ANDREW Y. CHEN

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EDUCATION

University of California, Berkeley — **Graduation anticipated: May 2022**
B.S., Mechanical Engineering, minor in Aerospace Engineering — GPA: 3.927/4.00

PROJECTS

Space Enterprise at Berkeley - UC Berkeley's Spaceshot Rocketry Team — **August 2018 – present**
President — March 2020 – present

- Oversaw the design, manufacturing, and static-fire testing of the propulsion system of *Eureka-1*, the team's first liquid-fuel (LOX/Methane) rocket. Created timelines for design, manufacturing, and system-level qualification and acceptance testing; led a CAD-forward design cycle using Onshape for collaboration; managed open design risks and cost-down drives during test-stand development. Successfully static-fired the engine in Fall 2021 using the test-stand, recording a peak thrust of 2.7kN over a 7-second burn time
- Led the from-scratch development of *LAD-4*, a hand-made 6.3"-diameter, 9'-tall carbon-fiber/fiberglass composite rocket designed to flight-test critical recovery and avionics infrastructure for *Eureka* flights. *LAD-4* successfully flew in March 2020 to an apogee of 11193 ft AGL and a maximum speed of Mach 1.18, setting UC Berkeley records
- Oversaw $15,000 team budget, streamlined internal reimbursement process, and managed multiple financial accounts. Filed for and obtained 501(c)3 non-profit status; increased year-over-year donation revenue by over 500%

WORK EXPERIENCE

Tesla — **June 2021 – August 2021**
Intern, Mechanical Design Engineering — Palo Alto, CA

- Developed a mechanical datuming and fastening strategy for the placement and mounting of PCBAs without risk of damage to electronic components or battery cell parts; oversaw a cross-functional team, including the selected contract manufacturer (CM), in the design and mechanical simulation-based validation of fasteners
- Spearheaded a testing campaign to identify the root cause of delamination failure in an adhesive bond; recommended an appropriate surface treatment to provide a 3X increase in adhesive strength; validated design changes using a series of lap-shear tests; communicated new functional requirements and initiated cost-down measures with CM for this part
- Designed a fluid-sealing foam surface to protect battery components from structural adhesive dispensed during module integration; characterized the compression behavior of the foam and quantified resulting loads and deflections on cell array parts; demonstrated the sealing functionality of the part using a fully 3D-printed prototype

HP Labs — **January 2021 – May 2021**
Intern, Multi Jet Fusion (MJF) Digital Twin Plastics Team — Palo Alto, CA

- Quantitatively evaluated mechanical properties of MJF-printed parts as a function of print geometry and nesting properties (location and orientation within the build volume) by conducting tensile, flexure, and impact tests following ASTM standards. The experimental design involved 1500+ test specimens printed in polyamide-11 and polyamide-12 spread across nine printing buckets
- Conducted data analysis in Python (primarily with `Pandas` and `matplotlib`) to isolate and visualize trends in strength, stiffness, energy absorption, and dimensional accuracy based on packing properties and material selection

Formlabs — **September 2020 – December 2020**
Intern, Mechanical Engineering - SLA Program — Somerville, MA

- Designed and built a closed-loop, temperature-controlled testbed for the development of a filtration system for volatile organic compounds (VOCs) generated from heated resin; demonstrated autonomous control of resin temperature to within 0.5°C and removal of 45% of generated VOCs using an activated charcoal filter
- Redesigned components in the linear drive system for an automated wash solution to increase stiffness by a factor of six and address lifetime reliability concerns; built in-house prototypes and validated changes
- Optimized solvent agitation parameters to improve automated wash performance in SLA post-processing; designed a screening experiment to isolate and tune key wash parameters; created and applied quantitative metric to empirically characterize and compare part cleanliness as a function of wash parameters

RESEARCH EXPERIENCE

Comparison of Manufacturing Methods for Laminar Carbon-Fiber Reinforced Polymer Composites
Introduction to Composite Materials, ME 127

- Fabricated laminar carbon-fiber epoxy composite structures by hand using a wet layup process and seperately using a commercially-available FDM 3D printer; computed theoretical laminate properties using published models
- Tested specimens in tension and flexure pursuant to ASTM standards; analyzed data to identify stiffness, strength, and individual ply failure strains; performed image processing using digital image correlation (DIC) to compute strains and characterize the effect of fabrication methods on failure behavior

Development of an Electrically Conductive Composite Nanomaterial for Stereolithographic 3D Printing
Microelectromechanical Systems Laboratory, UC Berkeley

- Developed an SLA-printable, UV-sensitive composite resin for multi-material, multi-functional additive manufacturing with $\sigma \sim 150$ S/cm, allowing for rapid desktop fabrication of electronic parts with high resolution
- Measured the viscosity and conductivity of the resin as a function of solid loading; identified and characterized the effect of a chemical dispersant additive to improve printability

3D-Printed Multimaterial Composite Base Isolator
Recipient of the Spring 2021 Jacobs Institute Spark Grant

- Characterized material properties of FDM-printable materials in tensile and shear loadings to determine suitable materials for a seismic base isolation structure
- Designed and prototyped a printable, soft-stiff composite base isolator using a commercial multimaterial FDM printer

PUBLICATIONS

Journal Articles

Chen, A. Y., Chen, A., Wright, J., Fitzhugh, A., Hartman, A., Zeng, J., & Gu, G. X. (2021). *Effect of build parameters on the mechanical behavior of polymeric materials produced by multi-jet fusion.* Advanced Engineering Materials, *in press.*

Chen, A. Y., Pegg, E., Chen, A., Jin, Z., & Gu, G. X. (2021). *4D-printing of electro-active materials.* Advanced Intelligent Systems, 2100019. https://doi.org/10.1002/aisy.202100019

Chen, A. Y., Baehr, S., Turner, A., Zhang, Z., & Gu, G. X. (2021). *Carbon-fiber reinforced polymer composites: A comparison of manufacturing methods on mechanical properties.* International Journal of Lightweight Materials and Manufacture, 4(4), 468–479. https://doi.org/10.1016/j.ijlmm.2021.04.001

Guardincerri, E., Bacon, J. D., Barros, N., Blasi, C., Bonechi, L., **Chen, A. Y.**, D'Alessandro, R., Durham, J. M., Fine, M., Mauger, C., Mayers, G., Morris, C., Newcomer, F. M., Okasinski, J., Pizzico, T., Plaud-Ramos, K., Poulson, D. C., Reilly, M. B., Roberts, A., Saeid, T., Vaccaro, V. & Van Berg, R. (2018). *Imaging the dome of Santa Maria del Fiore using cosmic rays.* Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 377(2137), 20180136. https://doi.org/10.1098/rsta.2018.0136

Conference Presentations

Chen, A. Y., Chen, A., Wright, J., Fitzhugh, A., Hartman, A., Zeng, J., & Gu, G. X. (2021). *Effect of build parameters on the material properties of printed parts produced by multi-jet fusion.* 2021 Solid Freeform Fabrication Symposium, Austin, TX.
Selected as the recipient of a National Science Foundation (NSF) Student Award grant.