

PhD in Chemistry: Physical Chemistry and Materials Sciences

Baylar Zarbaliyev

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Profile

PhD Chemist with experience in R&D across academic, industrial, and startup environments. Proven track record in research projects, with outcomes recognized through scientific publications and research awards.

Key Skills : Scientific Literature Analysis| Team Leadership and Mentoring| Design and Development of Advanced Polymeric and Inorganic Materials| R&D Project Management| Higher Education Teaching and Laboratory Instruction

Professional Experience

Temporary Lecturer and Researcher

Ecole Centrale de Lyon | 09.2026-present

- **Teaching** practical sessions in chromatography, corrosion, water treatment, mechanical and surface properties of materials.
- **Conducting research** on the development and characterization of iron-oxide nanoparticles and gold nanoclusters for biomedical applications.

PhD Researcher in Physical Chemistry and Materials

University of Strasbourg | 2022-2025

- **Development of biopolymer-based hydrogel composites incorporating nanozeolites** for biomedical applications, with a focus on the chronic wound-healing.
- **Designed and conducted advanced material synthesis and characterization studies** (XRD, UV-Vis, FTIR, TGA, DSC, BET surface area analysis, SEM, and rheometry) to establish structure-property relationships and validate material performance, particularly for chitosan and gelatin-based hydrogels as well as zeolites.
- **Conducted technology scouting and comprehensive scientific literature reviews** to identify promising research directions and guide experimental strategy.
- **Supervised** two undergraduate students and **contributed to international academic collaborations**, fostering multidisciplinary research and knowledge exchange.
- **Results :** 3 publications, 3 conferences, 2 Prizes in scientific conferences

Analytical Chemistry and General Chemistry Teacher

French-Azerbaijani University & University of Strasbourg | 2022-2025 64 hours per year

- Conducted the practical sessions in analytical chemistry techniques for the detection and quantification of organic contaminants in liquid matrices using instrumental methods such as UV-Vis, FTIR, HPLC, and GC-MS.
- Delivered General Chemistry lectures and exercise courses to undergraduate students.

Researcher & Chemist Intern (Master M2)

Faculty of Pharmacy, University of Strasbourg | 2022 6 months

- Designed and synthesized **fluorescent polymeric nanoparticles** using a **microfluidic system** for cellular bioimaging applications.
- Conducted particle size characterization using Dynamic Light Scattering (DLS) and Transmission Electron Microscopy (TEM), quantified nanoparticle quantum yield, and optimized the scale-up processes.
- Technical report writing and scientific collaboration within multidisciplinary research projects.

Researcher & Chemist Intern (Master M1)

Institut Le Bel, University of Strasbourg | 2021 3 months

- Developed and formulated **organometallic materials** for high-performance electrode applications.
- Characterized **physicochemical properties** using spectroscopic and crystallographic techniques.

Intern Engineer in the chemical industry

Lafarge Holcim Azerbaijan | 2020 2 months

- Characterized **cement and clinker materials** using crystallographic, rheological, and mechanical testing techniques.
- Investigated the development and optimization of **cement properties** using graphene oxide as a reinforcing nanomaterial.

Education

PhD in Physical Chemistry and Materials

University of Strasbourg | 2022-2025

Master's Degree in Physical Chemistry and Materials

University of Strasbourg | 2020-2022

Bachelor's Degree in Chemical Engineering

University of Strasbourg | 2016-2020

Languages

French: Fluent | **English:** Fluent | **Russian:** Intermediate | **Turkish:** Fluent | **Azerbaijani:** Native

Distinctions

- **Best oral presentation prize - TotalEnergies** «40e réunion du Groupe Français des Zéolithes» (2025)
- **Best poster presentation prize** « Summer School of High Functional Materials » (2023)
- Awarded a **Master's degree scholarship** by the French Ministry for Europe and Foreign Affairs (2020-2022)
- Awarded a **Master's degree scholarship** by the Faculty of Chemistry, University of Strasbourg (2022)

• Leadership & Community Engagement

Science & Careers Committee Lead, Researchers' Association-StrasAIR | 2022-2023

- Coordinated a multicultural team of eight members representing five nationalities.
- Organized academic and social events, managed budgets, and coordinated external partnerships.

Selected Publications

1. **Zarbaliyev, B.**; Israfilov, N.; Feyziyeva, S.; Lutzweiler, G.; Guliyeva, N.; Louis, B. Role of Cation Nature in FAU Zeolite in Both Liquid-Phase and Gas-Phase Adsorption. *Catalysts* 2025, 15, 734, doi:10.3390/catal15080734
2. Menard, T.; **Zarbaliyev, B.**; Echalard, A.; Bullier-Marchandin, E.; Gens, F.; Ladam, G.; Guliyeva, N.; Louis, B.; Lutzweiler, G. Synthesis and Characterization of Carboxylic- and Amine-Grafted FAU Zeolites as Inorganic Fillers to Design Biocompatible Composites. *Microporous and Mesoporous Materials* 2024, 363, 112834, doi:10.1016/j.micromeso.2023.112834
3. Ameh, A.E.; Feyziyeva, S.; Mukaba, J.-L.; Pokpas, K.; **Zarbaliyev, B.**; Fatoba, O.O.; Louis, B.; Petrik, L.F.; Oyekola, O.O. Synthesis of BEA Zeolite from Coal Fly Ash Nano-Silica Extract: Application in CO₂ Adsorption. *Microporous and Mesoporous Materials* 2026, 412, 114249, doi:10.1016/j.micromeso.2026.114249
4. **Zarbaliyev, B.** Development of Multifunctional Hydrogels Based on Zeolite/Biopolymer Composites for the Treatment of Chronic Wounds. Doctorat en Chimie physique des matériaux, PhD, Strasbourg, 2025. doi: 10.70675/d5591998z76f6z4423za637zeb70dd949408