

# Dr Momal Akram

Environmental and Analytical Chemist · Green adsorbents and visible-light photocatalysts for dye and heavy-metal removal

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## RESEARCH PROFILE

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I work on low-cost ways to remove textile dyes, heavy metals and antibiotics from water: biosorbents made from plant biomass and waste, and doped zirconia (ZrO<sub>2</sub>) photocatalysts that work under visible light. PhD in Chemistry (University of the Punjab, 2025), including a six-month HEC-funded research placement at the Scottish Universities Environmental Research Centre, University of Glasgow. Nine peer-reviewed papers (two as first author, one as corresponding author), 59 citations and h-index 4. Four years as university faculty, with 13 supervised student research projects and a year as a research analyst running ICP-OES, AAS, HPLC and flame photometry for water-quality work.

## EDUCATION

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### PhD in Chemistry

School of Chemistry, University of the Punjab, Lahore · Oct 2018 – May 2025 · Result: A

Thesis: *A green approach for the removal of textile dyes from simulated wastewater*. Supervisor: Dr Muhammad Salman.

- Developed biosorption, phytoremediation and nanomaterial-based adsorption routes for removing textile dyes from water.
- Modelled adsorption kinetics, isotherms and thermodynamics to optimise process conditions; assessed economic feasibility and scale-up.

### MPhil in Chemistry

School of Chemistry, University of the Punjab, Lahore · Feb 2016 – Mar 2018 · Result: A

Thesis: *Equilibrium, kinetics and thermodynamics in reactive dye removal via biosorption*

### MSc in Chemistry

School of Chemistry, University of the Punjab, Lahore · Oct 2013 – Dec 2015 · Result: A

Thesis: *Biosorptive removal of Brilliant Green dye using Sorghum bicolor L.*

### BEd in Science

Institute of Education and Research, University of the Punjab, Lahore · Oct 2012 – Sep 2013 · Result: A, 3rd position in batch

### BSc (Botany, Zoology, Chemistry)

Punjab College of Sciences, Lahore · Oct 2010 – Aug 2012 · Result: 1st Division

## RESEARCH EXPERIENCE

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### Visiting PhD Researcher (HEC IRSIP Fellow)

Scottish Universities Environmental Research Centre (SUERC), University of Glasgow, UK · Mar 2023 – Aug 2023 · Host: Gillian MacKinnon, Lecturer in Biogeochemical Tracers

- Six-month research placement funded by the Higher Education Commission (HEC) Pakistan through its competitive International Research Support Initiative Program (IRSIP); on leave from the University of Central Punjab.
- Carried out PhD experiments, instrumental analysis and material characterisation for thesis research on textile dye removal.

### Full-time Doctoral Researcher

School of Chemistry, University of the Punjab, Lahore · Mar 2021 – Mar 2022

### Research Analyst

School of Chemistry, University of the Punjab, Lahore · Jul 2017 – Jul 2018

- Operated, calibrated and maintained ICP-OES, AAS, HPLC, FTIR and flame photometry instruments.
- Analysed water samples for heavy metals and organic and inorganic contaminants using standard protocols; prepared data and reports for environmental monitoring research.

## ACADEMIC APPOINTMENTS

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**Assistant Professor, Chemistry (Jan 2026 – Jul 2026)**

**Lecturer, Chemistry (Apr 2022 – Dec 2025)**

Department of Basic and Applied Chemistry, Faculty of Science and Technology, University of Central Punjab, Lahore

- Taught Organic, Physical, Analytical and Environmental Chemistry, Spectroscopy, Instrumental Analysis and Entrepreneurship to BS and postgraduate students: more than 100 students per semester, in classes of about 60, with laboratory supervision.
- Co-designed an AI-resilient, interdisciplinary Environmental Chemistry course with a student partner (Student Pedagogy Partnership Programme, Learning Innovation Centre, Spring 2026).
- Academic Coordinator: ran faculty examinations, including question papers, scheduling, invigilation and evaluation.

#### Lecturer, Chemistry

Minhaj University Lahore · Oct 2018 – Mar 2021

- Taught Physical, Organic, Analytical and Inorganic Chemistry to undergraduate and postgraduate students: more than 100 students per semester, in classes of about 60, with laboratory supervision and assessment.

#### School and College Science Teaching

Ideal College of Science, Lahore (Chemistry, HSSC), Aug 2016 – Jul 2017 · Ideal Grammar School, Lahore (Physics, Chemistry, Biology, SSC), Mar 2014 – May 2016

### PUBLICATIONS

Nine peer-reviewed journal articles. 59 citations, h-index 4 (Google Scholar, September 2026). My name is in bold. [First author] and [Corresponding author] mark my role. IF = 2025 Journal Impact Factor (Clarivate Journal Citation Reports 2026).

1. Nagra, S. I., **Akram, M.**, Iftikhar, T., & Raja, M. (2026). Aloe barbadensis-mediated green synthesis of zirconium nanohybrids for carbon tetrachloride-induced hepatotoxicity in Wistar rats. *BioNanoScience*, 16, 609. [doi:10.1007/s12668-026-02845-6](https://doi.org/10.1007/s12668-026-02845-6) [Corresponding author] [IF: 4.0]
2. Tahir, S., **Akram, M.**, Salman, M., Ahmad, B., Farooq, U., & Ali, F. (2026). Synergistic effect of Zn and Mo co-doping in ZrO<sub>2</sub> for efficient photodegradation of Congo Red and Ciprofloxacin under visible irradiation. *Chemical Papers*, 1–23. [doi:10.1007/s11696-026-05146-0](https://doi.org/10.1007/s11696-026-05146-0) [IF: 2.7]
3. Tahir, S., Waheed, F., **Akram, M.**, Salman, M., Farooq, U., Saleem, S., & Ehsan, A. (2026). Vanadium-doped zirconia as an efficient visible-light photocatalyst for advanced treatment of dye-loaded wastewater. *Iranian Journal of Catalysis*, 16(2), 218–237. [doi:10.57647/ijc.2026.1602.15](https://doi.org/10.57647/ijc.2026.1602.15) [IF: 1.9]
4. Wahab, A., **Akram, M.**, Salman, M., Shakoar, A., Tahir, S., Farooq, U., & Majeed, M. (2023). Sorptive activity of potential native biosorbent for the elimination of lead and cadmium in one and two-component systems: characterization, kinetic activity, and mechanism exploration. *Desalination and Water Treatment*, 290, 82–93. [doi:10.5004/dwt.2023.29450](https://doi.org/10.5004/dwt.2023.29450) [IF: 3.4]
5. Saleem, U., **Akram, M.**, Salman, M., Farooq, U., Dar, A., & Tahir, S. (2022). Biosorption activity of chemically modified Trifolium alexandrinum for the detoxification of Cr(III) contaminated water. *Desalination and Water Treatment*, 246, 212–225. [doi:10.5004/dwt.2022.27993](https://doi.org/10.5004/dwt.2022.27993) [IF: 3.4]
6. **Akram, M.**, Salman, M., Rehman, R., Farooq, U., Tahir, S., & Nazir, H. (2021). Kinetic and isothermal investigations of cost-effective sorptive elimination of Gentian Violet dye from water using Haplophragma adenophyllum biowaste. *Journal of Chemistry*, 1–12. [doi:10.1155/2021/5549536](https://doi.org/10.1155/2021/5549536) [First author] [IF: 2.6]
7. **Akram, M.**, Salman, M., Farooq, U., Saleem, U., Tahir, S., Nazir, H., & Arsalan, H. M. (2020). Phthalate-functionalized Sorghum bicolor L.: an effective biosorbent for the removal of Alizarin Red S and Bromophenol Blue dyes from simulated wastewater. *Desalination and Water Treatment*, 190, 383–392. [doi:10.5004/dwt.2020.25724](https://doi.org/10.5004/dwt.2020.25724) [First author] [IF: 3.4]
8. Nazir, H., Salman, M., Athar, M., Farooq, U., Wahab, A., & **Akram, M.** (2019). Citric acid functionalized Bougainvillea spectabilis: a novel, sustainable, and cost-effective biosorbent for removal of Pb<sup>2+</sup> from wastewater. *Water, Air, & Soil Pollution*, 230(12), 303. [doi:10.1007/s11270-019-4360-1](https://doi.org/10.1007/s11270-019-4360-1) [IF: 3.5]
9. Nazir, H., Salman, M., Athar, M., Farooq, U., **Akram, M.**, & Saleem, N. (2019). A novel biosorbent Bougainvillea spectabilis stalks leaves for removal of Cd(II) and Cu(II) from wastewater. *Desalination and Water Treatment*, 148, 222–228. [doi:10.5004/dwt.2019.23706](https://doi.org/10.5004/dwt.2019.23706) [IF: 3.4]

### RESEARCH SUPERVISION

Supervised 13 student research projects at the University of Central Punjab, 2022–2026: 1 MPhil (individual) and 12 BS (Chemistry and Biochemistry), each BS project with a team of two or three students. Guided each project from proposal and experimental design to data analysis and thesis. Completed the HEC-policy MS/MPhil/PhD Supervision Course (2025).

#### MPhil Chemistry

- Phytochemical profiling and in silico assessment of herbal therapeutics to enhance insulin sensitivity (2026)

#### BS Chemistry and BS Biochemistry

- Fabrication of green nanocellulose–pectin composite beads for adsorptive removal of synthetic dyes from aqueous solution (2026)
- Silica nanoparticle-functionalized hydrogel-coated substrates for enhanced oil–water separation (2026)
- Formulation of a skin-friendly herbal moisturizing cream using plant extracts (2026)

- Phytochemical screening and formulation of a herbal cream for acne treatment (BS Biochemistry, 2026)
- Cymbopogon citratus-derived Cu@Zr bimetallic nanoparticles as advanced photocatalysts for organic pollutant degradation (2024)
- Synthesis of trimetallic Ni–Mo@Zr nanoparticles embedded in Aloe vera for antifungal applications (2024)
- Green synthesis of bimetallic Mg@Zr nanoparticles using Rosmarinus officinalis for antibacterial applications (2024)
- Degradation of organic pollutants using Mo- and Zn-doped zirconia catalyst under LED light (2023)
- Detection of Cr<sup>2+</sup> and Sn<sup>2+</sup> in commercial fruit juices in Lahore (2023)
- Detection of Cu<sup>2+</sup> and Fe<sup>2+</sup> in commercial tea brands in Lahore (2023)
- Synthesis, characterization and applications of Mg(OH)<sub>2</sub>/MnO<sub>2</sub> nanocomposite (2022)
- Analytical quality design of RP-HPLC for simultaneous estimation of metformin HCl, empagliflozin and linagliptin (2022)

## FELLOWSHIPS AND AWARDS

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- International Research Support Initiative Program (IRSIP) Fellowship, Higher Education Commission Pakistan: funded six-month PhD research placement at the University of Glasgow (2023).
- Promotion to Assistant Professor in recognition of performance, University of Central Punjab (2026).
- Recognition of Achievement, Mexoxo Take the Lead leadership programme, eCornell, Cornell University (2026).
- Certificates of Appreciation, University of Central Punjab: Faculty Partner, Student Pedagogy Partnership Programme (2026); Organiser and Resource Person, LabXpert 2025 (2025); Global Scholars Connect Series (2025); Organiser and Coordinator, 21st NAPRECA Winter School (2024).
- Certificates of Appreciation from external conferences: ICEST-2025, Govt. Islamia Graduate College Civil Lines, Lahore (2025); IGCSEPS-2024, Lahore College for Women University (2024).
- 3rd position in batch, BEd in Science, University of the Punjab (2013).

## EVENTS ORGANISED

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- **LabXpert 2025:** hands-on training in laboratory instrumentation and practice, Department of Basic and Applied Chemistry, University of Central Punjab (20 Oct – 6 Nov 2025). Organiser, and resource person leading the UV–Vis spectroscopy session.
- **Global Scholars Connect Series:** seminars introducing science students to international scholarships, including a hybrid session on Commonwealth Scholarships (6 Oct 2025). Co-organiser and coordinator.
- **Upcycling Waste exhibition:** Environmental Chemistry project exhibition in which student teams presented products made from waste (21 Jun 2025). Organiser and course instructor.
- **21st NAPRECA Winter School** (Natural Products Research Network for Eastern and Central Africa), hosted at the University of Central Punjab (25–28 Nov 2024). Organiser and Coordinator.
- **2nd ICEHST-2024 international conference**, Faculty of Science and Technology, University of Central Punjab (21–22 Nov 2024). Media Coordinator on the organising team.
- **Undergraduate and postgraduate meet-ups with faculty**, Department of Basic and Applied Chemistry (2024). Organiser.
- **International webinar “NMR: Fundamentals to Applications”**, Department of Basic and Applied Chemistry (28 Dec 2023). Organiser.
- **Ongoing roles:** Co-Patron, Environmental Protection Society (from Dec 2022); Social Media and Events Coordinator, Department of Basic and Applied Chemistry.

## CONFERENCE PRESENTATIONS

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- CHEMSMART-2025, International Expo Centre, Lahore (Apr 2025). Presentation on a sol–gel sunblock formulation.
- International Conference ICPU2019: Recent Innovations in Molecular Sciences, University of the Punjab, Lahore (Nov 2019). Two posters based on MSc and MPhil research on dye biosorption.
- Environmental and Analytical Chemistry Conference, Lahore Garrison University (Apr 2018). Poster based on MPhil research on dye biosorption.

## PEER REVIEW

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Reviewed six manuscripts for five Springer Nature journals, 2023–2025: *Scientific Reports* (2), *Microchimica Acta*, *Archives of Microbiology*, *Water Conservation Science and Engineering* and *Nanotechnology for Environmental Engineering*.

## TECHNICAL SKILLS

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**Instruments (operated, calibrated, maintained):** ICP-OES, atomic absorption spectroscopy (AAS), HPLC, flame photometry, UV–Vis spectrophotometry, FTIR.

**Materials characterisation:** X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM).

**Methods:** batch adsorption and photodegradation experiments; kinetic, isotherm and thermodynamic modelling; sol–gel and plant-mediated nanomaterial synthesis; water-quality analysis to standard protocols; RP-HPLC method design.

**Computational:** molecular docking; ADMET (absorption, distribution, metabolism, excretion and toxicity) prediction.

**Software:** MS Office, EndNote, Turnitin.

## COURSES AND CERTIFICATES

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- Mexoxo Take the Lead, eCornell, Cornell University (Sep 2026)
- Quality Control and Regulatory in Cosmetic Science, Olay via Coursera (Dec 2025)
- Cosmetic Product Development, Olay via Coursera (Dec 2025)
- Introduction to Cosmetic and Skincare Science, Olay via Coursera (Sep 2025)
- Cosmetic Formulation Science, Olay via Coursera (Aug 2025)
- MS/MPhil/PhD Supervision Course, HEC Graduate Education Policy 2023, University of Central Punjab (Jul–Aug 2025)
- The World of Classroom Assessment and Testing, HEC Pakistan via Coursera (May 2025)
- Nanotechnology: A Maker’s Course, Duke University, NC State and UNC Chapel Hill via Coursera (Mar 2025)
- Entrepreneurship Strategy: From Ideation to Exit, HEC Paris via Coursera (Mar 2025)

## TRAININGS AND WORKSHOPS

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- Theory of Learning: Student Engagement, FoST and Learning Innovation Centre, UCP (Dec 2025)
- AI in Academic and Research Training, ORIC and Learning Innovation Centre, UCP (Sep 2025)
- Role of AI in Open Access Publishing, Wiley Research Training (Aug 2025)
- Mentoring and Counselling Skills, FoST and Learning Innovation Centre, UCP (Feb 2025)
- Assessment, Grading, Purpose and Technique, FoST and Learning Innovation Centre, UCP (Jan 2025)
- Interactive Teaching: BOPPPS Model, FoST and Learning Innovation Centre, UCP (Jan 2025)
- Intellectual Property: Patents, Copyrights and Commercialisation, 6-session workshop, ORIC, UCP (Aug–Sep 2024)
- EndNote Management and Generative AI in Research, UCP (Sep 2024)
- Elsevier Researcher Academy On Campus: Researcher Academy and Journal Finder (Dec 2023)
- ASTM COMPASS Standards Database Training, ASTM International (Nov 2022)
- Turnitin Plagiarism Detection: Pedagogy and Application, Learning Innovation Centre, UCP (Nov 2022)
- Teaching Excellence Training Program (4 days), Centre of Professional Excellence, UCP (Oct 2022)

## LANGUAGES AND REFEREES

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English (C2, proficient) · Urdu (native) · Punjabi (native) · Arabic (basic) · Turkish (basic)

Referees available on request.