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2015-2016 **EMERGENCY PRESSURE VESSEL [EPV]**

A pressure tolerant electronics enclosure storing batteries, GPS, pressure switches, and emergency circuits to monitor vehicle status and control emergency buoyancy

- Designed novel sheet metal rack to encase array of 8 batteries that minimized parts, machining costs, and facilitated battery replacement with single screw disassembly
- Designed cantilever rack and sliding rails for easy install and removal, which I validated with FEA

2015-2016 **AIR BAG PRESSURE VESSEL [ABPV]**

A pressure tolerant pneumatic and electronics enclosure housing solenoid valves and relays to pneumatically inflate air bags for emergency buoyancy

- Redesigned for usability by nesting valves into the end cap, removing supports that impeded installation, changing to more reliable fittings, and freeing up space for improved access

2016 **FIN ADAPTER AND BREAKAWAY FASTENERS**

A mechanical adapter and breakaway fasteners to hold an underwater vehicle control surface fin and isolate the actuators from large stresses

- Designed novel-shaped adapter to increase strength while staying light by analyzing stresses (using FEA), removing unnecessary material, and splining the joint
- Designed modified fasteners to yield at precise load to limit the forces seen by the controlling actuators

2015 **PRESSURE-BALANCED OIL-FILLED ELECTRONICS BOX [PBOF Box]**

A full-ocean depth pressure compensated modular electronics enclosure for testing electronics in a full ocean pressure environment

- Designed for modularity and usability during electronics tests to reduce the efforts of changing and troubleshooting of pressure tolerant sensors and circuits
- Created open-topped box with viewing window, novel hinge mechanism, minimized opening procedure, and no-mess oil fill and air bleed system

2015 **POWER SYSTEM ARMING PLUG**

A manual switch embedded in an underwater vehicle for arming and disarming the power system using a waterproof proximity switch

- Designed for usability and fail-safety, with natural mapping and a two-step locking procedure

2013-2014 **VARIABLE-FRICTION SHOE-SURFACE MECHANISM**

A mechanism to fit in the sole of a shoe and dynamically simulate the friction of a full range of surfaces

- Designed a compact motor, gear, and lead screw system that controlled the height of a compressive and high-friction surface compared to the height of a rigid and low-friction surface

2013-2014 **AUTONOMOUS UNDERWATER VEHICLE**

A small unmanned underwater vehicle for an international student design team competition

- Designed the frame, pressure vessels, and propulsion system with limited-budget including machined, 3D-printed, and hand-manufactured parts

2012-2013 **AUTONOMOUS LUNAR MINING ROBOT**

A small unmanned lunar vehicle for mining lunar regolith at an international student design team competition

- Designed the collection and storage system including a linkage lifting mechanism, composite storage bucket, and tilting dump-truck door