William Kimball Skelly

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Education

Olin College of Engineering, Needham, MA, Bachelor of Science in Mechanical Engineering GPA 3.87/4.0 | May 2025

Course Assistant: Design for Manufacturing, Dynamics, Controls, Engineering Systems Analysis, Quantitative Engineering Analysis 3, Theory and Application of Algebraic Structures

- Held office hours, wrote and delivered substitute lectures, held machine shop hours, graded homeworks

Relevant Coursework: Failure Analysis and Prevention, Applied Mathematics for Engineers, Finite Element Analysis, Mechanical Design, Design for Manufacturing, Dynamics, Controls, Engineering Systems Analysis, Theory and Application of Algebraic Structures

Skills

CAD: Solidworks **FEA:** Solidworks **CAM:** HSM-Works **Fluid Dynamics:** Ansys Fluent CFD; XFLR5

Fabrication: CNC and Manual Mill; Shopbot CNC Router; Composites Fabrication; Injection Molding; CNC Waterjet; CNC Plasmacutter; CNC Laser Cutter; Sandblaster; Thermo-former; Sheet metal fabrication; Manual Lathe; 3D Printing

Code: Python; Matlab

SCUBA: SSI Certified Divemaster -- 100+ Drysuit dives logged in New England -- NAUI Technical Helitrox Diver

Publications

Lee, C., Liu, J, Qazilbash, A., Rajasinghe, M., **Skelly, W.**, Vidaurrazaga, C., and Lee, A. (2025) "Cosmic Ray Measurements in the Stratosphere via High Altitude Balloons," Abstract (1864399) presented at AGU25, 14-19 Dec.

- Poster: https://agu.confex.com/agu/agu25/meetingapp.cgi/Paper/1864399
- NASA-funded project to measure cosmic radiation after a Coronal Mass Ejection
- Created analytical model accounting for atmospheric effects of weather balloon ascent/descent rate and burst altitude
- Used model for flight planning. Predictions well matched experimental data.
- Participated in all mission phases, including preparation, launch, and recovery

Roos, C., Stolk, J. D., Brinkmann, W., Vo, K., and **Skelly, W**. (2025) "The causes of sustained load cracking in Aluminum 6351-T6 Gas Cylinders," Materials & Design, Vol. 258., p.114538.

- Peer reviewed paper: https://doi.org/10.1016/j.matdes.2025.114538
- Failure analysis of SCUBA tanks made from AL6351 alloy prone to sudden, catastrophic failure
- Conducted microstructural analysis with XRF, EDS, SEM and optical microscopy
- CNC machined test dogbone from tank, conducted Instron tension test to determine material properties
- Identified likely crack formation and propagation mechanisms

Projects and Experience

CNC Conformal Coat Spray Machine – Blue Origin SCOPE Team – Olin College *Fall 2024 – Spring 2025*

- Member of 6 person team that designed and built CNC conformal coating machine for Blue Origin for our Senior Capstone
- Our solution reduces Blue Origin's PCB re-work process cost by 50%, and reduces process time by 15%
- Designed and built pneumatic/fluid system to control spray of conformal coat and cleaning solvent through precision valve
- Utilized combination of COTS and custom components

Founder and Team Lead – Underwater Glider Research Team – Olin College *Fall 2023 – Fall 2024*

- Led research team developing autonomous underwater glider (AUG) wings
- Designed novel hydrofoil optimized for use on AUGs
- Conducted CFD analysis on hydrofoils in Ansys Fluent
- Novel wing reduces drag by 35%
- Conducted trade study on proposed mini-glider: 303% increase in overall lift-to-drag ratio allows for long range despite 1/10th the battery capacity of standard AUGs
- Designed and ran experiments in MIT Seagrant's tow tank to validate CFD simulations
- Coordinated teams working on electrical, software, and mechanical design

Professor of Student Lead Class – Mechanical Analysis – Olin College *Fall 2024*

- Taught Junior-level mechanical engineering class: "Mechanical Analysis"
- Wrote and delivered lectures on harmonic oscillations, FEA, precision mechanics, buckling, bolted joints, and other topics
- Wrote and assigned homework problem sets

Mechanical Engineering Intern – Cognex Test Engineering Team – Natick, MA *Summer 2023*

- Lens gripping mechanism: Designed, CADed and FEA analyzed mechanism, then did V&V testing on 3D printed prototypes
- Quoted machined parts through Xometry and Protolabs; ordered machined parts for V&V testing.
- Conducted torque testing on lenses to determine mechanism design spec
- Virtual Target Focuser: utilized combination of custom and off-the-shelf optomechanical mounts for proof of concept demonstrator for focusing cameras with virtual images

Researcher – Hummingbird Ducted Multirotor UAV – Olin Robotics Lab *Fall 2021 – Spring 2023*

- Designed, fabricated, and tested precision, composite propellor ducts to increase thrust of multirotor UAV
- Designed and tested multirotor UAV propellors to increase thrust and decrease power draw
- Ducts increased max thrust by 27%, and decrease cruising power draw by 33% over unducted case
- Total performance increase of 55% over unoptimized design
- Wrote numerical blade element implementation in Python to model ducted propellors, compared to Qprop for unducted case
- Mechanical design, Solidworks CAD, and CNC fabrication for integrated duct multirotor UAV platform
- First test flight of the integrated platform was successfully conducted in Spring 2023
- Designed and fabricated custom CNC mill fixture for modifying COTS propellors to fit the walls of the aerodynamic duct

Researcher – GD Electric Boat Robotuna Fins – Olin Robotics Lab *Fall 2021 – Spring 2023*

- Designed stall-delay hydrofoils in Solidworks for use in marine robotics
- Used Ansys CFD to predict stall angles of hydrofoils
- Optimized design increased maximum coefficient of lift by 13% and increased stall angle by 257%

Aerodynamics Lead/Mentor – Design Build Fly (AKA AERO) – Olin College *Fall 2021 – Spring 2024*

- Led and later mentored team responsible for designing and fabricating flight surfaces
- Helped guide design and aerodynamic analysis of flight surfaces, including via XFLR5 software
- Fabricated fiberglass composites for flight surfaces with a hotwire foam core
- Placed 15 out of 100 teams at intercollegiate AIAA competition in Spring 2022
- Used XFLR5 and AVL panel-method software to evaluate and improve design for wide speed range task aircraft
- Fabricated prototypes and rapid-repaired at competition

CNC Machined Flexure Box – Design for Manufacturing – Olin College *Fall 2023*

- Designed, CADed, analyzed, and machined aluminum box with flexural "twist to lock" feature
- Conducted fatigue analysis with S-N curve, beam-bending hand calcs, toleranced force and free fits, and created cost analysis
- Programmed CNC toolpaths in HSM-Works Computer Aided Machining software (CAM) to maximize material removal rate
- Ran toolpaths on Tormach 770M CNC milling machine

Aeroelastic Flutter Analysis – Quantitative Engineering Analysis 3 – Olin College *Fall 2022*

- Collected experimental wind tunnel data on aeroelastic flutter
- Tested effect of different masses, moments of inertia and airspeeds from 8 m/s to 38 m/s
- Created Python implementation of motion model based on system of 2nd order ODEs

Wooden Sailboat – Personal Project *Summer 2020*

- Scratch-built my 16-foot, wooden sailboat, named *Courage*
- Used tools in my garage to build 2-person sailboat out of pine, marine plywood, and maple with no prior boatbuilding experience
- Sharpie catboat design; modified with kick-up rudder and water-tight hatches in fore and aft flotation tanks

Flying Aces Club – MA, CT, NY *2017 – 2024*

- Winner of over 20 first-place awards at New England regional model airplane competitions for building and flying traditional balsa stick-and-tissue scale free-flight model planes designed as scale flying replicas, judged for accuracy
- and flight performance in competition
- Fly under rubber power in low Reynolds number conditions without the aid of remote control
- Built from scratch out of balsa wood and tissue paper using only hand tools
- Original designs and construction plans published multiple times on state-level club website