

Hashim Salar

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Education and licensing

2021 to present	Bachelor of Medicine and Bachelor of Surgery (MBBS) The Aga Khan University, Karachi Clinical Honors in Community Health Sciences (2024). Clerkships include general surgery (12 weeks), surgery and critical care sub-internships, internal medicine, paediatrics, and obstetrics and gynaecology.
2020 to 2021	Natural Sciences and Computational Sciences (two semesters) Minerva University, San Francisco Minerva Scholarship. Coursework in complex systems, formal analyses and empirical analyses.
2016 to 2020	Secondary and Higher Secondary School Certificates Cadet College Hasanabdal HSSC 2020: 1st of about 71,000 candidates, Rawalpindi Board (gold medal); class rank 1 of 108. SSC 2018: 11th of about 125,000 candidates, Rawalpindi Board.
January 2026	USMLE Step 1: Passed
2026	ACR-AMSER Standardized Tool for the Assessment of Radiology Students (STARS): Scored 92%, against a national average of 74.4% and an institutional average of 80% (Cleveland Clinic)

Research funding

April 2023	The Agency Fund, Global Math Talent Grant (US\$183,796) Evaluating the impact of the National Science Bowl Pakistan programme on high school students' STEM engagement, performance and career aspirations: a randomised controlled trial. Principal investigator: Prof. Asim Ijaz Khwaja. Role: co-wrote the proposal.
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Peer-reviewed publications

- Gadani S, Chou E, Chansangrat J, **Salar H**, Kapoor B. Advances in interventional oncology for hepatocellular carcinoma. *Cancers*. 2026;18(20):3319. doi:10.3390/cancers18203319
- Waqar U, Rupji M, Salar M, **Salar H**, Devin CL, Olson TJP, Liu Y, Sullivan P, Rosen SA. Impact of adjuvant chemotherapy on overall survival in early-onset stage II-III mucinous adenocarcinoma of the colon: a propensity-based analysis. *Journal of Surgical Oncology*. 2026;134(5):720-729. doi:10.1002/jso.70344
- Salar H**, Anns KM, Salar M, Khan F, Aman M, Zafar U, Ahmad I, Basharat S, Murad R, Salar K, Anwar SSM. From gut to gray matter: a case report of posterior reversible encephalopathy syndrome in a pediatric patient with celiac disease. *Clinical Case Reports*. 2025;13(3):e70260. doi:10.1002/ccr3.70260
- Salar M*, **Salar H***, Ali SMF, Qureshi A, Jamil MA, Waseem S, Jehanzeb H, Mahmud O, Saleem A, Waqar MA. Glucocorticoids for pain flare prophylaxis after palliative radiotherapy for bone metastases: a systematic review and meta-analysis of randomised controlled trials. *BMJ Supportive & Palliative Care*. Published online 1 October 2025. doi:10.1136/spcare-2025-005680 (joint first authors)

5. Ahmed S, Waqar U, **Salar H**, Salar M, Irshad HA, Khan MMM, Shields MC, Olson TJP, Rosen SA. Association between objective performance indicators and patient outcomes in robotic surgery: a systematic review. *Journal of Robotic Surgery*. 2025;20(1):65. doi:10.1007/s11701-025-03031-8
6. Anns KM, Salar M, **Salar H**, Khan F, Memon WA, Aman M, Zafar U, Minhas K, Zafar H, Shahid J. Duodenal stricture secondary to IgG4-related chronic sclerosing duodenitis: a case report with review of the literature. *Clinical Case Reports*. 2024;12(6):e8980. doi:10.1002/ccr3.8980
7. Martins RS, **Salar H**, Salar M, Luo J, Poulikidis K, Razi SS, Latif MJ, Tafuri K, Bhora FY. Making minimally invasive procedures more sustainable: a systematic review comparing the environmental footprint of single-use versus multi-use instruments. *World Journal of Surgery*. 2024;48(9):2212–2223. doi:10.1002/wjs.12286

As a group collaborator

8. Waqar U, Ahmed S, Fatimi AS, et al.; PakSurg Collaborative. Epidemiology and risk factors of surgical site infections in elective surgeries in Pakistan (2022–2023): a multicentre, prospective cohort study from PakSurg 1. *The Lancet Regional Health – Southeast Asia*. 2026;50:100786. doi:10.1016/j.lansea.2026.100786 Role: Collaborator and steering committee member.
9. Martins RS, Ahmed W, Mahar MU, et al.; Global Eco-Health Collaborative. Beyond the operating room: surgeons' perceptions of the environmental footprint of the healthcare sector. *British Journal of Surgery*. 2025;112(5):znaf088. doi:10.1093/bjs/znaf088 Role: Collaborator.

Accepted

1. Rehman B, Sagri N, **Salar H**, Rao O, Salar M, Kirmani S, Arif M. A novel PPP1R12A (c.2530C>T) variant associated with 46,XY atypical genital development: a case report. *JCEM Case Reports* (accepted).

Preprints

1. Hussain AS, Yousuf HMA, Salar M, **Salar H**, Munir R, Schmölzer G, Hoodbhoy Z, Rizvi A, Khan U, Zakai F. Automated versus manual oxygen control in preterm infants on respiratory support: a randomised crossover trial. *Research Square*. Posted 3 September 2026. doi:10.21203/rs.3.rs-10655696/v1

Manuscripts under review

1. Salar M*, **Salar H***, Ahmad R*, Rehman A, Waqar MS. Prevalence of diabetic retinopathy among patients with diabetes mellitus in Pakistan: a systematic review and meta-analysis.
2. **Salar H**, Salar M, Qureshi A, Bin Faisal A, Fatimi A, Sidhwa A, Asim Z, Mahmud O. Outcomes of same-day discharge after colectomy: a systematic review and meta-analysis.
3. **Salar H**, Salar M, Agrawalla A, Khan MA, Fatimi AS, Mahmud O. Multidisciplinary simulation in surgical education: a systematic review.
4. Sohail SH*, Salar M*, **Salar H***, Madni V, Ahmed A, Khan S, Haroon F, Ahmed F, Kamal AK. Simulation-based training for mechanical thrombectomy: a systematic review of educational quality and skill acquisition.
5. **Salar H**, Salar M, Zafar B, Ameen A, Mallick MZU, Zafar U, Iqbal J, Azeemuddin M, ul Haq T, Fazal K. Transhepatic embolization of a high-flow variceal pouch in a spontaneous ovarian–ileocolic–IVC shunt: a rare cause of hemorrhagic shock in decompensated cirrhosis.
6. Raja MHR, Kim JY, Khan NS, Manji AAA, Khan SD, Nasim Z, Salar M, **Salar H**, Aziz K, Hogg HDJ, Hassan A, Balu S, Hoodbhoy Z, Sendak M, Samad Z. Understanding artificial intelligence adoption in Pakistani healthcare: a qualitative analysis of stakeholder perspectives.
7. Umer A, Salar M, **Salar H**, Muzammil M, Arshad A. Associations between antimicrobial drugs and hospitalization outcomes in sepsis-coded patients at a tertiary care hospital in Pakistan: a cohort study.
8. Lone MD, Haroon F, Durrani A, Salar M, **Salar H**, Silat HA. Efficacy and safety of Kv7 (KCNQ) channel openers in depressive disorders: a systematic review and exploratory meta-analysis.

9. Shamim F, Slote MU, Shafiq F, Kukreja B, Salar M, **Salar H**. Effect of intravenous lidocaine on immediate post-operative pain, nausea and vomiting in patients undergoing laparoscopic cholecystectomy: a randomized placebo-controlled trial.
10. Fazal ZZ, Kumari S, Fatima SK, Salar M, **Salar H**, Usmani BA, Rani M. Marks behind the mask: nationwide insights on new-onset facial dermatoses in university students observed during the COVID-19 pandemic.
11. Salar M, **Salar H**, Martins RS. Who performs your peer review at a leading surgical journal?.
12. Afridi SB, Hussain AS, Salar M, **Salar H**, Shamim N, Zaheer H, Hoodbhoy Z, Rizvi A, Quraishi Z. Turning screens into scanners: validation of Picterus Jaundice Pro, a smartphone tool for bilirubin estimation in newborns.
13. Khan MM, Waqar MS, Rizvi SSA, **Salar H**, Salar M, Ajwad MN, Fatimi AS, Khan S. Updated comparison of Karydakos and Limberg flap procedures in pilonidal sinus surgery: a systematic review and meta-analysis.
14. Salar M, **Salar H**, Anns KM, Khan F, Aman M, Memon WA, Khan P, Ashraf N, Siddiqui NR, Abbas Q. Pneumorrhachis associated with pneumothorax, pneumomediastinum, and surgical emphysema in a child after posterior fossa tumor resection: a case report.
15. Martins RS, Akhund R, Saqib S, Khan FA, **Salar H**, Salar M, Evans L, Corey BL. Sex-based disparities in the research productivity of final year general surgery residents across the United States.
16. Faruqui N, Kashif U, Abdullah K, Aurakzai A, Asim Z, Qureshi A, Naveed HK, Malik A, Baloch N, Salar M, **Salar H**, Chughtai NG. Efficacy and safety of sacral neuromodulation for neurogenic lower urinary tract dysfunction: a systematic review and prevalence meta-analysis.
17. Salar M, Abdullah K, **Salar H**, Kashif A, Javaid D, Qureshi A, Jaskani H, Jahangir A, Nasser H, Khokhar A, Qayum A, Inam A. Knowledge, attitudes and practices regarding dietary patterns and perceived barriers to a balanced diet among healthcare shift workers at a tertiary care hospital in Pakistan: a cross-sectional study.
18. Mahalleh M, Moradi K, **Salar H**, Mohajer B, Brett A, Roemer F, Guermazi A, Demehri S. Statin use and longitudinal changes in knee MRI-derived three-dimensional bone shape: data from the Osteoarthritis Initiative.

Conference abstracts

1. Mahmud O, Fatimi AS, Daudi A, Adnan U, **Salar H**, Salar M, Tok NS, Scheepens J, Halm D, Morgan K, Kluger MD, Cohen N, Hewitt DB, Sacks GD, Wolfgang CL, Javed AA. Surgical and oncological outcomes after multivisceral resection for pancreatic ductal adenocarcinoma: a systematic review and meta-analysis. AHPBA 2027 Annual Meeting, United States, 2027. Submitted.
2. Ahmed A, Rizvi SA, Khan H, Salar M, Fatimi AS, **Salar H**, Fatimi SH. Unequal voices: an analysis of global authorship trends in top cardiothoracic surgery journals. 21st Annual Academic Surgical Congress, Orlando, United States, February 2026.
3. Abdullah K, **Salar H**, Salar M, Qadri A, Yaqoub S. ANCA-negative crescentic transformation of primary membranous nephropathy. International Student Research Conference (ISRC) 2026, Karachi, Pakistan, 2026. **Outstanding Poster Award.**
4. Lone MD, Haroon F, Durrani A, Salar M, **Salar H**, Silat HA. Efficacy and safety of Kv7 (KCNQ) channel openers in depressive disorders: a systematic review and exploratory meta-analysis. International Student Research Conference (ISRC) 2026, Karachi, Pakistan, 2026. **Outstanding Poster Award.**
5. Shamim F, Slote MU, Shafiq F, Kukreja B, Salar M, **Salar H**. Effect of intravenous lidocaine on immediate post-operative pain, nausea and vomiting in patients undergoing laparoscopic cholecystectomy: a randomized placebo-controlled trial. 3rd International Student Research Conference (ISRC), Karachi, Pakistan, September 2025.

6. Sohail SH, **Salar H**, Salar M, Ahmed A, Madni V, Khan S, Kamal A. Simulation-based teaching in mechanical thrombectomy: a systematic review. *3rd International Student Research Conference (ISRC)*, Karachi, Pakistan, September 2025.
7. Fazal ZZ, Kumari S, Fatima SK, Salar M, **Salar H**, Usmani BA, Rani M. Marks behind the mask: nationwide insights on new-onset facial dermatoses in university students observed during the pandemic. *International Congress of Dermatology 2025*, Rome, Italy, June 2025.
8. Salar T, Salar M, Eisa M, **Salar H**, Hanafi A, Karki R. Differences in in-hospital outcomes of atrial fibrillation ablation in patients with and without coronary artery bypass grafting: an NIS (National Inpatient Sample) study. *Heart Rhythm* 2025, San Diego, United States, April 2025. *Heart Rhythm*. 2025;22(4):S495–S496.
9. Waqar U, Rupji M, Salar M, **Salar H**, Devin CL, Olson TJP, Liu Y, Sullivan P, Rosen SA. Impact of adjuvant chemotherapy on overall survival in early-onset stage II–III mucinous adenocarcinoma of the colon: a propensity-based analysis. *Society of Surgical Oncology Annual Meeting*, Tampa, United States, March 2025. Podium presentation.
10. Martins RS, Akhund R, Saqib S, Khan FA, **Salar H**, Salar M, Evans L, Corey BL. Sex-based disparities in the research productivity of final year general surgery residents across the United States. *20th Annual Academic Surgical Congress*, Las Vegas, United States, February 2025.
11. Salar M, **Salar H**, Umer M, Khwaja AH, Sirang Z. Comparative efficacy and safety of manual small-incision cataract surgery (MSICS) versus phacoemulsification: a systematic review and meta-analysis of randomized controlled trials. *Khyber EYECON 2025*, Peshawar, Pakistan, February 2025.
12. Shamim F, Slote MU, Shafiq F, Kukreja B, Salar M, **Salar H**. Effect of intravenous lidocaine on immediate post-operative pain, nausea and vomiting in patients undergoing laparoscopic cholecystectomy: a randomized placebo-controlled trial. *AKU Annual Surgical Conference 2025*, Karachi, Pakistan, 2025.
13. **Salar H**, Salar M, Qureshi A, Bin Faisal A, Fatimi A, Sidhwa A, Asim Z, Mahmud O. Outcomes of same day discharge after colectomy: a systematic review and meta-analysis. *AKU Annual Surgical Conference 2025*, Karachi, Pakistan, 2025.
14. Anns KM, Salar M, **Salar H**, Khan F, Memon WA, Aman M, Zafar U, Minhas K, Zafar H, Shahid J. Duodenal stricture secondary to IgG4-related chronic sclerosing duodenitis: a case report with review of the literature. *Liaquat National Hospital Symposium 2025*, Karachi, Pakistan, 2025.
15. **Salar H**, Anns KM, Salar M, Khan F, Aman M, Zafar U, Ahmad I, Basharat S, Murad R, Salar K, Maheen A, Shayan S. From gut to grey matter: a case report of posterior reversible encephalopathy syndrome in a pediatric patient with celiac disease. *Liaquat National Hospital Symposium 2025*, Karachi, Pakistan, 2025.
16. Sohail SH, **Salar H**, Salar M, Ahmed A, Madni V, Khan S, Kamal A. Simulation-based teaching in mechanical thrombectomy: a systematic review. *SIMPACT 2025*, Karachi, Pakistan, 2025.
17. Martins RS, **Salar H**, Salar M, Luo J, Latif MJ, Poulikidis KP, Razi SS, Bhora F. Eco-friendly minimally-invasive procedures: are multi-use instruments truly better for the environment?. *American College of Surgeons Clinical Congress 2024*, San Francisco, United States, October 2024. *J Am Coll Surg*. 2024;239(5 Suppl):S226–S227.
18. Nisar M, Iqbal A, Anns KM, **Salar H**, Salar M, Khan YB. Comparative outcomes of semi-continuous and interrupted suturing techniques in mitral valve replacement for rheumatic heart disease: a retrospective cohort analysis. *PULSE 2024*, Karachi, Pakistan, January 2024.
19. Khan YB, Faisal M, Iqbal A, Anns KM, Salar M, **Salar H**, Nasir A. One-year outcomes of St. Jude Medical (SJM) mechanical valve replacement: mortality and morbidity analysis in a resource-constrained cardiac centre. *PULSE 2024*, Karachi, Pakistan, January 2024.
20. Salar M, **Salar H**, Ali SF, Qureshi A, Jehanzaib H, Jamil MA, Mahmud O. Effectiveness of prophylactic glucocorticoids for pain flare prophylaxis in patients with bone metastases undergoing radiotherapy: a systematic review and meta-analysis. *2nd International Student Research Conference (ISRC)*, Karachi, Pakistan, 2024. **Poster of Distinction**.

Invited talks and panels

1. The synergy equation: building effective research teams. 3rd International Student Research Conference (ISRC), 2025 (panellist).
2. The AI copilot: a partner in research. National Health Science Research Symposium, 2025 (invited speaker).

Ongoing projects

1. Evaluating the impact of the National Science Bowl Pakistan (NSB-P) programme on high school students' STEM engagement, performance and career aspirations: a randomised controlled trial. Randomised controlled trial, randomised at school level. Role: First author and research team member.
2. Non-invasive high-frequency oscillatory ventilation versus nasal intermittent mandatory ventilation as primary respiratory support in preterm neonates with respiratory distress syndrome: a non-inferiority randomised controlled trial. Non-inferiority randomised controlled trial in preterm neonates. Role: Co-author.
3. Effectiveness of non-invasive high-frequency oscillatory ventilation versus nasal intermittent mandatory ventilation as post-extubation respiratory support in neonates born at ≥ 26 weeks' gestation: a randomised clinical trial (NOV-A). Randomised clinical trial in neonates born at 26 weeks or later. Role: Co-author.
4. Effect of topical tranexamic acid vs. normal saline on post-operative bleeding in pediatric open-heart surgery: a double-blinded randomized controlled trial (TANS trial). Double-blind randomised controlled trial. Role: First author.
5. Automated assessment of vertebral bone mineral density, spinal sarcopenia and fracture risk from chest CT in chronic obstructive pulmonary disease. Multi-cohort imaging study using deep learning segmentation (NIH grant proposal in development). Role: Contributed to the research strategy and methods of the NIH proposal, and to the segmentation and machine learning work: 3D thoracic vertebral segmentation (T1 to T10) with modified TotalSegmentator and nnU-Net, HU calibration, volumetric BMD and paraspinal muscle features.
6. Development and evaluation of a structured conference abstract scoring tool for capacity development in peer review. Instrument development and psychometric evaluation (content validity, inter-rater and test-retest reliability). Role: Developed the abstract scoring criteria and led the validation study.
7. Nasopharyngeal transcriptomic profiling of unvaccinated COVID-19 patients reveals translational shutdown, mucosal immune suppression, and convergence on neurodegenerative pathway gene sets. Secondary analysis of public RNA-seq data (GSE152075). Role: First author.
8. Assessment of awareness, perceptions, and barriers to environmental sustainability analyses in healthcare randomized controlled trials: a global survey of corresponding authors. Global cross-sectional survey. Role: First author.
9. Retrospective validation of the PMCardio AI to estimate left ventricular ejection fraction from 12-lead ECG at Aga Khan University Hospital, Karachi. Retrospective diagnostic validation study. Role: Co-author.
10. Inequality, coded: a systematic review evaluating gender bias in large language models used in healthcare. Systematic review. Role: Second author.
11. Anticoagulation after atrial fibrillation ablation: an umbrella review with a source-verified randomized trial synthesis. Umbrella review with randomised trial synthesis. Role: Co-author.
12. Gender and geographic disparities in cardiothoracic surgery research arise at journal placement, not at citation. Bibliometric analysis. Role: Co-author.
13. Incidence of dry eye disease following manual small incision cataract surgery (MSICS), phacoemulsification, and femtosecond laser-assisted cataract surgery (FLACS): a systematic review and meta-analysis. Systematic review and meta-analysis. Role: Second author.

14. Emerging and established pharmacotherapies for steatohepatitis and hepatic fibrosis in MASLD: a clinical review. Clinical review. Role: Co-author.
15. Top 100 cited articles from The Journal of Bone and Joint Surgery (JBJS): a bibliometric analysis. Bibliometric analysis. Role: Co-author.
16. Non-linear association between healthcare expenditure and in-hospital mortality in sepsis: a retrospective cohort study from a Pakistani tertiary care center. Retrospective cohort study. Role: Co-author.
17. Patterns of antimicrobial utilization in sepsis-coded patients. Retrospective cohort study. Role: Co-author.
18. Knowledge, attitude, and practices towards the continuation of mask-wearing with respect to facial skin changes among university students of Pakistan: a cross-sectional study. Nationwide cross-sectional survey. Role: Co-author.
19. Does mask-induced facial dermatopathy have an impact on the self-image of adolescents? A cross-sectional study. Cross-sectional survey. Role: Co-author.

Clinical electives and sub-internships

2026	Sub-internship in vascular surgery, University of New Mexico Hospital, Albuquerque Worked at the level of a junior resident: led daily rounds on about 15 patients, joined consults and postoperative care, and scrubbed on carotid endarterectomy, peripheral revascularisation, aneurysm repair, bypass, dialysis access and venous procedures. Built the Vascular Surgery Field Guide for incoming students and sub-interns, and submitted three case reports to the American Venous Forum.
2026	Sub-internship in interventional radiology, Cleveland Clinic, Cleveland, Ohio Pre-procedural evaluation, image-guided biopsies, drainages, vascular access, angiography, embolisation and endovascular procedures, with exposure to TACE, TARE and tumour ablation.
2026	Elective in diagnostic radiology, Cleveland Clinic Imaging Institute, Cleveland, Ohio Rotated through thoracic, abdominal, paediatric, musculoskeletal, neuro and emergency reading rooms, dictating preliminary reports for attending sign-off. Presented an AMSER Case of the Month and scored 92% on the ACR-AMSER STARS examination.
2024	Elective in interventional radiology, Aga Khan University Hospital, Karachi (4 weeks)

Research training

2026	Demehri Lab, Russell H. Morgan Department of Radiology and Radiological Science, Johns Hopkins University School of Medicine (Dr Shadpour Demehri) Quantitative musculoskeletal imaging and deep learning. Contributed to an NIH grant proposal on automated vertebral bone density, spinal sarcopenia and fracture risk from chest CT in COPD (MESA, COPDGene, CARDIA, RURAL), and co-authored a study of statin use and MRI-derived 3D knee bone shape in the Osteoarthritis Initiative.
2026	Gadani Lab, Interventional Oncology Research Laboratory, Lerner Research Institute, Cleveland Clinic (Dr Sameer Gadani, Dr Dola Das, Dr Susmita Dey) Translational hepatocellular carcinoma research: hepatoma and hepatic stellate cell co-culture, doxorubicin cytotoxicity assays, immunocytochemistry and fluorescence microscopy, 3D liver spheroids, and flow cytometry and confocal imaging of PEG-folate drug carriers. Co-authored a review of interventional oncology for HCC, published in Cancers.

2026	Hasan Lab, Department of Pathology and Laboratory Medicine, The Aga Khan University (Dr Zahra Hasan) Designed a high-throughput pipeline for host–pathogen transcriptomics in COVID-19: Kraken2 and DIAMOND filtering, STAR alignment to GRCh38, featureCounts, DESeq2, and GO and KEGG enrichment.
2025	Fatima Lab, Department of Biological and Biomedical Sciences, The Aga Khan University (Dr Ambrin Fatima) Genetics of rare lysosomal storage and neuro-ophthalmic disorders: DNA extraction, hybridisation capture, Illumina sequencing, variant calling and ACMG interpretation, including a novel TPP1 nonsense variant.
2023	Shafiq Lab, Department of Biological and Biomedical Sciences, The Aga Khan University BCL2 dysregulation in colorectal cancer: immunohistochemistry on FFPE tissue with blinded scoring, and survival and mutation analyses across TCGA, MSK and DFCI datasets.
2018 to 2020	Early research training Codon Corps, Islamabad; Institute of Integrative Biosciences, CECOS University; Pakistan Institute of Nuclear Science and Technology; National STEM School, Pakistan Innovation Foundation.

Multicentre collaboratives

2026 to present	SurgWeek-2 (GlobalSurg Collaborative) Collaborator. An international prospective cohort of consecutive surgical patients, coordinated by the University of Birmingham and the NIHR Global Health Research Unit on Global Surgery, defining global variation in postoperative complications.
2023 to present	PakSurg Collaborative Steering committee. PakSurg 1: a prospective multicentre cohort study of surgical site infection after elective surgery across Pakistan, published in The Lancet Regional Health – Southeast Asia.
2022 to present	Global Eco-Health Collaborative Collaborator and data collector for an international study of how clinicians and students view healthcare’s environmental footprint.

Teaching

2021 to 2025	From Data to Insights: R for research associates, CITRIC Health Data Science Centre, AKU (5-day CME-accredited workshop) Co-organised and taught 50 research associates: descriptive and inferential statistics, regression and survival analysis.
2025	Research in Medical School: an A-to-Z approach, Student Research Forum, AKU Three sessions on biostatistics for about 60 medical and nursing students. The OnlyStats site grew out of this teaching.
2024 to 2025	Teaching and research assistant, AI4MED Summer School, Pakistan Innovation Foundation Taught 20 students to extract and clean MIMIC-III data and build NLP pipelines and models for length of stay and mortality.

2022 to 2025	Python programming and machine learning workshops, Society for Promotion of Innovation in Education, AKU Coding bootcamp for more than 75 medical and nursing students, and a summit on machine learning for clinicians.
2022 to 2025	The science of learning, Society for Promotion of Innovation in Education, AKU Taught each incoming AKU Karachi medical class active recall, spaced repetition and Anki, and gave the session to students at AKU Nairobi.
2022 to 2025	Lead trainer, Debate and Public Speaking Forum, The Aga Khan University Coached World Schools and British Parliamentary formats: case construction, rhetoric and logical fallacies.
October 2023	The scientific method: a look inside the academic bubble, Student Research Forum, AKU Designed and taught a workshop on p-hacking, the replication crisis and the limits of statistical assumptions.
2023	Beginners' Guide to Research 3.0 and Research 101, Student Research Forum, AKU National online research training series that reached more than 750 health science and pre-medical students.

Peer review and academic service

2026	Peer reviewer, Hospital Pharmacy (SAGE) Recorded on Web of Science.
September 2025	Chair, Workshops Committee, 3rd International Student Research Conference, Student Research Forum, AKU A conference of more than 1,500 attendees with 1,200+ abstracts from six countries. Ran 12 pre-conference workshops for 400+ participants, wrote the standardised abstract scoring rubric and reviewed more than 60 abstracts.
2024	Publications and Impact Committee, 2nd International Student Research Conference, Student Research Forum, AKU Designed the abstract scoring criteria, now validated in a manuscript under revision, and the pre- and post-test instruments used to evaluate the conference.
2023	Technical logistics, 1st International Student Research Conference, Student Research Forum, AKU

Leadership

2021 to present	Co-President, National Science Bowl Pakistan, Centre for Economic Research in Pakistan Led four national iterations, including legal registration, governance and the regional and national rounds. Designed the online competition format during COVID-19, wrote the app's product requirements and maintains a 2,000+ question bank.
2021 to present	Student Research Forum, The Aga Khan University Chair of the Workshops Committee for ISRC 2025; Director of the Academics Wing; earlier, member of the Academics Wing.
2021 to 2025	Director, MedTech Wing, Society for Promotion of Innovation in Education, AKU Ran clinical skills workshops for ISRC, a machine learning summit and coding bootcamps, a seminar on generative AI in healthcare, and a visit to SIUT for robotic surgery simulation. Wrote the rulebook for the Innovation to Incision hackathon.

2023 to 2025	Co-Convener, Public Speaking Forum; Executive Producer, TEDxAgaKhanUniversity, The Aga Khan University Launched AKU's first TEDx event and wrote its playbook; scaled the AKU Debating Championship to 60 teams and co-organised the university's first Model United Nations. As General Secretary, revived the forum and ran the inaugural 40-team championship.
2022 to 2023	Member, Provincial Youth Assembly of Khyber Pakhtunkhwa Took part in assembly sessions and planted 1,500 trees with the Billion Trees Tsunami project.

Hackathons

April 2026	1st place, RUFAYDA Anti-Burnout Hackathon, Rufayda, National Incubation Center and British Asian Trust, Pakistan Baat Karo, a burnout support system for healthcare workers. Prize of PKR 300,000.
April 2024	Most Innovative Team, DISRUPT Quality of Care Hackathon, World Health Organization, Milan A neural network for early sepsis detection in intensive care, presented to WHO experts.
March 2024	2nd place, Innovation to Incision Hackathon, AKU Annual Surgical Conference A neural network predicting surgical site infection from routine laboratory markers, deployed on the web. Prize of PKR 75,000.

Awards

2026	Outstanding Poster Award (two), International Student Research Conference For the Kv7 channel opener meta-analysis and a case of ANCA-negative crescentic membranous nephropathy.
2026	1st place, RUFAYDA Anti-Burnout Hackathon For Baat Karo (PKR 300,000).
2024	Poster of Distinction, 2nd International Student Research Conference For the glucocorticoids and pain flare meta-analysis.
2024	Most Innovative Team, WHO DISRUPT Quality of Care Hackathon, Milan
2024	2nd place, Innovation to Incision Hackathon, AKU Annual Surgical Conference PKR 75,000.
2024	Clinical Honors in Community Health Sciences, Aga Khan University
2022 to present	Parliamentary debating Semi-finalist at several national championships; 7th of 100 speakers at the Karachi World Style Debating Championship; 4th best team at the 2024 AKU Debating Championship.
2020	1st position, Higher Secondary School Certificate, Rawalpindi Board Of about 71,000 candidates.
2020	2nd nationally, National Biology Talent Contest (Higher Education Commission) Selected for the training camp at NIBGE.
2019	Outstanding Performance Award, National STEM School Best overall performance, and captain of the winning Science Bowl team.
2017	Jinnah Scholarship for academic excellence

Programmes

July to August 2025	Students United for Regional and Global Education (SURGE) , Yale Global Health, Yale School of Medicine Presented on privacy and data sovereignty in AI for global health; co-authored an op-ed on a global health problem.
2020 to 2021	Curriculum Development Intern , Minerva University Curriculum Committee, San Francisco Designed course frameworks and analysed the academic performance of more than 500 students.
September 2020	Head Student, Sakura Science Exchange Program , Japan Science and Technology Agency, Tokyo One of ten students selected from across Asia; lab work at the University of Tsukuba, JAXA and NIED.

Certifications

2025	Artis Q biplane angiography system application training , Siemens Healthineers
2024	Machine Learning Specialization , Stanford University and DeepLearning.AI
2024	Systems Biology and Biotechnology Specialization , Icahn School of Medicine at Mount Sinai
2024	Introduction to Systematic Review and Meta-Analysis , Johns Hopkins University
2024	Biomedical Responsible Conduct of Research , CITI Program
2023	Biomedical Research , basic course, CITI Program

Methods and skills

Evidence synthesis	Pairwise and prevalence meta-analysis (GLMMs, Freeman–Tukey and logit transforms), meta-regression, risk of bias, RevMan
Statistics	Regression, survival analysis, propensity score matching and inverse probability weighting, sensitivity analyses (Stata 19, SPSS 27, R)
Psychometrics	Content validity, inter-rater and test–retest reliability (ICC, Krippendorff’s alpha, Gwet’s AC1)
Computation	Python and R; neural networks, gradient boosting, NLP; medical image segmentation (TotalSegmentator, nnU-Net)
Bioinformatics	Kraken2, DIAMOND, STAR, featureCounts, DESeq2, GO and KEGG enrichment, variant calling
Laboratory	Cell culture and co-culture, cytotoxicity assays, immunocytochemistry, flow cytometry, IHC, DNA extraction, NGS library capture
Qualitative	Interview and focus group coding and thematic analysis in NVivo
Design and web	Websites and interactive teaching tools; figures in Datawrapper, Lucidchart, Canva and Photoshop
Languages	English and Urdu (native)