

Khanım Aghayeva

PhD Researcher | ICPEES, CNRS Strasbourg

xanim.aghayeva2002@gmail.com | +33 7 59 23 49 43 | Strasbourg, France

ABOUT ME

I am a PhD researcher in Chemical Engineering at ICPEES, CNRS Strasbourg (starting October 2026), holding an MSc in Physical Chemistry and Chemical Engineering from the French-Azerbaijani University (UFAZ) and a BSc in Chemical Engineering from Khazar University. My doctoral research will focus on solar-driven photocatalytic reduction of CO_2 to ethylene using mesostructured Cu/CeO_2-TiO_2 catalysts, aiming to convert CO_2 into valuable C2 chemicals using exclusively solar energy. This builds on my master's research at ICPEES on Fischer-Tropsch synthesis over cobalt-based catalysts, where I developed strong experimental and characterization skills (XRD, TGA, BET, TPR) in heterogeneous catalysis.

EDUCATION

Oct 2026
PhD in Chemical Engineering — *Incoming PhD Candidate*
ICPEES, CNRS, Strasbourg, France

Sep 2023 – Jul 2026
MSc in Physical Chemistry and Chemical Engineering *GPA: 90/100*
French-Azerbaijani University (UFAZ), Baku, Azerbaijan

Sep 2019 – Jul 2023
BSc in Chemical Engineering *GPA: 84/100*
Khazar University, Baku, Azerbaijan

PROFESSIONAL EXPERIENCE

Oct 2026 – Present
PhD Candidate in Chemical Engineering
ICPEES, CNRS, Strasbourg, France

- Solar-driven photocatalytic reduction of CO_2 to ethylene using mesostructured Cu/CeO_2-TiO_2 catalysts.

Feb 2026 – Jun 2026
Research Intern – Catalysis and Materials Characterization
ICPEES (Institut de Chimie et Procédés pour l'Énergie, l'Environnement et la Santé), Strasbourg, France

- Investigated Fischer-Tropsch synthesis (FTS) using iron (Fe) and cobalt (Co) catalysts supported on silicon carbide (SiC, L207 support) for the conversion of syngas to hydrocarbons.
- Performed catalyst characterization using X-ray Diffraction (XRD) to analyze crystalline phase composition and structural properties of fresh and spent catalysts.
- Conducted Thermogravimetric Analysis (TGA) to evaluate thermal stability and decomposition behavior of catalyst precursors and supports.
- Carried out BET surface area and porosity measurements to determine specific surface area, pore volume, and pore size distribution of catalyst materials.
- Applied Temperature-Programmed Reduction (TPR) to investigate the reducibility of metal oxide precursors and optimize pre-treatment conditions.
- Utilized induction heating technology for controlled catalyst activation and reaction experiments under Fischer-Tropsch conditions.
- Correlated physicochemical properties of catalysts with their catalytic performance to support structure-activity relationship studies.

Apr 2024 – May 2024

Chemical Engineering Intern

SOCAR Downstream, Azerbaijan

- Assisted in reactor and regenerator operations, monitoring key process parameters during catalytic cracking units.
- Performed product quality testing and contributed to evaluation of final output specifications.

Jul 2022 – Sep 2022

Chemical Engineering Intern

Norm OJSC, Azerbaijan

- Conducted laboratory analyses across Chemical, Mortar, and Well labs, applying core chemical engineering principles.
- Gained applied knowledge of industrial safety regulations and cement plant production processes.

UNIVERSITY RESEARCH & LABORATORY PROJECTS

Analytical & Physical Chemistry Laboratory Modules

French-Azerbaijani University (UFAZ)

- Developed and validated analytical methods using GC, GC-MS, and HPLC; carried out quantitative analysis, multi-point calibration, and method characterisation across several analytical chemistry modules.
- Performed experiments in core chemical engineering unit operations including separation processes, reactor engineering (CSTR and PFR), mass and heat transfer, and distillation; applied mass and energy balance calculations to assess system performance.
- Gained practical experience in physicochemical measurements, experimental data processing, and scientific report writing in line with laboratory standards.

PROFESSIONAL TRAINING & CERTIFICATES

Sep – Oct 2025

Aspen HYSYS – Process Simulation

PFDs, material/energy balances, unit operation modelling including distillation, heat exchangers, and separation systems.

Jan – Apr 2025

Process Design Training

Design fundamentals, thermodynamic and transport properties, fluid dynamics, heat exchanger design, and process safety.

Feb – Apr 2025

Advanced Excel Training

Data management, financial and logical functions, Pivot Tables, Macros & VBA for engineering data analysis.

May – Jun 2022

Business Education for Engineers

Project management, risk management, cost control, and engineering leadership.

TECHNICAL SKILLS

Characterization: XRD, TGA, BET/Porosimetry, TPR, XRF
Chromatography: GC, GC-MS, HPLC
Process Software: Aspen HYSYS, ProSim, MestReNova
Programming: Python, MATLAB, Advanced Excel & VBA
Soft Skills: Research methodology, problem solving, teamwork, project management

LANGUAGES

Azerbaijani: Native
English: B2 – Upper Intermediate
Turkish: C1 – Advanced
Russian: A2 – Pre-Intermediate