BBS - Believe Become Succeed

Message from the Chair

As the year draws to a close, research continues to stand at the heart of the Department of Biological and Biomedical Sciences (BBS)'s mission. It is not simply an activity; it is an expression of our curiosity, our dedication to scientific advancement, and our responsibility to contribute meaningfully to the broader academic community. In October, the department hosted its 5th Annual Biological Sciences Conference, themed Biological Sciences: Innovation, Translation, and Impact. The response was noteworthy: 89 abstracts were received, with 64 selected for oral presentations, lightning talks, and poster sessions. The conference was marked by thoughtful scientific exchange, vibrant participation, and an encouraging display of emerging talent, an achievement that reflects the collective effort of our faculty, students, and staff.

Teaching and training remain a cornerstone of the BBS commitment, spanning both undergraduate and graduate education. This year, the Research Module in Year II of the UGME program once again demonstrated the strength of this commitment. Designed to immerse students in bench science, the 2025 cohort was guided by 18 dedicated faculty members, working across 56 diverse research projects. As our UGME students prepare for their professional examinations, our faculty continue to provide mentorship and guidance that uphold the highest standards of scientific training. Equally, at the graduate level, the successful defense of 14 MPhil theses reflects the dedication of our students and the invaluable support of their supervisors. We now look forward to welcoming the next MPhil cohort, with preparations for their orientation already underway, ensuring that our commitment to nurturing the next generation of scholars remains steadfast.

I welcome you to explore this edition of the BBS newsletter, where you will find a glimpse of our recent milestones and initiatives. And I end this note with my gratitude for everyone's continued dedication and contributions, which make our collective pursuit of excellence in research, teaching, and scholarship possible.

5th Annual Biological Sciences Conference

The 5th Annual Biological Sciences Conference brought together researchers, clinicians, and trainees for a full day of scientific exchange. The event opened with remarks from institutional leaders, followed by an inspiring address by the Chief Guest, Mr Zia Akhter Abbas, the CEO of The Citizens Foundation. The scientific program featured two main themes: *Emerging Paradigms in Drug Delivery, Gene Therapy, and Cellular Engineering* and *Advances in Metabolic and Cancer Research*. Invited talks highlighted innovations in biomaterials, inherited cancers, and gene-editing therapies, complemented by diverse oral presentations covering CRISPR applications, metabolic disorders, neurodevelopmental diseases, and novel therapeutic approaches. Attendees also engaged with parallel poster sessions and a keynote lecture by Dr Simon Reed from Cardiff University.

The afternoon showcased dynamic lightning talks spanning precision nanocarriers, inflammatory disease models, KRAS-related oncology research, neurogenetic variants, and insights into long-COVID. The program concluded with *The Curious Lens*, a reflective segment led by trainees, followed by closing perspectives, award announcements, and a networking session. The conference was supported by dedicated committees, faculty mentors, and a large team of volunteers, highlighting the collaborative spirit behind this growing annual event.

Strengthening Skills Through Conference Workshops

As part of the 5th Annual Biological Sciences Conference, a series of impactful pre- and post-conference workshops were conducted to enhance research and academic capacity among participants.

The pre-conference sessions included a workshop on *Peer Mentoring for Students: Building Supportive Academic Communities*, led by Dr Rehana Rehman, MPhil Director, BBS, and co-facilitated by Dr Ambereen Surti from BBS and Dr Rahila Ali from the Department of Educational Development. Another key session, *From Clicks to Code: Mastering Health Data with SPSS and R*,

was led by Dr Najeeha Iqbal, Vice Chair Research, BBS, with support from Dr Sadia Fatima and Dr Faisal Fahim.

The conference concluded with a post-conference workshop by Dr Ambrin Fatima, co-facilitated by Dr Hammad Yousuf on *CRISPR/Cas9 Genome Editing in Model Systems*, offering hands-on insights into both in vitro and in vivo gene-editing approaches.

Faculty & Staff Achievements

Academic Leadership Development Workshop: Empowering HER

BBS, in collaboration with the Department of Continuing Professional Education, hosted a full-day *Academic Leadership Development Workshop: Empowering HER* on August 9, 2025. The workshop highlighted the growing recognition of women's leadership within Pakistan's academic landscape and provided participants with practical skills in mentorship, networking, and leadership development.

BBS faculty members Dr Satwat Hashmi and Dr Ambreen Surti facilitated the sessions, offering guidance on navigating leadership challenges and planning career growth. Their involvement underscored the department's commitment to supporting women scholars.

The workshop also featured insights from distinguished speakers and was supported by the MBBS Class of 1988 Training Workshops/Courses – Round 4, reinforcing the University's dedication to fostering inclusive and empowering learning environments.

Enhancing First Aid Training Competency in the Community

Dr Amber Palla and her team, on behalf of BBS, successfully conducted a DCPE-approved workshop titled *"Enhancing First Aid Training Competency in the Community"* on Monday, October 13, 2025. The session was hosted by the Workshop Committee of the 2nd International Allied Health Conference.

The hands-on training received an overwhelmingly positive response, with participants showing unwavering energy and engagement throughout, reflecting the community's strong commitment to preparedness and lifelong learning.

The workshop was delivered with support from the Centre for Innovation in Medical Education (CIME), whose collaboration was instrumental in executing this competency-based training. Facilitators Mahwish Fatima, along with dedicated students Rohaan Ali and Yasir Aziz, played a key role in driving the workshop's success through their ownership and active involvement.

Promoting Responsible Antibiotic Use

Additionally, Dr Palla along with AKU alumna Dr Amna Hanfee, successfully conducted a DCPE-approved, hands-on training workshop on the rational use of antibiotics in managing upper respiratory tract infections. The session was supported by Dr Syed Faisal Mehmood and Dr Nosheen Nasir from the Adult Infectious Diseases Section, Department of Medicine.

The workshop aimed to strengthen healthcare professionals' understanding and clinical practices through the TARGET-inspired antibiotic toolkit, promoting responsible antibiotic prescribing and use. Participants engaged in interactive, evidence-based discussions, case scenarios, and reflective exercises, enhancing their ability to combat antimicrobial resistance (AMR), a rapidly escalating global health concern.

Teaching Innovation

BBS continues to advance pharmacology education through simulation-based learning. Furthermore, building on prior experience, Dr Palla also introduced enhanced simulation scenarios this year to strengthen conceptual understanding and promote applied learning in a realistic, engaging environment.

Led by Dr Amber, the action team included Dr Hasan Salman Siddiqi and Rabia Aiman from BBS, Dr Ayesha Ahmed, Iqra Navroz, and Mr Ghalib from CIME, with the pre-design research team comprising Ms Shirin Rahim (Faculty, SON; PhD Scholar) and medical students Dawar Zahid and Ruwa Rahim. This collaboration highlights faculty and student teamwork in designing, implementing, and debriefing simulations.

By linking pharmacology to clinical context, the initiative helps students connect theory with practice and develop problem-solving and communication skills. Student feedback emphasized that sessions made concepts come alive, improved their understanding of drug mechanisms, and were transformative, interactive, and confidence-building.

This effort reflects the department's commitment to pedagogical innovation, paving the way for interactive learning models that enhance engagement and deepen understanding in biomedical sciences.

Plenary Talk at APBEN 2025

Dr Kulsoom Ghias presented a plenary session titled *"Whose ethics? Bioethics teaching and learning in context"* at the Asia Pacific Bioethics Network (APBEN) 2025 conference held in Hong Kong this October. The session highlighted the importance of context in bioethics education and its influence on teaching and learning practices across diverse settings.

Academic Excellence at IMEC ICME 2025

At the IMEC ICME 2025 conference in Kuala Lumpur, Malaysia, two notable symposiums featured contributions from our colleagues:

- *Excellence across borders: The AMEE story of global recognition, partnership and scholarship* – Lloyd A, Ghias K, Atta K, Nadarajah V.
- *Teaching ethics and professionalism in health professions education: Globalisation with decolonization* – Lau W-M, Calderon P, Shamim MS, Ghias K.

These presentations highlighted innovative approaches to global collaboration, ethics, and professionalism in health professions education, showcasing our commitment to advancing excellence and scholarship in the field.

Advancing Research Through AI Capacity Building

Dr Sadia Fatima delivered a rich series of AI-focused workshops strengthening research capacity and digital competency across multiple departments. Her sessions included AI-enhanced research workflows, manuscript writing, and literature search training under the Fundamentals of Research Course. She conducted specialized workshops on AI for scholarship in postgraduate medical education and introduced VoiceSim for AI-powered clinical encounters.

Dr Fatima also led sessions on prompt craftsmanship, generative AI, and health data analysis using AI. Additional contributions included training on the use of AI in protocol writing, the role of AI as a research co-pilot, and applications of AI in oncology research, collectively supporting a culture of innovation and technology-driven inquiry at AKU.

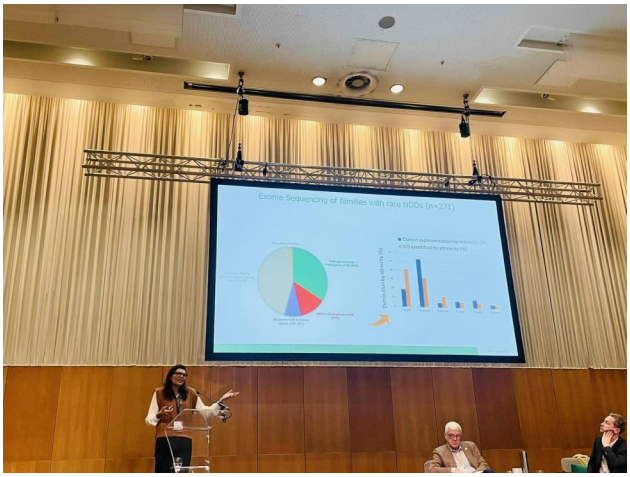
Global Engagements in Genomics and Rare Disorders

Dr Ambrin Fatima actively engaged in genomics and rare disorder initiatives at both international and national levels. She attended as a collaborator, *Undiagnosed Disease Network International (UDNI) Hackathon* at Mayo Clinic, Minnesota, USA, addressing undiagnosed cases of rare disorders.

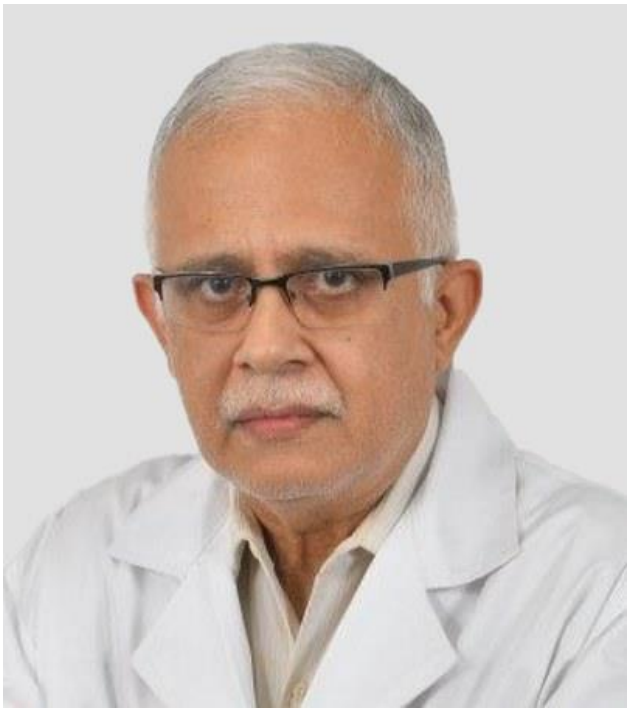
Nationally, Dr Fatima alongside Dr Shahid Mahmood Baig served as a panelist on *Decoding the AT&CG of Life: Genomics, Personalized Medicine, and Precision Public Health* at the *International Conference on the Future of Healthcare* in Islamabad, where Dr Hammad Yousuf, postdoctoral fellow at BBS, presented his research.

Additionally, Dr Fatima also delivered an oral talk on global genomics data from the Pakistani population during the *20th Manchester Dysmorphology and Developmental Disorders*

Conference in Manchester, USA, highlighting her contributions to advancing genomics research and precision medicine.



International Advisor for Royal College of Physicians and Surgeons of Glasgow



Dr Hasanat Sharif, joint appointee with the Department of Surgery and BBS, has been appointed as the new International Advisor for Pakistan by the Royal College of Physicians and Surgeons of Glasgow. His appointment highlights his dedication to fostering international collaboration and advancing the College's mission in the region.

In this role, Dr Sharif will serve a three-year term, actively participating in three to four virtual advisory meetings each year, helping to guide the Pakistan advisory group.

ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF GLASGOW

MSDT-One Health Mentor

Dr Shakil Saghir, visiting faculty at BBS, and faculty at the Institute of Environmental Science and Meteorology (IESM), University of the Philippines Diliman, has been selected as a mentor for the NIH-funded Mentoring and Skills Development Training Program in One Health (MSDT–One Health).

Hosted by the University of California, Davis, the program strengthens research and mentoring capacity in toxicology and transdisciplinary One Health science. Dr Saghir will guide early-career scientists and students working at the intersection of human, animal, and environmental health.

Senior Mentor for NIH-Funded Program

Dr Saghir has also been selected as a Senior Mentor for the Mentoring and Skills Development Training Program in One Health (MSDT–One Health) for 2025–2026.

Hosted by the University of California, Davis, and funded by the US National Institutes of Health (NIH), the program aims to build research and mentoring capacity in toxicology and transdisciplinary One Health science, integrating human, animal, and environmental health. In his role, Dr Saghir will guide early-career scientists and students conducting research at the interface of health and the environment, strengthening collaboration and knowledge exchange across disciplines.

This recognition underscores Dr Saghir's dedication to mentorship and advancing global One Health initiatives.

The Health Corner

Good Sleep: Healthy Heart

In our persistently paced modern lives, sleep often takes a backseat, perceived as a luxury rather than a fundamental necessity. Yet, beneath the surface of our conscious awareness, an important physiological harmony unfolds during sleep. It profoundly affects the health and resilience of our cardiovascular system. To truly nurture a healthy heart, we must recognize sleep not merely as a period of inactivity, but as an active and vital process of rest and recovery, intricately linked to the complex workings of our circulatory engine.

At its core, sleep provides the heart with a much-needed break from its tireless labor. Throughout our waking hours, the heart diligently pumps blood and delivers oxygen and nutrients to every corner of our body. To accomplish this task, your heart constantly adjusts its rate and force in response to physical activity, emotional states, and environmental signals. Sleep offers a period of relative calm. Heart rate and blood pressure naturally dip during the deeper stages of sleep, reducing the workload on the cardiac muscle and its blood vessels. This nighttime dip, known as nocturnal dipping, is not just a passive slowing down; it's an active physiological process regulated by the autonomic nervous system. This nervous system regulates involuntary physiologic processes including heart rate, blood pressure, respiration, digestion, and sexual arousal. The reduction in cardiac demand allows the heart muscle to recover and repair, much like any other hardworking muscle in the body. Chronic sleep deprivation disrupts this crucial dipping pattern, keeping heart rate and blood pressure elevated even during the night, effectively forcing the heart to work harder for longer periods, increasing the risk of hypertension and other cardiovascular complications.

Beyond simply reducing workload, sleep plays a vital role in regulating key physiological processes that directly impact heart health. One such process is the management of inflammation. Chronic inflammation is now recognized as a significant contributor to the development and progression of atherosclerosis, the buildup of plaque in the arteries. During sleep, the body actively works to regulate inflammatory pathways. Sufficient sleep allows for the release of anti-inflammatory cytokines. The cytokines are proteins that help control inflammation in your body. They allow your immune system to mount a defense if germs or other substances that can make you sick enter your body. On the other hand, inadequate sleep disrupts this delicate balance, leading to elevated levels of inflammatory molecules circulating in the bloodstream, thereby increasing the risk of endothelial dysfunction. This dysfunction of endothelium acts as a precursor to plaque formation in the blood vessels.

Sleep profoundly influences metabolic health as well, which is intimately linked to cardiovascular well-being. Sleep deprivation disrupts sugar digestion and insulin sensitivity, increasing the risk of insulin resistance and type 2 diabetes. They both are major risk factors for heart disease. Hormones that regulate appetite are also thrown off balance by insufficient sleep, potentially leading to increased food intake, weight gain, and obesity, further straining the cardiovascular system. The intricate hormonal dance that occurs during restorative sleep is essential for maintaining metabolic equilibrium and protecting the heart from the downstream consequences of metabolic dysfunction.

The effect of sleep extends even to the complex workings of our blood vessels. The endothelium is a delicate inner lining of blood vessels. It plays a critical role in regulating blood flow, preventing blood clot formation, and maintaining vascular tone. The vascular tone is the degree of contraction of the muscle lining the blood vessel walls, affecting how much blood can pass through. Chronic sleep loss impairs endothelial function, making blood vessels less flexible and more prone to constriction. This can lead to increased blood pressure and an elevated risk of heart attacks and strokes. Adequate sleep, on the other hand, supports healthy endothelial function, ensuring the smooth and efficient flow of blood throughout the circulatory system.

The notion of "sleeping your way to a healthier heart" is not merely a comforting proverb; it is grounded in fundamental physiological principles. Prioritizing sufficient and quality sleep, we actively invest in the long-term health and resilience of our cardiovascular system, allowing our tireless heart to continue its vital work with greater ease and efficiency. Recognizing sleep as an indispensable pillar of heart health is a significant step towards a life lived with a stronger and more vibrant circulatory engine.

By: Dr Saadia Saad

Senior Instructor, BBS, AKU

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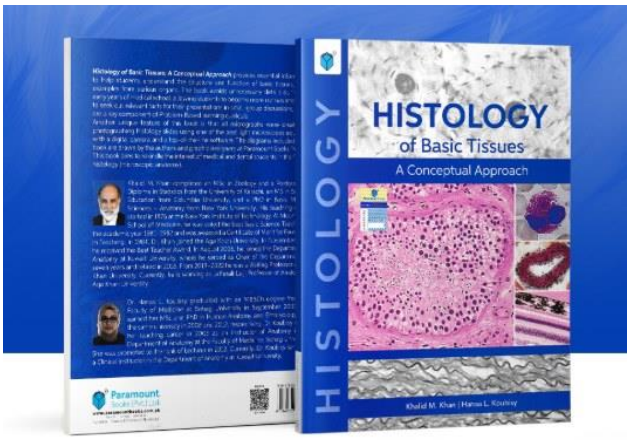

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