](mailto:nuruliza@usim.edu.my)) is an academic in the Faculty of Medicine and Health Science of the Universiti Sains Islam Malaysia, Malaysia. She is the recipient of the FAOBMB Education Special Travel Fellowship 2024 and presented her work at the [Biomolecular Horizons Conference 2024](#)

## Events for your calendar

1. FAOBMB2025 Conference (20-23 May 2025) in Busan, South Korea. For further details click on this [link](#).
2. Conference of the Higher Education Research and Development Society of Australasia (7-10 July 2025) in Perth, Western Australia. For further details click on this [link](#).
3. IUBMB Education Symposia (26-27 August 2025) in Kuala Lumpur, Malaysia. For further details click on this [link](#).
4. ASBMB2025 Conference (29 September - 2 October 2025) in Brisbane, Australia. For further details click on this link.
5. NZSBMB2025 Conference (11-14 November 2025) in Rotorua, New Zealand. The conference link is pending, please contact Dr Kathryn Jones ([ks.jones@auckland.ac.nz](mailto:ks.jones@auckland.ac.nz)) for further details