YOUSUF ABUBAKR

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EDUCATION

University of California, Berkeley, Class of 2024 GPA: 3.8 | **August 2020 - Present**

Mechanical Engineering BS & Electrical Engineering and Computer Science Minor

Relevant Coursework: Thermodynamics, Solid Mechanics, Two and Three-Dimensional CAD Modeling and FEA, MATLAB, Physics I & II, Calculus II & III, Linear Algebra and Differential Equations, Intro to Computer Science (Python)

EXTRACURRICULAR ACTIVITIES

Research Assistant | **Grace O'Connell Biomechanics Lab** Berkeley, CA | **December 2020 – Present**

- Developed 3+ ANSYS Meshing models by optimizing node/element features to account for node conformity at contact regions, unique material assignments, and simulation parameters in FEBio (Biomechanics solver)
- Enhanced validation of FEM bovine model by constructing 7+ experiments in FEBio to verify mechanical properties of model over multiple loading modalities and physical, experimental data
- Modeled 4+ biphasic and triphasic tissue structures with validated bovine disc model in FEBio to examine stress and strain distributions and to simulate transport of solvent, ion, and water contents in fiber-reinforced tissues
- Assembled FEA data from FEBio in MATLAB to categorize, curve-fit, and graph results of computational models

Aero Lead | **CalSol, UC Berkeley Solar Vehicle Team** Berkeley, CA | **July 2020 – Present**

- Validated aerodynamic performance of solar vehicle by performing over 30+ Flow tests in ANSYS Fluent to strengthen understanding of weather conditions impact on vehicle and to forecast driving techniques in future races
- Optimized design of shell in SolidWorks by refining surface modeling of our vehicle's geometry to reach appropriate 0.00+ degree draft angles to prepare for molding and manufacturing of exterior shell for vehicle
- Investigated model stability by parameterizing meshing features and conducting mesh convergence studies to evaluate validity of ANSYS Fluent simulations
- Conducted 4+ PDR (Preliminary Design Reviews) with CalSol managers, alumni, and General Motor representatives

President | **VEX Robotics/Engineering Club** Peoria, AZ | **August 2018 – May 2020**

- Saved school over $3000 dollars by designing, producing, and placing teachers' names on their doors in paper textiles
- Placed in top 10% for all Arizona VEX teams for VEX Robotics at state competition
- Advised CAD Assembly team, who was tasked with recreating robot in a 1-to-1 assembly in SolidWorks

PUBLICATIONS

Torque- and Muscle-Driven Flexion Induce Disparate Disc Mechanical Behavior | **O'Connell Lab** UC Berkeley | **August 2021**

- Collaborated with grad student to examine impact of torque and muscle driven flexions on intervertebral disc mechanics to produce more clinically relevant data and improve current understanding of torque loading schemes
- Simulated muscle-driven flexion with validated FEMs, examining different ICRs to evaluate disc mechanical behaviors
- 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*

WORK EXPERIENCE

Network Engineering Assistant | **STS (Student Technology Services)** UC Berkeley | **October 2020 – August 2021**

- Wrote and programmed 3+ Python scripts and templates to expedite data collection process in Excel documents
- Renewed network switches and access points in 150+ ports in university housing to sustain ethernet connection systems

SLC Math Tutor | **SLC (Student Learning Center)** UC Berkeley | **January 2021 – August 2021**

- Backed up professor instruction by creating custom practice questions to reinforce lecture topics and review concepts
- Spearheaded group tutoring sessions of 4+ to help students struggling in similar areas in single-variable calculus

HONORS AND AWARDS

- 6th Place American Solar Challenge 2021 & 5th Place Formula Sun Grand Prix 2021 **August 8, 2021**
- NSF REU (National Science Foundation Research Experience for Undergraduates) Grant **April 23, 2021**
- CSWA (Certified SolidWorks Associate) Certification (Certification Number: C-SHL4RND67P) **November 16, 2019**

SKILLS AND INTERESTS

- **Engineering/Computer Applications:** SolidWorks (proficient), MATLAB (proficient), ANSYS (proficient), FEBio (proficient), Python (proficient), NX (competent), Siemens Star-CCM+ (competent), Paraview (competent)
- **Languages:** Arabic (conversational), Spanish (conversational)
- **Interests:** Avid Basketball Fan (#DontSleepontheSuns), Casual Movie and TV Reviewer, Ardent Minecraft Enthusiast