# RAYANE KOUBAA

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## EDUCATION

**University of California, Los Angeles (UCLA)** – *B.Sc. Chemical Engineering* *Los Angeles, CA | June 2026*
- 3.90/4.00 GPA, Cum Laude (Top 20% of Class of 2026) | Dean's Honor List | AIChE Member | CH ENGR 101A (Fluid Mechanics) Learning Assistant | Sigma Nu Fraternity, Epsilon Pi Chapter (Risk Management & Intervention Co-Chair) | STEM Tutor (Mathematics, Physics & Chemistry)

**Lycée Français International Georges Pompidou** – *French Baccalauréate* *Dubai, UAE | June 2022*
- Co-Valedictorian (19.35/20) | European Section with Expert Mathematics | Co-founded "La Bulle" with the school psychologist to address a gap in student mental health resources | Math Olympiad Top 5 Award | Student Body Government President (2020–2022)

## ENGINEERING PROJECTS: PROCESS DESIGN, LEADERSHIP AND INNOVATION

**UCLA Chemical Engineering Capstone** – *Project Manager, 19-Engineer Team* *Los Angeles, CA | Jan 2026 – Jun 2026*
- Led a 6-month capstone designing LouisiAmmonia Holdings, Inc., a conventional blue-ammonia production facility in Donaldsonville, LA producing ∼1,800 metric tons/day of anhydrous liquid ammonia at >99.95% purity, operating 360 days/year
- Orchestrated full-plant process design, process simulation, and PFD drawing across all sections, including the natural gas desulfurization and steam methane reforming (hydrogen production) units, unifying naming conventions, equipment sizing/costing standards, and a synchronized schedule
- Directed plant-wide process safety analysis to identify and mitigate hazards in hazardous gas streams; managed scope-change submissions and real-time cross-team problem resolution with course instructors
- Delivered a 12-year techno-economic cash flow valuation yielding an NPV of $370.5 million, reconciling material/energy balances, capital and operating cost roll-ups, and multi-scenario analysis of depreciation, financing, taxes, and cost escalation

**Project H at UCLA** – *Co-Founder* *Los Angeles, CA | Mar 2026 – Jun 2026*
- Began laying the groundwork for a hydrogen innovation engineering club at UCLA, assembling an early cross-disciplinary team of mechanical, electrical, and chemical engineers and initiating hydrogen fuel cell lab experiments toward a future fuel cell-powered tricycle
- Led early-stage recruitment and outreach to secure interest and resources for advancing hydrogen technology research on campus

**ExxonMobil & RAPID Manufacturing Institute, ChemE Cube** – *Business Subteam Lead* *Los Angeles, CA | May 2023 – May 2024*
- Led the business team for a $CO_2$ Direct Air Capture Cube (bench-scale process unit) through summer development; delivered a Shark Tank-style pitch with market analysis and financial viability modeling. Supported the structures subteam in designing and fabricating the load-bearing frame for a tabletop chemical process, ensuring structural stability under process loads. Placed 5th out of 12 finalists from 38 initial teams

## UNDERGRADUATE LABORATORY RESEARCH

**UCLA CH ENGR 104D – Biotechnology Laboratory** – *Undergraduate Researcher* *Los Angeles, CA | Mar 2026 – Jun 2026*
- Executed a complete "gene-to-product" bioprocessing pipeline for recombinant $\beta$-galactosidase (*E. coli* BL21(DE3)/pET28a), including plasmid transformation, IPTG-induced fermentation with real-time growth kinetics monitoring, and multi-step chromatographic purification (Q-Sepharose ion exchange, Sephacryl S-200 HR size exclusion) achieving 34.0-fold enrichment and 79.7% yield
- Applied analytical methods including SDS-PAGE, Bradford protein quantification, and UV-Vis enzyme kinetics assays (ONPG substrate), using nonlinear regression (MATLAB) to extract Michaelis-Menten parameters and Lineweaver-Burk inhibition analysis, and validated predicted protein structure against crystallographic data (AlphaFold vs. PDB 1F4H)

**Annabi Laboratory** – *Undergraduate Researcher (Dr. Annabi)* *Los Angeles, CA | Oct 2024 – Oct 2025*
- Investigated bioinspired microneedle-based barrier tunneling (MBT) for advanced ocular drug delivery into the vitreous and retina; designed hypothesis-driven experiments and controls to formulate hydrogels and quantify drug release kinetics, optimizing efficiency
- Performed wet chemistry and analytical characterization including micropipetting, hydrogel synthesis and crosslinking, UV-Vis and fluorescence spectroscopy, dialysis, rheology, cell culturing, in vivo surgery, and ex vivo experimentation, alongside rigorous sample labeling/inventory tracking, lab notebook documentation, and adherence to lab safety protocols

**UCLA Systems Engineering Laboratory** – *Undergraduate Researcher (Dr. Manousiouthakis)* *Los Angeles, CA | Jun 2024 – March 2025*
- Developed MATLAB and Julia computational frameworks implementing Sustainability Over Sets (SOS) methodology for process modeling of multi-dimensional ODE dynamical systems over a summer-long research project, advancing a novel approach to global sustainability verification
- Co-authored technical paper pending approval in IEEE Transactions on Sustainable Computing: "A Global Optimization-Based Realization of Sustainability over Set Assessment of Two-Dimensional State-Space Systems"

## PROFESSIONAL EXPERIENCE

**Lucidly** – *Software Development Engineer Intern* *Remote Internship | Jun 2025 – Aug 2025*
- Built a financial KPI schema (churn, LTV) with FastAPI and YAML and mapped SQL lineage for revenue metrics

**UCLA Information and Technology Services** – *Student Desktop Analyst (Hybrid)* *Los Angeles, CA | Oct 2023 – Feb 2025*
- Resolved 40+ monthly hardware/software cases with high customer satisfaction; trained and onboarded 5 incoming student analysts

## ADDITIONAL

**Process & Lab:** Process Simulation (PRO/II, UniSim; Aspen-equivalent), PFD Drawing, Wet Chemistry, Spectroscopy, Chromatography
**Technical:** MATLAB, Julia, SQL, FastAPI, Minitab, Benchling, Prism, OriginPro, Excel & 3D Printing
**Certifications:** AIChE Level 1 Process Safety | Six Sigma White Belt (Green Belt In Progress) | UCLA Machine Shop Training
**Languages:** English (Fluent), French (Native), Arabic (Native), Spanish (Professional Working Proficiency)