Burton Yale, III

Curriculum Vitae

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EDUCATION

Cal Poly Pomona — **Pomona, CA** — **Sep 2015 – May 2021**

B.S. Aerospace Engineering (Core GPA: 3.75/4.00 | Overall GPA: 3.71/4.00)

Course Highlights: Spacecraft Flight Dynamics & Controls, Mechanical Vibrations, & Space Vehicle Design

EXPERIENCE

Jet Propulsion Laboratory — **Pasadena, CA** — **Jan 2021 – Mar 2021**

Mission Design & Navigation Intern

Developing broad trajectory search tool for solar sail cubesat, NEAScout, launching as secondary payload on Artemis I. Optimizing for a sequence of lunar flybys that allow the spacecraft to escape the Earth-Moon system at the right time and with the correct hyperbolic escape energy to rendezvous with Near-Earth Asteroids (NEAs).

Cal Poly Pomona — **Pomona, CA** — **Aug 2020 – May 2021**

Grader & Teaching Assistant

Graded for class topics such as: Orbital Mechanics, Spacecraft Attitude Dynamics, Mechanical Vibrations, and Space Environment. Created lectures and offered technical assistance to students in Orbital Mechanics classes when applying MALTO to trajectory design projects.

Cal Poly Pomona — **Pomona, CA** — **Feb 2019 – May 2021**

Research Assistant

Under research grant from NASA Jet Propulsion Laboratory, redesigned user interface and experience for JPL medium-fidelity, low-thrust trajectory optimizer MALTO. Deployed software to 200 undergraduate orbital mechanics course students and to mission designers at JPL. Available to outside universities through technology sharing.

Panasonic Avionics — **Lake Forest, CA** — **Jun 2019 – Aug 2019**

Certification Engineering Intern

Conducted Structural, Environmental, Smoke/Leak, and Cooling tests and identified failures, then generated reports summarizing results and identifying issues. Coordinated with various engineering groups to help evaluate a new set of materials for Line Replacement Units (LRUs) that are compliant with FAA, EASA, and OEM requirements.

PUBLICATIONS

Yale, B., Nakhjiri, N., Patel, R., & Lam, T. (2020). Raising the Bar: Adapting MALTO For Use In Undergraduate Classrooms, in progress.

Abdolrahimi, S., **Yale, B.**, Welsher, J., Tzounis, C., Fofrich, J., Cancinos, R., Patel, R., Cabrera, J., Hassel, C. B., Nakhjiri, N., Scott, D., & Johnson, A. (2020). Voyager 3: A Concept Mission to Interstellar Medium, submitted to *AIAA Journal of Spacecraft and Rockets*.

Yale, B., Patel, R., Cabrera, J., & Nakhjiri, N. (2020). Broad Trajectory Searches Using Monte Carlo Tree Search with the Inclusion of ΔVEGA Trajectories, proceedings of *2020 Astrodynamics Specialist Conference*. AAS 20-686.

PROJECTS

Broad Trajectory Searches Using Monte Carlo Tree Search (MCTS) — **Aug 2019 – Aug 2020**

For the conference proceedings of *2020 Astrodynamics Specialists Conference*, was the lead author and contributor to broad trajectory search, path finding algorithm. Employing a heuristics-based decision-making search tree, named Monte Carlo Tree Search, to find interplanetary multi-gravity assist trajectories. Code Repository Link

Voyager III JPL RFP Response – Capstone Spacecraft Design Project — **Aug 2019 – May 2020**

For JPL student design proposal, lead team of 7 students over multiple design reviews with industry professionals and school-year long development. Winning 1^{st} place in design to send a spacecraft with scientific payload to a point outside the solar system at 550 AU to directly view exoplanet surfaces. Preliminary Design Proposal Link

Attitude Control System Design of a Momentum Bias Satellite **Apr 2020 – May 2020**

Employed active control methods to orient unstable spacecraft through MATLAB system modeling. Through state and rate sensing, independently controlled yaw, pitch, and roll axes to bring spacecraft within designated guidelines and prevented the passive exponential growth. Final Report Link

Friends of Amateur Rocketry 1030 (FAR 1030) Competition Team **Sep 2018 – Jun 2019**

Achieved 1^{st} place out of four teams, including San Diego State University and University of Central Florida, in competition by launching to 24,000 feet on a student built & researched rocket. Member of 25-person team that designed and built rocket over course of school year. Engineered a mounting system for fins to withstand supersonic conditions throughout the competition flight. Manufactured carbon fiber and fiberglass body tubes for sub-scale and full-scale rockets. Competition Photos & Videos Link

Ceres Sample Return **Aug 2018 – Dec 2018**

Lead team of 5 students to design sample return trajectory from the asteroid Ceres for orbital mechanics class project. Developed MATLAB ephemeris-based porkchop plotter and planetary flyby calculation tool to find Earth-Mars-Ceres trajectories for departure and return legs of mission.

PROFESSIONAL SKILLS

Coding Languages: MATLAB | Python (PyKep, SpiceyPy) | Julia | LaTeX | Bash | UNIX
Software Experience: MS Office | JPL MALTO | NAIF SPICE | Git | JIRA | SolidWorks | AGILE PLM
Engineering Skills: Software Design | Tool Development | Systems Engineering | Program Management

AWARDS & HONORS

Dean's List (Cal Poly Pomona)
Received for outstanding work ethic and achieving a quarter/semester GPA of 3.5 or higher
Awarded in: F15, W17, F17, S18, F18, S19, F19, S20, & F20

President's List (Cal Poly Pomona)
Received for outstanding work ethic and achieving a school-year GPA of 3.5 or higher
Awarded in: Academic Year 2018-2019 (Year 4), & 2019-2020 (Year 5)

MEMBERSHIPS & AFFILIATIONS

Member, American Astronautical Society
Member, American Institute of Aeronautics and Astronautics
Member, Sigma Gamma Tau, Aerospace Engineering Honors Society
Member, Undergraduate Missile Ballistics and Rocketry Association (UMBRA)