

X Sun

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Education

UC Berkeley College Of Engineering, Berkeley, CA, USA
Bachelor of Science in Mechanical Engineering

Aug 2019 - May 2022

- Jacobs Institute Innovation Catalyst Recipient (\$500), 2020 Fall: led a student team to create a mobile, open-sourced USB bicycle phone charger
- Summer Undergraduate Research Fellowship, 2021: Cost and Construction Analysis of Concrete Gridshells by Finite Element Analysis
- Cal Alumni Leadership Scholarship Recipient, 2021-2022
- Jacobs Institute Innovation Catalyst Recipient (\$2000), 2021 Fall: Extending work of Bear Air (a economically efficient air ventilator) into real life application in face of COVID and wild fire season
- Selected Relevant Coursework (> 100: undergraduate upper division courses; > 200: graduate courses): ME C117 - Structural Aspects of Biomaterial; EE 145B: Medical Imaging Signals and Systems; ME H194 - Honor Undergraduate Research; ME C201 - Modeling and Simulation of Advanced Manufacturing Process; ME 223 - Polymer Engineering; ME C225 - Fracture and Fatigue of Structural Materials ; ME 280A - Introduction to the Finite Element Analysis;
- Accumulative GPA: 3.7 / 4.0

Mater Dei High School, Santa Ana, CA, USA

Aug 2016 - May 2019

- Principle's Honor List, Class of 2019
- Founder and Team Captain of Math Team & Captain of Speech and Debate Team
- Graduated with 96.28 UC transferable units (including Advanced Placements units and courses taken in community colleges)

Key Qualifications

- Skilled in research (literature review, planning and executing experiments, analyzing and organizing data, grant and paper writing) at additive manufacturing, biofabrication, (bio)material, HVAC (Heating, Ventilation, and Air Conditioning), mechanical design and optimization, ocean engineering, and control fields.
- Trained on mammalian cell culture and various molecular imaging techniques
- Experienced in data analysis and simulation with Matlab and Python & CAD with Solidworks and Fusion 360
- Familiar with Finite Element Method theory and its applications in Ansys and Abaqus
- Proficient with mechanical component design and fabrication (3D printers, wood shop, metal shop, and CNC machines)

Research Experience

Research Assistant

Feb 2020 - Present

Design For Nanomanufacturing Lab

- Regularly reviewing literature, proposing research ideas, and helping with grant writing
- Attending group meetings, workshops and conferences in relevant fields
- Making organic / bio photo-resin with various monomer and photoinitiators for conducting different experiments, including discovering novel materials
- Conducting various bio-related projects for exploring the advantages of volumetric light patterning
- Designing and executing experiments to print, post- process, and evaluate optical components with Computed Axial Lithography (CAL) printer
- Building a theoretical model to optimize post-processing

- Leading a team to build an open-sourced CAL printer
- Improving optical performance of the CAL system by further developing projection generation code
- Evaluating mechanical properties of novel hydrogels and fabricate tools for tissue engineering and contact lenses printing
- Leading a collaboration with O'Connell Lab on creating cartilage tissue with CAL printer using a mixture of agarose, alginate, and PEGDA gels
- Assisted to upgrade the CAL printer for multi-wavelength printing and applying it to bioprinting in collaboration with a Stanford team
- Built a theoretical simulation for volumetric 3D printing with metal powder in ultrasonic field
- (Bear Air) Co-leading a team in a COVID air purification project that gained 130K initial fund from the CITRIS Institution: Literature reviewing, planning and executing experiments, data analysis and product designing, paper and grant writing, communication with research partners
- Led a student team in producing a 3D printable Bacterial Viral Filter model

Cartilage Tissue Engineering Research Assistant
O'Connell Lab

Feb 2021 - Present

- Constantly reviewing literature and propose new research ideas
- Preparing bovine meniscus samples
- Making agarose, alginate, PEGDA, GelMA, and collagen gels with different formulas and conducting biocompatibility (using chondrocytes) compressional & stress relaxing test with casted samples
- Printing and evaluating hydrogels with a bio fused deposition printer (Allevi 2)
- Conducting print fidelity tests and improve the print fidelity by alternating print parameters: successfully printed soft 3D structures with overhang parts
- Meeting with graduate student mentor weekly and presenting final research result to the group every semester

Researcher

June 2019 - Dec 2021

Mentored by professor Zhenyu Gan, Mechanical & Aerospace Engineering, Syracuse University

- Investigated the impact of spring linear stiffness in a SLIP (Spring Loaded Inverted Pendulum) model using mataba simulation.

Summer Undergraduate Research Fellowship

May 2021 - Aug 2021

Departments of Architectural and Civil Engineering, UC Berkeley

- Analyzed laminated composite material properties (Young's Modulus, Shear Modulus, Poisson's Ratio, bending strength, and bending modulus) and structural integrity in Ansys and Abqus for their use in gridshell constructions
- Created CAD models for Finite Element Analysis (FEA)
- Reviewed and summarized literature in the field
- Organized, analyzed, and created graphs to visualize data

Mechanical Engineer And Researcher

Mar 2020 - July 2020

COVID19 Project - HelpVentilator (<https://www.ventilatorsos.org>)

- Repurposed CPAP and BiPAP machines as ventilators for supplementary medical devices
- Created CAD model for 3D printing and press release
- Built and Tested prototype with off-shelf-products and 3D printing parts
- Created the fist website and started a Gofundme campaign for the project
- Gathered and analyzed data including flow rate, pressure drop, and oxygen concentration
- The VentilatorSOS team distributed thousands of machines across the world

Ocean Engineering Researcher

Dec 2019 - Jun 2021

TAF (Theoretical & Applied Fluid Dynamics) Lab

- Operated apparatus around a large scale wave tank in O'Brien Hall at UC Berkeley campus.
- Assisted calibrate wave gauges and force cells
- Team member of UC Berkeley MECC (Marine Energy Collegiate Competition) Team: research, design, and conduct business plan for novel marine energy technologies — Underwater UUV (unmanned underwater vehicle) Charging Station & Wave Energy Microgrid System for Isolated Communities

- Lead author of a paper published at Berkeley Scientific Journal

Other Activities

Officer in Project Grant Committee

Feb 2021 - Present

American Society of Mechanical Engineers UC Berkeley Chapter

- Working on a project providing funds to student projects in mechanical engineering classes

Engineer & Team leader & Mentor & Volunteer

Feb 2016 - Present

Code Orange FRC 3476, RoboRAVE international

- 3rd Place in Innovation & Entrepreneur Competition Asia Regional 2016: Built a robot automated to deliver toilet paper in bathrooms of commercial stores
- 4th Place in FRC (First Robotics Competition) World Championship 2018
- Volunteering for various educational programs: mentor & judge

Volunteer For Youth Education Events

Sep 2019 - Present

Society of Women Engineer & Berkeley Splash

- Taught Rocket, Marine Energy, manufacturing, and bioprinting courses to hundreds of high school students
- Regularly volunteer for engineering or scientific workshops to elementary and secondary school students

Researcher, Mechanical Team Lead

Feb 2020 - May 2021

Space Technologies At California

- Worked on the mechanical control system and design & manufacturing of payload box in HAB (High altitude Balloon) Team
- Led the Mechanical Team in 2021 Spring

Mechanical Engineer

Aug 2019 - May 2020

Cal Space Technologies and Rockery & UC Berkeley Solar Vehicle Team & UC Berkeley Robomaster Team

- Researched on various propulsion systems and simulation techniques of rockery
- Fabricated CCTV camera mount with laser cutting
- Created CAD model for using Ansys to analyze torsional rigidity of the car structure
- Designed and manufactured mechanical parts for additional support on the robot

Publications

- Sun, X., Deng, B., Zhang, J., Kelly, M., Alam, R., & Makiharju, S. (2021). Reimagining Autonomous Underwater Vehicle Charging Stations with Wave Energy. *Berkeley Scientific Journal*, 25(2). <https://doi.org/10.5070/BS325254504>

Conference Presentations

- 2020 Fall: CITRIS COVID-19 Grant Projects Discussion — “A low-cost, accessible ventilation system for indoor air purification”
- 2020 Fall: Undergraduate Research Symposium in College of Engineering, UC Berkeley — “A low-cost, accessible ventilation system for indoor air purification”
- 2021 Summer: UC Berkeley Summer Undergraduate Research Fellowship Conference — “Investigation on Bending Behavior of Externally Carbon Fiber Reinforced Concrete Using Finite Element Method and Its Applications in Gridshell Architectures”
- 2021 Fall: Undergraduate Research Symposium in College of Engineering, UC Berkeley — “Volumetric Biomanufacturing via Computed Axial Lithography”
- 2021 Fall: Gulf Coast Undergraduate Research Symposium, Rice University — “Volumetric Biomanufacturing via Computed Axial Lithography”

Social Media & Research Platform Links

- Research Gate: <https://www.researchgate.net/profile/X-Yaxuan-Sun>
- LinkedIn: <https://www.linkedin.com/in/x-sun/>
- Personal Website: www.xxsun.org