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IUBMB Trainee Initiative: supporting emerging biochemists and molecular biologists around the world

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The International Union of Biochemistry and Molecular Biology (IUBMB) Trainee Initiative aims to identify challenges experienced by biochemistry and molecular biology trainees and create programming to foster their growth and development as the next generation of scientists. Here, we highlight resources and events developed by the Trainee Initiative in their endeavor to support trainees around the world.

Founding the IUBMB Trainee Initiative

As president of the IUBMB, Dr Alexandra Newton recognized the need for increased financial and academic support for trainees at the forefront of biological discovery and founded the IUBMB Trainee Initiative (IUBMB TI)[i] in January 2022. The TI Leadership Committee started with a small group of passionate graduate students and has grown to include 17 trainees from 14 countries around the world. TI members are organized into four geographical regions representing North and South America (The Pan-American Association for Biochemistry and Molecular Biology, PABMB), Asia and Oceania (The Federation of Asian and Oceanian Biochemists and Molecular Biologists, FAOBMB), Europe (Federation of European Biochemical Societies, FEBS), and Africa (The Federation of African Societies of Biochemistry and Molecular Biology, FASBMB) (Figure 1). Together, these regions have run more than 13 virtual events, reaching hundreds of trainees around the world. In their mission to help aspiring researchers, the TI has four objectives: (i) promoting professional skills development, (ii) sharing scientific resources and knowledge, (iii) increasing inclusivity and accessibility in science, and (iv) making science more sustainable. We discuss herein the TI's past events and how they support its objectives in helping trainees overcome shared challenges.

Objectives of the TI

Objective 1: professional skills development

While graduate studies allow trainees to develop critical thinking and research skills, many students feel lost when looking for employment beyond their master's or PhD degrees. This prompted the TI to develop programming aimed at helping students build their professional profiles, network with industry experts, and learn about unconventional career paths in science.

Upon completion of their PhD degree, graduates commonly either remain in academia pursuing postdoctoral studies or pivot directly into industry careers. The *Marketing yourself for academia and industry* webinar[ii,iii] was designed with these trainees in mind. Dr Arjun Raj, a Professor of Bioengineering and Genetics at the University of Pennsylvania, discussed the benefits of pursuing a postdoc and what makes a good applicant, emphasizing a strong record of finishing projects and publications as key traits he looks for in potential postdocs. He also shared the importance of having a clear career direction when selecting a laboratory and to evaluate laboratory fit by noting the career paths of previous postdocs. The focus then shifted towards students foregoing a postdoc, opting instead for the benefits associated with working in industry, including better compensation, work–life balance, and access to the latest technology. Dr Kyle Hess, Proteomics Scientist at Bristol Myers Squibb, was invited to share his application journey. Dr Hess emphasized selecting roles that match your expertise and tailoring applications using measurable descriptors of previous relevant experiences. Dr Hess noted that industry resume formats are often superior to academic CVs, and highlighted how 'soft skills' can be framed to strengthen applications. Overall, both speakers emphasized the importance of finding an environment that fits both one's scientific aspirations and personal endeavors.

Throughout their studies, trainees may contribute to the discovery of novel therapeutics or workflows accelerating biomedical discovery. However, it is often an unclear and daunting process for trainees to channel their work into a scalable start-up company. To overcome this, the PABMB Region organized a webinar entitled 'From Academia to Innovation: Navigating the Start-up Journey'[iv,v]. The objective was to highlight the approaches and resources used by academic researchers-turned-entrepreneurs to commercialize their innovations and bring them to market. The session was led by three entrepreneurs who have successfully made the academia-to-start-up transition, including: Dr John Axerio-Cilies (Senior VP, Tempus), Dr Leandro Sanchez (Cofounder, Nat4Bio), and Dr Amy Strilchuk (Cofounder, SeraGene). Each speaker gave a brief overview of their career trajectory and the steps they took to identify, develop, and scale their unique ventures. During the open Q&A panel, the audience took interest in the options available to protect their innovation. Dr Strilchuk introduced the concept of intellectual property (IP) and the importance of filing provisional patents prior to conference presentations or publication of new technology. Drs Axerio-Cilies and Sanchez used

Figure 1. IUBMB Trainee Initiative Leadership Committee. From left to right, top to bottom, FAOBMB (The Federation of Asian and Oceanian Biochemists and Molecular Biologists): Jessie Wong Ling Ai (FAOBMB Region Leader), Ryan Lintao, Hui Lan Jong (X Coordinator); FEBS (Federation of European Biochemical Societies): Mihaela Jovanovic (FEBS Region Leader, Instagram Coordinator), Julia Meier, Teresa Rubio-Tomas; PABMB (The Pan-American Association for Biochemistry and Molecular Biology): Sunnie Kong (PABMB Region Leader), Sana Ahmed (LinkedIn Coordinator, Connections Page Manager), Maria Elisa Vazquez (Connections Page Manager), Rocio Meinero; FASBMB (The Federation of African Societies of Biochemistry and Molecular Biology): Aishatu Malami (FASBMB Region Leader), Victoria Patten (Publications Committee Representative), Douglas Njuguna, Arnold Anaasi and Oswald Djihinto. Communications Officer: Patrick Penndorf. Trainee Chair: Cathy Cozma.

their respective ventures to emphasize the value of determining potential market reach and profitability of a product, especially when raising capital. To conclude our session, the speakers shared the value of university technology transfer desks and non-academic incubators in supporting scientists undergoing commercialization of their technology.

Objective 2: sharing scientific resources and knowledge

Trainees rely on well-equipped laboratories and the ability to purchase high-quality reagents to progress their wet-lab research and ensure it remains competitive. In recent years, the rise of artificial intelligence (AI) has offered more accessible avenues of exploring scientific questions and meaningfully contributing to our understanding of biology. The FASBMB team recognized the value AI could bring in progressing trainee research, particularly in resource-limited institutions, and designed an event to showcase the applications of AI in biomedical research[vi]. Dr Chiranjib Chakraborty, a Biotechnology Professor at Adamas University in India, led the event and highlighted his group's work in characterizing and developing vaccines against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) with AI. Dr Chakraborty's work sparked conversation on the value of AI in fighting future pandemics, as well as showcasing the power of AI tools for early therapeutics development. Overall, this event reached more than 300 researchers around the world, with many trainees remarking on the applicability of the tools and techniques in their own research. Previous events covering protein design resources can be found at the TI website[vii].

Objective 3: increased inclusivity and accessibility in science

In recent years, biochemistry departments have shifted their hiring practices to be more inclusive of underrepresented backgrounds. Building on this trend, the TI supports inclusivity by highlighting scientists from all backgrounds through online webinars. The TI hopes diverse speaker engagement will inspire trainees from underrepresented groups to pursue science and take on leadership positions throughout academia and industry. Relatedly, TI representatives were invited to the 2024 Standing Committee for Gender Equality in Science (SCGES) panel to discuss the challenges faced by trainees from a variety of science, technology, engineering, and mathematics (STEM) disciplines and possible solutions[viii]. Key takeaways included the lack of support for females with families, limiting their ability to complete graduate school and pursue leadership roles, as well as the pay gap between male and female students, particularly in developing countries. The panel concluded with a call to action for attendees to advocate for improved university-wide policies protecting females and under-represented groups.

Within the TI Leadership Committee itself, we strive to have a balance of male and female membership from around the globe. Our strong female leadership among the region leaders and the chair has created a welcoming environment for our members to develop their networking and organization skills as well as to connect with other trainees facing similar challenges. With each new cohort of TI members, we hope to motivate incoming trainees from disadvantaged backgrounds to stay in biosciences research and help them navigate the unique challenges they face.

The IUBMB TI strongly believes in equal opportunity for all students pursuing biosciences research. Therefore, we have prioritized making our content more

accessible. Our online webinars are offered in both synchronous and asynchronous formats, with some additional resources being made available offline. This allows trainees from various time zones and levels of internet accessibility to engage with our content[ix]. In the future, we plan to add closed captioning in different languages to benefit non-English-speaking trainees. Last, through the IUBMB, numerous fellowships are available for the academic and professional development of trainees[x], including for conference travel and attendance, as well as research exchange opportunities. This ensures that trainees from resource-limited regions can develop their research skills.

Objective 4: sustainable science

Few scientists are aware that laboratory waste reduction can be achieved while maintaining high-quality research output. To overcome common misconceptions and to engage researchers in making science greener, Patrick Penndorf, a TI member, started ReAdvance[xi] [1]. ReAdvance is an international initiative which aims to share practical tips for reducing waste in the laboratory, design green protocols for wet-lab experiments [2], and highlight sustainable instrument alternatives. Their ultimate goal is to provide solutions for laboratory scientists looking to protect the environment while enhancing research efficency. Together with non-profit partners and industry experts, ReAdvance has hosted numerous free seminars on various topics such as motivating peers to adopt sustainable practices, the impact of funding bodies in promoting greener science, and using green laboratory practices to improve reproducibility and efficiency. Moving forward, the TI is dedicated to sharing ReAdvance's messaging on sustainable science practices with all trainees and educating researchers on the positive impact of green science on the health of our planet.

Looking forward

As a new initiative, we are focused on continuing to engage the biochemistry trainee community and to spread the word about our resources and events. To stay up to date with our future programming, join our mailing list[i]. If there is a specific webinar topic or resource trainees can benefit from, share your thoughts via the Trainee Connections Page[xii]. Last, as current members of the TI move on to the next stage of their research careers, we are recruiting passionate students to join our Leadership Committee. For more information, see Box 1.

Box 1. Benefits of joining the IUBMB TI Leadership Committee

- Leadership experience. Leadership positions on the TI allow students with various levels of training to gain experience fostering a focused work environment among individuals from a variety of academic and cultural backgrounds. Leadership positions include chair, region leader, social media coordinator, and focus project lead.
- Teamwork. Each region comprises three to five trainees who work together to develop region-specific resources and quarterly events. Beyond this, TI members from different regions collaborate with one another on various focus projects of interest to them.
- Project management. The TI mainly facilitates online webinars and, more recently, the delivery of focus projects which often involve various community stakeholders. Due to the geographical distribution of our team, spanning multiple time zones and diverse language backgrounds, we encounter several unique challenges when developing our events. These are overcome by the trainees in leadership positions through effective project management, to maintain the quality of our resources, and to reach event objectives.
- Networking. Many of our trainees get the opportunity to travel to international conferences representing their region, participate in seminars in collaboration with other scientific societies and work with fellow trainees across the world.

Applications to join us can be made online[xiii].

Resources

[i]hiips://iubmb.org/about/committees/iubmb-trainee-initiative

[ii]www.youtube.com/watch?v=ZZ1zMtlGdNc&t=2162s

[iii]hiips://iubmb.org/event/m arketing-yourself-for-careers-in-academia-industry/

[iv]wwwyoutubecom/watch?v=2sEtB6goagM&t=3s

[v]hiips://iubmb.org/event/from-academia-to-innovation-navigating-the-startup-journey/

[vi]hiips://iubmb.org/event/arti ficial-intelligence-in-biomedical-research/

[vii]hiips://iubmb.org/iubmb-trainee-initiative- first-event/

[viii]hiips://gender-equality-in-science.org/

[ix]hiips://iubmb.org/about/committees/iubmb-trainee-initiative/iubmb-trainee-initiative-events-archive/

[x]hiips://iubmb.org/activities/fellowship-programs/

[xi]hiips://re-advance.com/

[xii]wwwlinkedincom/groups/14402053/

[xiii]hiips://forms.gle/Cg8hmbCv8CvN2ELa7

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