MIRKANAN ABDULLAYEV

PhD Researcher

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ABOUT ME

PhD Researcher in Chemical Engineering at the University of Strasbourg (ICPEES), with a background in Physical Chemistry and Chemical Engineering from UFAZ. Experienced in experimental research, chromatographic analysis, and analytical method development through research work at IPHC/CNRS. My doctoral research focuses on the solar-driven conversion of hydrogen sulfide (H_2S) into green hydrogen and elemental sulfur using advanced MXene-based photocatalysts, with an emphasis on sustainable chemical process development. My research interests include advanced functional materials, photocatalysis, and sustainable energy technologies.

EDUCATION

PhD in Chemical Engineering *2026 – Present*
Joint Doctoral Programme – ICPEES (CNRS / University of Strasbourg) & ASOIU / UFAZ · Funded by ASOIU
Research topic: Solar-driven valorization of hydrogen sulfide into green hydrogen and sulfur

MSc in Physical Chemistry & Chemical Engineering *2024 – 2026*
French-Azerbaijani University (UFAZ)

BSc in Chemical Engineering *2020 – 2024*
French-Azerbaijani University (UFAZ)

RESEARCH EXPERIENCE

Research Intern – Analytical, Physical Chemistry and Radiation Chemistry *Feb 2026 – Jun 2026*
IPHC (Institut Pluridisciplinaire Hubert Curien), CNRS / Université de Strasbourg
Project: Effects of dose rate and dissolved oxygen on the radiolysis of biomolecules (Phe, Trp, aspartame) in the context of hadrontherapy and FLASH radiotherapy

- Investigated the physicochemical mechanisms behind the differential response of tumour and healthy tissue to ultra-high dose-rate (FLASH) irradiation, focusing on the role of dissolved oxygen in radical-induced biomolecular damage.
- Performed irradiation experiments on aqueous solutions of phenylalanine, tryptophan and aspartame using proton beams at the CYRCé cyclotron (24 MeV, Cronenbourg campus) and the 4 MeV Van de Graaff accelerator.
- Identified and quantified hydroxyl radical (HO•)-induced degradation products by HPLC with fluorescence detection (HPLC-FLD), and evaluated the influence of dissolved O_2 concentration and dose rate on their formation and distribution.
- Developed and validated HPLC methods for the quantitative analysis of biomolecule degradation products under varying irradiation conditions.

UNIVERSITY LABORATORY EXPERIENCE

Analytical & Chemical Engineering Laboratory Projects – UFAZ *2020 – 2026*

- Developed and validated analytical methods using GC, GC-MS and HPLC, including quantitative analysis, multi-point calibration and method characterisation.
- Conducted experiments on core unit operations (separation, CSTR and PFR reactors, mass and heat transfer, distillation) and applied mass and energy balances to evaluate system performance.
- Student project (2024): extraction and quantification of caffeine from three commercial coffee brands (liquid-liquid extraction, evaporation, crystallisation) with comparison of yield, purity and extraction efficiency.

INDUSTRIAL EXPERIENCE

Chemical Engineering Intern – Catalytic Reforming Unit *Apr 2025 – May 2025*

SOCAR Downstream, Azerbaijan

- Gained hands-on experience in catalytic reforming for high-octane gasoline production, including hydrotreating of straight-run gasoline (desulfurisation and denitrogenation over Co-Mo/Ni catalysts).
- Participated in reactor operations, feedstock purification and process control under high temperature and pressure; engaged with catalyst lifecycle management and quality assurance.

Chemical Engineering Intern – Water Treatment Unit *Apr 2024 – May 2024*

SOCAR Downstream, Azerbaijan

- Acquired practical skills in industrial water treatment: raw water purification, cation-exchange filtration, resin regeneration and hardness reduction.
- Contributed to process optimisation and quality control in the demineralisation unit, monitoring water quality and ion-exchange resin performance.

TRAININGS, CERTIFICATES & SCHOLARSHIPS

ASOIU Doctoral Funding *2026 – Present*

- Selected for ASOIU-funded doctoral studies on the basis of academic performance and suitability of the proposed research topic.

Research Fellowship – France (Strasbourg) *Feb 2026 – Jul 2026*

- Awarded by UFAZ for a research internship in France, based on academic results and GPA.

Eyyub Taghiyev Scholarship *Feb 2025 – Feb 2026*

- Awarded to high-achieving UFAZ Master's students for academic excellence and social contribution.

Industrial Chemical Engineering Training Programme – AZMIIB *Feb 2023 – May 2023*

- Process hazard analysis (HAZOP, LOPA), separation processes, oil refining, water demineralisation and steam generation, sulfur determination in petroleum products.

TECHNICAL SKILLS

Chromatography & Detection: HPLC-UV, HPLC-Fluorescence (biomolecule analysis), GC, GC-MS, column chromatography

Spectroscopy: UV-Visible, Infrared (IR)

Programming: Python (beginner), MATLAB (beginner)

Software: MS Office (Word, Excel, PowerPoint), Google Workspace

LANGUAGES

Azerbaijani: Native | **English:** B2 | **French:** A2 | **Turkish:** B1 (CEFR)