

MUHAMMAD LUQMAN HAKIMI BIN MOHD ZAMRI



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SUMMARY

Recent Chemical Engineering graduate with strong capability in CSTR design and simulation modeling, process design, and safety analysis, tailored toward project execution and delivery. Proficient in Aspen Plus, Aspen HYSYS, Aspen Energy Analyzer, and Microsoft Power BI for process evaluation, cost analysis, and performance tracking. Skilled in MATLAB for kinetic modeling, GUI development, and advanced simulations covering mass/energy balances, cooling jacket design, and reactor dimensioning. Hands-on experience in dispersion modeling of chlorine release and hazardous chemical leaks, including leak simulations using ALOHA and preparation of CIMA reports for regulatory compliance. Completed projects in process risk assessment, industrial effluent treatment, and dynamic plant simulations. Demonstrated ability in technical documentation, dashboard reporting, and stakeholder presentations, with proven leadership in coordinating cross-functional teams. Fully prepared to contribute as a Project Engineer, bringing both technical depth and project execution skills, with immediate availability and full relocation flexibility.

EDUCATION

UiTM, Shah Alam (Bachelor Hons Chemical Engineering)

OCT 2021 - AUG 2025

Curriculum Activities

- Volunteer, Flood Relief Mission (Dec 2021) – Assisted post-flood recovery at Teratai College, UiTM Shah Alam's staff housing near Shah Alam, removing and salvaging submerged household items; helped restore livable conditions within 48 hours.
- Volunteer, Karisma Games – Coordinated and verified hockey equipment readiness for 10+ matches, ensuring zero delays and supporting over 200 athletes and officials.
- Telemetry Team Member, EcoPhoton Solar Race Car (5th Generation) – Designed and programmed a real-time digital speedometer interface, enhancing driver performance decisions and increasing race data accuracy by 30%, by using Arduino-Uno.
- Class Representative (Semesters 1–5) – Served as liaison between faculty and 30+ classmates, streamlining communication and ensuring 100% on-time delivery of academic requirements.
- Member, Red Crescent Society (2022–2023) – Participated in public health awareness and first-aid readiness programs, boosting community engagement by 25%.
- Multimedia Committee Member, IChemE Student Chapter – Created high-quality posters, promotional videos, and social media content, increasing event participation by 40%.
- Peer Tutor, Reaction Engineering I – Conducted pre-class tutorials for 20+ students, improving understanding of complex concepts and raising average class scores by 15%.
- Exchange Student, Universitas Gadjah Mada, Indonesia (Aug 2023 – Feb 2024) – Completed a one-semester academic exchange, building cross-cultural collaboration skills and enhancing technical expertise in chemical engineering.
- Project Developer, Thermodynamics Mini Project – Engineered an Arduino Uno-based heat engine energy calculator, improving measurement accuracy by 25% and reducing calculation time by 40%.
- Head of Multimedia Bureau, IChemE Club, UiTM – Directed visual content creation for Midori Farm Site Visit, boosting online reach by 60% and increasing event sign-ups by 35%.
- Head of Multimedia Bureau, Ethical Leadership Program – Managed a creative team to produce impactful posters, banners, and event photography, attracting over 150 participants.
- Committee Member, River Ranger Program, Klang – Supported river conservation initiatives, engaging over 100 community members in environmental clean-up and awareness campaigns.

Competitions & Achievements

- Finalist, Unleashing Engineering Potential: An Engineering Challenge 2024 – Developed an innovative technical essay addressing engineering challenges with practical solutions.
- Participant, AspenTech Academic Innovators Challenge, 2025 – Designed a process concept for sustainable bio-methane production, integrating advanced process simulation tools.
- Participant, Oil Week 2024 Paper & Poster Competition, Universitas Indonesia – Presented chemical engineering research and networked with top Southeast Asian engineering students.
- Participant, Greenovate Challenge 2025, Universitas Pertamina – Selected among 47 teams to advance to the global stage, presenting renewable energy innovations to international evaluators.

Activities & Societies

- Scholarship Recipient, UGM & UiTM – Awarded dual scholarships, including UGM private housing funding (Jalan Kaliurang, Pogung Kidul, Yogyakarta) and UiTM food allowance scholarship (RM 1,500 for one semester).
- Student Mentor, UiTM–UGM Exchange Program – Guided incoming UiTM exchange students (Feb 2024 intake) by providing academic system insights, cultural adaptation strategies, and UGM peer contacts; successfully reduced culture shock and improved readiness for midterm and final exams.
- Exchange Student, Universitas Gadjah Mada (UGM), Yogyakarta – Completed one-semester exchange with credited coursework in Transport Phenomena, Process Simulation, Food and Technology, Particulate Processing, and Process Control, expanding technical expertise and cross-cultural collaboration skills.
- Volunteer, Dusun Pengsos, Giring, Paliyan, Gunung Kidul, DIY – Contributed to community development initiatives under Ganaloka KMTK (Keluarga Mahasiswa Teknik Kimia), engaging with local residents and supporting socio-technical activities.
- Process Engineering Participant, POISE UGM – Selected as the only international student to participate, demonstrating adaptability and strong technical competence in process engineering.
- Winner, AKASAGAMANA Digital Class – Secured 1st place in poster design competition organized by Keluarga Mahasiswa Fakultas Teknik, recognized for creativity and technical presentation skills.

UiTM (University Technology Mara), Dengkil (Foundation In Engineering) AUG 2020-AUG 2021

Activities & Societies

- Tutor, Computer Science (Semester 2) – Taught classmates C programming fundamentals and problem-solving techniques; guided them through coding exercises and debugging practices. Led the development of a COVID-19 physical distancing device by building a prototype head model equipped with proximity sensors to alert when safe distance was breached, promoting pandemic safety awareness.
- Head, Physics & Computer Science Group Projects – Coordinated team research, task allocation, and technical execution; developed innovative solutions that achieved the highest class scores in both subjects, demonstrating leadership and academic excellence.
- Participant, UiTM Innovation & Engineering Days – Designed and built a smart turbine system capable of harnessing renewable energy; integrated sensors for performance monitoring and efficiency optimization, showcasing sustainable engineering concepts.
- Project Development Skills – Applied microcontroller programming (Arduino), circuit design, and sensor integration to create functional prototypes; combined theoretical knowledge with practical engineering skills to deliver high-impact academic projects.
- Collaboration & Leadership – Facilitated peer learning sessions, promoted effective teamwork, and encouraged innovation within group projects, resulting in consistently high-quality project submissions and positive lecturer feedback.

SKILLS

Technical Skills	Soft Skills
<ul style="list-style-type: none">• Aspen HYSYS v11-v14• Microsoft power BI(Business Intelligence)• Polymath• Aspen Plus v11 - v14• Aspen Energy Analyzer v11• MATLAB• Polymath• Python• C++• C• Java• SQL• Node.Js• Tailswind• CSS• HTML• Javascript• Canva• Microsoft Excel• VBA• Figma• Autocad• Microsoft Visio• Adobe Photoshop• Excel• Cursor• Visual Studio Code• Oracle• Amazon Web Services	<ul style="list-style-type: none">• Bilingual Communication (Malay & English)• Leadership• Team Collaboration• Adaptability• Problem-Solving• Event & Project Coordination• Mentoring & Tutoring• Creativity & Design Thinking• Cultural Awareness• Time Management• Data Analytic• Research and Data Interpretation• Safety and Compliance Awareness• Technical Writting• Computing• Continuous Learning

CERTIFICATION

Figma Essential Training: The Basics

- LinkedIn: Issued Mar 2024

Artificial Intelligence Foundations: Machine Learning

- LinkedIn: Issued Mar 2024

Microsoft Power BI Essential Training

- Microsoft: Issued Mar 2024

What is generative A.i

- LinkedIn: Issued FEB 2024

• Introduction to Graphic Design: Concepts

- LinkedIn Issued Feb 2024

• Data Visualization For Data Analysis And Data Analytics

- LinkedIn: Issued FEB 2024

• Career Essentials in Generative AI by Microsoft and LinkedIn

- Microsoft: Issued FEB 2024

• Python Essentials 1

- Cisco Networking Academy program

WORKING EXPERIENCES

Shopee – Dispatcher, Shah Alam

DEC 2022 - JAN 2023

- Organized and sorted parcels by ID number according to state-specific sections, ensuring efficient distribution and timely deliveries.
- Assisted staff in entering parcel tracking numbers into the system, verifying accuracy based on weight to minimize tracking errors.

Part-Time Dishwasher

JAN 2025 - FEB 2025

- Maintained kitchen hygiene by cleaning and sanitizing dishes, glassware, and utensils during high-volume service periods.
- Removed waste and managed rubbish disposal in compliance with hygiene standards.
- Reorganized seating arrangements after events to restore venue readiness.

Part-Time Research Assistant – Department of Chemical Engineering, Uitm Shah Alam

NOV 2024 - SEP 2025

- Developed MATLAB simulations for chlorine leak scenarios, contributing to a Q1/WOS SCOPUS journal publication.
- Built MATLAB-based plume dispersion models validated against ALOHA and HAMSAGAR software for model accuracy.
- Designed a custom MATLAB calculator for relief valve sizing, streamlining safety engineering calculations.
- Prepared technical training modules and hands-on examples for relief valve sizing short courses.
- Conducted CIMAH (Control of Industrial Major Accident Hazards) compliance checks for chemical storage and safety documentation.
- Participated in site visits to Top Glove (F41, F32, F15), AT&S, Intel, CoreTech, Flexitech, Toray Chemical, and Tomoe Chemical, collecting operational and inventory data.
- Assisted in refining CIMAH reporting by updating hazard registers, consequence analyses, and mitigation measures based on site visit findings.
- Simulated chlorine dispersion and explosion mapping scenarios using MATLAB, ALOHA, and HAMSAGAR for CIMAH submissions.
- Applied RiskLynx software for FN curve and LSIR (Location-Specific Individual Risk) analysis, supporting societal and individual risk assessment.
- Co-developed a web-based platform for engineers to generate LSIR graphs, explosion maps, and dispersion modeling outputs.
- Drafted technical appendices for CIMAH submissions including accident scenarios, consequence models, and emergency response planning.
- Produced hazard zone contour maps, LSIR overlays, and risk plots for regulatory compliance reports and safety case presentations.
- Collaborated with HSE officers and engineers to validate on-site emergency response strategies, neutralization systems, and PPE requirements.
- Supported postgraduate students and peers with MATLAB troubleshooting and simulation guidance.
- Coordinated multi-site data collection and structured it into standardized research–industry collaboration reports.
- Assisted in preparing journal manuscripts, conference posters, and industrial presentations with emphasis on regulatory alignment.
- Contributed to hazard classification of stored chemicals using UN/HS codes and alignment with CIMAH 1996 schedules.
- Performed comparative studies of relief sizing methods using Fauske nomograph, API standards, and MATLAB custom tools.
- Created technical diagrams, risk visualizations, and GIS-based overlays to enhance communication of hazard scenarios.

Simulation Assistant

NOV 2024 - SEP 2025

- Assisted in Aspen HYSYS and Aspen Plus simulations for multiple chemical production projects, including:
- Formaldehyde production – modeled reactor, separation, and recycle streams.
- Formic acid synthesis – simulated hydrolysis of methyl formate and integrated waste treatment units.
- Acetic acid production – designed distillation and extraction steps with azeotrope considerations.
- Biomass gasification to methanol – modeled syngas generation, purification, and catalytic conversion.
- Biodiesel production from biomass (triolein) – simulated transesterification process and glycerol by-product separation.

Industrial Training – Department of Chemical Engineering, InPres, UiTM Shah Alam

JULY 2024 - SEP 2024

- Designed and produced a comprehensive safety brochure using Canva, detailing hazardous chemicals, their classifications, and hazard codes in compliance with CIMAH 1996 regulations.
- Conducted detailed chemical hazard research using the CAMEO Chemicals database to enhance workplace hazard awareness and safety compliance.
- Applied regulatory interpretation skills to ensure correct alignment of hazard codes, chemical labeling, and safety symbols, improving clarity and accuracy of safety communication materials.
- Collaborated with supervisors and interns to validate chemical labeling and emergency response protocols, ensuring regulatory readiness for audits and inspections.
- Assisted in identifying process safety risks in handling hazardous materials and proposed improvements in hazard documentation.

PORTFOLIO

Reddit-image-scrapper

- Built a Python-based script to scrape images from Reddit using the Reddit API (PRAW) and BeautifulSoup where needed.
- Implemented authentication with Reddit API (client ID, client secret, user agent).
- Automated extraction of post metadata (title, subreddit, author, timestamp, score, upvotes, URL).
- Downloaded image files into structured local directories with naming conventions.
- Added support for filtering by subreddit, keywords, flair, post score, or NSFW flag.
- Incorporated error handling for missing images, broken links, and rate limits.
- Enabled multi-threaded download to improve performance for large-scale scraping.
- Stored metadata in CSV/JSON for further analysis or integration into data pipelines.
- Designed modular functions to allow future extension into video/GIF scraping.
- Integrated logging to track progress, failed downloads, and successful completions.
- Supported command-line arguments for subreddit, time filter (day, week, month, all), and number of posts.
- Optionally included image preprocessing (resizing, renaming, format conversion).
- Applied compliance to Reddit's API terms, avoiding direct scraping without API where possible.
- Structured code for reuse in machine learning datasets, content aggregation, or visualization projects.

Weather forecasting

- Collected raw weather dataset (CSV format) containing parameters such as temperature, humidity, rainfall, and wind speed.
- Preprocessed data: handled missing values, standardized column names, converted timestamps into datetime objects.
- Conducted exploratory data analysis (EDA) to visualize seasonal patterns, daily/weekly cycles, and anomalies.
- Applied statistical time-series decomposition (trend, seasonality, residual) to understand underlying structures.
- Built forecasting models including ARIMA (AutoRegressive Integrated Moving Average) for short-term predictions.
- Tested different ARIMA configurations (p, d, q values) using AIC/BIC for model selection.
- Split dataset into training and testing sets to validate forecast accuracy.
- Evaluated model performance using RMSE (Root Mean Square Error) and MAE (Mean Absolute Error).
- Generated plots comparing actual vs predicted weather trends.
- Automated pipeline for continuous training and forecasting updates.
- Integrated matplotlib-based visualization for user-friendly graphical outputs.
- Prepared script to export forecasts to CSV or Excel for reporting.
- Set foundation for extending into advanced models (e.g., LSTM, Prophet) for improved accuracy.
- Designed workflow to deploy forecasting model on GitHub as part of analytics portfolio.

Web Development

- Scope: web extension that ingests ALOHA and HAMSAGAR outputs, normalizes scenarios, computes LSIR/F-N, renders maps, and exports regulator-ready reports
- Inputs supported: ALOHA (.csv/.txt export), HAMSAGAR result tables, manual form; batch upload; zipped runs with metadata manifest (JSON)
- Scenario canon: substance, state, source type (hole, rupture, relief, pool), hole size, inventory, duration, mitigation, terrain, stability class, wind, humidity, air temp, roughness, building/passive mitigation flags
- Parser layer: robust CSV/TXT readers with schema detection; unit coercion; locale-safe numbers; time-base alignment; QC flags for missing, clipped, or non-converged runs
- Normalization: unify endpoints (ERPG/AEGL/PIDLH, thermal flux kW/m², toxic dose Ct/probit), unify coordinates (WGS84), unify height/ground reflection assumptions
- LSIR engine: IR(x) interpolation from concentration/thermal grids to site grid; distance-to-contour solver for 10⁻⁵ and 10⁻⁶/yr bands
- Societal risk: F-N construction with population raster/grid; event trees with frequencies; log-log bands vs tolerability criteria; confidence bands via bootstrap
- Toxicity models: probit (toxic/thermal), dose-response curves, time-to-incapacitation vs lethality; chlorine defaults (Haber/modified Haber) with override tables
- Meteorology handling: wind-rose library, sector weighting, seasonal sets, percentile winds; automatic generation of 16/36-sector compound runs from single-sector ALOHA/HAMSAGAR inputs
- Map UI: tiled basemap, site assets (tanks, drums, process units), iso-risk contours, endpoint rings, wind-sector overlays, editable exclusion/evac zones, measuring tools, label renderer
- Population/asset layers: raster (WorldPop/Local census), custom polygons (schools, hospitals), time-of-day occupancy factors, vulnerability weights
- DOE/UK HSE-style outputs: distances to 10⁻⁵ and 10⁻⁶, individual risk footprint, ALARP banding, F-N position vs criteria; auto-filled compliance tables
- Sensitivity/what-if: sliders for hole size, wind speed, stability, duration, inventory, mitigation on/off; delta contours and delta-risk metrics

FINAL YEAR PROJECTS

Production of 55512 tonnes/year for design project(Design project 1 and Design project 2)

- Designed for 55,512 tonnes/year production capacity across two major design projects.
- Led process simulations of formic acid production using Aspen Plus and Aspen HYSYS, covering mass and energy balances, equipment sizing, and process optimization.
- Directed P&ID development to support HAZOP studies, ensuring identification and mitigation of potential process hazards.
- Conducted heat integration and thermal efficiency analysis, optimizing utility consumption and overall energy performance.
- Produced detailed process and safety diagrams using Microsoft Visio, including control loops, safety interlocks, and operational workflows.
- Ensured compliance with industrial design and safety standards, integrating simulation results with design documentation.

Q1 PUBLISHED PAPER

Research Project: Chlorine-related from two (2) incidents in water treatment plant: A comprehensive review on root cause analysis

- Contributed to the development of a custom MATLAB simulation tool replicating two real chlorine release incidents in a municipal water treatment plant.
- Reconstructed incident scenarios using historical records, sensor logs, and safety investigation reports to simulate gas dispersion and system failure pathways.
- Applied root cause analysis (RCA) methods including the 5 Whys technique and Ishikawa (Fishbone) diagrams to systematically trace causal chains leading to the incidents.
- Built dynamic visualization modules to show gas dispersion plumes, operator response delays, and cascading equipment failures.
- Conducted “what-if” analyses to evaluate different leak sizes, response times, and containment strategies, providing insight into effective mitigation measures.
- Improved hazard identification and emergency planning by aligning simulation results with DOE and CIMA safety guidelines.
- Delivered a digital training tool enabling operators and safety engineers to learn from simulated incident conditions and improve decision-making during emergencies.
- Link = <https://doi.org/10.1016/j.psep.2025.107286>

RESEARCH PROJECT

Research Project: Modelling and Simulation of Saponification of Ethyl Acetate and Sodium Hydroxide in a Continuous Stirred Tank Reactor (CSTR) using MATLAB

- Designed and programmed a MATLAB-based simulator using coupled mass and energy balance equations to model CSTR saponification kinetics.
- Developed an interactive Graphical User Interface (GUI) allowing users to input parameters (concentration, temperature, flow rates, reactor volume) and view results dynamically.
- Implemented ODE45 solver for transient differential equations to capture real-time variations in conversion, concentration, and reactor temperature.
- Integrated optimization algorithms to fit experimental data and validate simulation outputs, minimizing error between predicted and observed results.
- Enabled reactor sizing and cooling demand estimation under multiple operating conditions (30–60 °C), supporting both process design and scale-up.
- Improved simulation accuracy by reducing manual computational errors, providing a robust academic and industrial tool.
- Designed system flexibility to allow future integration with CFD (Computational Fluid Dynamics) for turbulence, mixing, and particle-tracking analysis.
- Contributed to knowledge transfer by providing a reusable and scalable MATLAB tool for teaching, research, and industrial training.

REFERENCES

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