YOUSUF ABUBAKR

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EDUCATION AND SKILLS

University of California, Berkeley, Class of 2024   GPA: 3.7 | **August 2020 - Present**
Mechanical Engineering BS & EECS Minor
Relevant Coursework: FEA, Controls, Composites, Manufacturing, Material Mechanics, Fluid Mechanics, Orthopedic Biomechanics, Thermodynamics, Dynamics, Statics, Mechatronics, Heat Transfer, Machine Learning
Engineering Software: SolidWorks, NX, ANSYS, ANSA, ABAQUS, LS-Dyna, Optistruct, FEBio, Gmsh, Paraview, Metapost
Design and Manufacturing: Composite Layups and Molds (Wet/Prepreg Layups), Mill and Lathe, GD&T, CAD, FEA, DOE
Programming Languages and Systems: MATLAB, Python, Simulink, Git, Java, LabVIEW

EXPERIENCE

Materials Researcher | **Cornell University**   Ithaca, NY | **May 2023 – Aug 2023**
- Built and analyzed efficacy of 4+ multi-scale computational biomaterial and engineering metal FEA models
- Designed and assembled fixture for nanoscale metal impact tester to improve testing efficiency and precision

Interior CAE Intern | **General Motors**   Detroit, MI | **June 2022 – Aug 2022**
- Performed linear and nonlinear structural FEA analysis on multiple IP components to assess performance of design
- Coordinated with test engineers to prototype, set up, and execute dynamic loading tests on IP components
- Collaborated with design engineers to share analysis, provide design recommendations, and assure that product testing and consumer protocols are met and validated

Senior Advisor | **CalSol, UC Berkeley Solar Vehicle Team**   Berkeley, CA | **July 2020 – Present**
- Co-led manufacturing of 30+ squared meters of aluminum and Nomex composite sandwich panels for exterior shell and interior structural panels of solar vehicle
- Managed weekly mechanical team meetings and design presentations to advance manufacturing of 10th gen vehicle
- Optimized interior structural frame of vehicle by iterating chassis and joint design to fit 3+ driver configurations
- Validated aerodynamic performance of solar vehicle by performing wind tunnel tests and over 60+ CFD simulations in ANSYS to strengthen understanding of flow conditions on vehicle and heat transfer to battery cells and driver
- Enhanced design of shell in SolidWorks by refining surface modeling of our vehicle's geometry to reach appropriate 0+ degree draft angles to prepare for molding and manufacturing of exterior shell for vehicle

Biomechanics Researcher | **Grace O'Connell Biomechanics Lab**   Berkeley, CA | **December 2020 – Present**
- Used experimental testing framework to guide FEA modeling of 7+ multi-scale tissue and joint level models
- Enhanced validation of FEA models to verify mechanical properties over multiple loading modalities and physical data
- Post-processed and analyzed stress and strain distributions in fiber-reinforced tissues in MATLAB and Paraview
- Tested 10+ IVD tissue samples in uniaxial loading conditions to investigate chemical and anisotropic disc characteristics
- Parameterized scoliotic joint level model to measure and validate how varying degrees of surgical corrective tethering techniques impact long term spinal growth and health

PUBLICATIONS

Torque- and Muscle-Driven Flexion Induce Disparate Disc Mechanical Behavior | **O'Connell Lab**   UC Berkeley | **August 2021**
- Built 3+ multi-scale tissue and joint level computational FEA models to examine impact of flexion on IVD mechanics
- Concluded that greater concentration of solid stress and strain in posterolateral outer AF region more accurately simulates herniation, which challenges current complications in replicating herniations *in vitro*

Non-enzymatic Glycation Strengthens Annulus Fibrsous Through Crosslinks Aligned with Primary Collagen Fibers   UC Berkeley | **August 2022**
- Studied anisotropy of glycated and nonglycated IVD tissues to characterize tissue mechanics with diabetic patients
- Determined glycation induced fiber crosslinking, which stiffened tissue modulus in direction of primary collagen fibers

HONORS AND AWARDS

- 4th Place American Solar Challenge & 4th Place Formula Sun Grand Prix 2022   **July 16, 2022**
- JUMP Undergraduate Research Initiative Scholarship   **August 19, 2021**
- NSF REU (National Science Foundation Research Experience for Undergraduates) Grant   **April 23, 2021**

INTERESTS

- **Languages:** Arabic (conversational), Spanish (conversational)
- **Interests:** Avid Basketball Fan (#dontsleeponthesuns), Casual Movie and TV Reviewer, Messi Enjoyer