MUYIDEEN ABDULSAMAD

CAD & Design Engineer · SolidWorks · ANSYS FEA · COMSOL CFD · Engineering Simulation

PROFESSIONAL SUMMARY

Design and simulation engineer with 6+ years of experience in 3D CAD modelling, finite element analysis, and multi-physics simulation across aerospace, defence, bioengineering, and materials engineering domains. Primary tools: SolidWorks (strongest), ANSYS (FEA and Explicit Dynamics), and COMSOL Multiphysics. Delivered fabrication-ready designs for a UC San Diego Bioengineering research programme, conducted ballistic armour FEA for defence-sector analysis, simulated ventilation CFD for agricultural engineering research, and qualified composite materials for the Nigerian Air Force. Complementary expertise in materials characterisation (SEM, TEM, XRD) and NDT provides engineering judgement that purely computational designers lack.

DESIGN & SIMULATION SKILLS

3D CAD: SolidWorks (primary — parts, assemblies, technical drawings, fabrication packages), AutoCAD (2D drawings, schematics)

FEA & Structural Simulation: ANSYS Structural, ANSYS Explicit Dynamics (high-velocity impact, ballistic analysis), static and dynamic loading, stress and deformation analysis, mesh convergence studies

CFD & Multi-Physics: COMSOL Multiphysics (fluid flow, heat transfer, species transport, NH dispersion modelling), boundary condition setup, parametric studies across multiple configurations

Materials Selection: Ansys Granta (systematic materials selection against multi-criteria — weight, strength, fatigue, cost, airworthiness)

Materials Characterisation: SEM, TEM, XRD, optical microscopy — microstructure-property relationship analysis

NDT: Magnetic Particle Testing, Dye Penetrant Inspection — aerospace component inspection

Manufacturing Knowledge: Composite fabrication, powder metallurgy, sol-gel synthesis, additive manufacturing (FDM), heat treatment processes

Supporting Software: MATLAB (data analysis, simulation post-processing), Python (automation, data visualisation), Microsoft Excel

DESIGN & SIMULATION PROJECTS

Bio-Neuron Chip Prototype — SolidWorks Design | UC San Diego, Dept. of Bioengineering (Remote Collaboration) *2023 – 2024*

- Collaborated with a UC San Diego Bioengineering doctoral researcher to design a bio-neuron chip prototype from scratch — the most technically demanding CAD project in terms of geometric precision and fabrication constraint.
- Designed micro-electrode array geometry, microfluidic channel networks, chip body, and component interfaces in SolidWorks; all geometry constrained by nanoscale fabrication tolerances specified by the researcher.
- Iterated design across multiple review cycles based on researcher feedback; delivered a complete fabrication-ready technical drawing package and 3D assemblies ready for laboratory prototyping.
- Domain: bioengineering, MEMS-adjacent design, microfluidics — cross-disciplinary application of SolidWorks to a research-grade engineering problem.

Ballistic Armour FEA — SiC/Lead Composite Panels | ANSYS Explicit Dynamics Study *2024*

- Designed and ran a systematic ANSYS Explicit Dynamics simulation study of SiC-lead composite armour panels under high-velocity impact loading.
- Modelled composite panel geometry, material properties (SiC and lead), projectile, and impact boundary conditions; ran parametric simulations across layer thickness configurations.
- Characterised stress wave propagation, deformation modes, and energy absorption across all configurations; identified optimal layer geometry reducing peak stress by 23% compared to baseline.
- Deliverable: technical analysis report with stress contour plots, deformation animations, and layer thickness

recommendations.

Pig-House Ventilation CFD — NH Dispersion Study | COMSOL Multiphysics — Doctoral Research Collaboration *2024*

- Designed a full-scale pig-house ventilation model geometry in COMSOL Multiphysics for a doctoral research project studying the effect of NH on the environment.
- Set up coupled fluid flow and species transport physics; defined 6 distinct airflow configurations varying inlet velocity, inlet position, and outlet arrangement.
- Ran all 6 configurations; post-processed NH concentration fields across the building volume; identified which configurations kept NH below regulatory environmental thresholds.
- Results directly informed the doctoral researcher's ventilation design recommendations for publication.

Materials Analysis & Design | 431 Engineering, Nigerian Air Force, Kaduna *2022 – 2024*

- Selected and qualified composite materials for aircraft structural applications using Ansys Granta; evaluated 15+ candidate materials against Nigerian Air Force airworthiness criteria including weight-to-strength ratio, fatigue life, and environmental resistance.
- Developed and validated computational models in ANSYS to simulate composite material behaviour under operational aircraft loading conditions; correlated simulation outputs with experimental SEM and XRD characterisation data.
- Executed NDT inspections — magnetic particle testing and dye penetrant inspection — on aircraft structural components; zero non-compliance findings across 3 full inspection cycles.
- Authored technical reports submitted to the Nigerian Air Force engineering review board documenting materials selection rationale, simulation results, and NDT findings.

3D CAD Design & FEA | Freelance *2018 – Present*

- Delivered 3D CAD models, assemblies, and technical drawings for multiple clients across mechanical engineering, product design, and structural applications using SolidWorks and AutoCAD.
- Performed FEA using ANSYS to analyse structural integrity of client designs under specified loading conditions; provided design optimisation recommendations based on simulation results.
- Translated engineering drawings and design briefs into detailed SolidWorks models for prototyping and production; collaborated with clients through iterative design review cycles.

Engineering Designer — Defence (NDA) | Technoguard / DICON (Nigerian Defence Industries Corporation) *2023 – 2024*

- Engaged under NDA — specific deliverables and design details are confidential.
- Produced engineering designs for a defence-sector engagement in collaboration with DICON; applied rigorous design methodology and operated within a classified, high-accountability project environment.

PROFESSIONAL EXPERIENCE — SUPPORTING

Materials Science & ML Researcher | Independent / ABU Zaria *2022 – 2024*

- Developed ML models for materials property prediction and inverse design — complementary to simulation work, providing computational tools that reduce the search space before expensive FEA or experimental validation.
- This AI/ML background means I can automate post-processing of simulation data, build parametric study pipelines, and connect simulation outputs to predictive models — capabilities that pure CAD engineers typically lack.

EDUCATION

B.Eng. Metallurgical & Materials Engineering *Oct 2024*

Ahmadu Bello University, Zaria · Second Class Upper (Hons)

Thesis: ML simulation and prediction of steel mechanical properties via iron-carbon phase diagram — 90%+ prediction accuracy.

AWARDS & CERTIFICATIONS

- Computational Materials Engineer Class Award — ABU MME Department, 2024
- Tech Oracle Award — NUESA Online Quiz Competition, 2024

- Google Project Management Certificate
- Advanced Certification in Environmental Standards — SPESSECE