UNLV | HOWARD R. HUGHES COLLEGE OF ENGINEERING

Fred & Harriet Cox
Senior Design Competition
Project Policy Handbook

Fred and Harriet Cox Senior Design Competition Overview

The Howard R. Hughes College of Engineering is committed to creating hands-on experiential learning experiences by fostering an environment of innovation, high-impact research, and engaging our students to continue learning and overcome challenges. The Fred and Harriet Cox Senior Design Competition challenges engineering students to create a working prototype to a real-world engineering problem.

By sponsoring a Senior Design project, you play in critical role in encouraging students to lead a successful project while promoting their professional growth through hands-on application.

Beyond the Classroom
Because of the requirement to work in teams, students build good communication skills, presentation skills, and even business writing skills. They also have to source and purchase the materials for the prototypes themselves, giving them real-world budgeting experience.

Reward and Recognition
A team of industry judges chooses winners in each category based on innovation, commercial potential, presentation quality and sustainability. A cash first prize and second prize are given in each discipline, as well as a grand prize. Through the generosity of partrons Fred and Harriet Cox, as well as award sponsors, the College of Engineering reimburses teams for the costs associated with the creation of their prototype. This ensures that teams are not working under unfair financial constraints, but have the resources they need to excel.

Taking it Further
Students wanting to take their projects to the next level are offered support from UNLV's Research and Economic Development team to pursue a patent for their prototypes.

Educate. Engage. Inspire. Innovate.

Policies & Processes
Industry Sponsored Senior Design Projects

The Fred and Harriet Cox Senior Design Competition is the capstone project in every engineering student's academic experience. Senior Design encourages students to use everything they have learned to plan, design and build a real-world solution to an engineering challenge. Project ideas are submitted from industry partners and individuals with conceptual ideas or problems with emphasis on market potential and impact. Various levels of interaction are possible, from suggesting an idea, sponsoring a Senior Design project, to mentoring and coaching student teams.

Senior Design challenges and expose students to real product development and profit implications. The experience also gives students an understanding of design challenges that can be expected when entering the workforce, giving them a cutting edge as job applicants after graduation. Industry design engagement helps students discover potential career interests and demonstrated skills. Overall, Senior Design shares the College of Engineering's intellectual talent with the community at large and fosters entrepreneurial opportunities.

Policies:

Intellectual Property (IP):
If the original idea is from the industry partner, then the IP resides with the industry partner if there is no enhancement to the idea by the student group in the process of the design and build. If there is an enhancement, then the additional contribution by the student group will be shared by the student group and the industry partner. An agreement to this effect will be signed by the industry partner and the students groups before a project starts.

Non-disclosure Agreement:
Students working on an industry-sponsored project are required to sign a non-disclosure agreement before discussions begin. The College of Engineering will facilitate the processes between the students and the industry partner.

Process:

- Deadlines for submission of project ideas, proposals, will be accepted until August 15th for Fall semester and January 15th for Spring semester through the College of Engineering Associate Dean for Undergraduate Programs.
- The proposal will be one page with title, industry contact (name, phone number and email address, etc.) and a brief description of the project with design constraints. (See included sample)
- The Associate Dean for Undergraduate Projects will review proposals and recommend viable proposals to the Senior Design instructor in the department most relevant to the subject matter of the proposal. If it is multi-disciplinary, it will be sent to all instructors whose units can be involved in the project.
- It is noted that Civil Engineering and Computer Science degree programs run their Senior Design projects in one semester and all other degree programs run it over two semesters (Spring-Fall or Fall-Spring).
- Decisions to accept a project or not are to be communicated by the Associate Dean to the industry partner within two months of the deadlines. Students have the ability to select design ideas and not all submissions are selected. Proposals may be re-submitted for subsequent competitions.
- One or more industry mentors who supply the project idea will work with the student team and guide them on the project.
- The Industry Partner will sponsor the project with in-kind components, facilities and a minimum cash support, which will be discussed and decided by the Associate Dean for Undergraduate Programs and the industry partner taking into account the cost estimate by the students. This will be done before the students begin building the prototype.
- The Industry Partner should be aware that student groups make final project presentations to the class and also participate in an open Senior Design competition and therefore, the project details will be divulged. If there is a need to protect the IP, it should be done before then.
- The Senior Design instructor and mentors will be in periodic communication (at least once a month) on the student progress and challenges they face.
- At project completion, projects fully supported in terms of cost and mentoring will receive the project report and prototype. Additional avenues for pursuing commercial development may be available.
- If the project is built upon or benefited from an existing IP associated with current UNLV employees (faculty and/or staff members), that IP continues to reside with the UNLV employee(s) and UNLV. The IP cannot be claimed by the industry partner.
- This is a student academic research program and while every effort is made to complete a project, in some cases, it may not be possible. Neither the students,

UNLV nor the College of Engineering make any guarantees, implied or otherwise, and assumes no liability for the final success of a project or liability resulting from this program.

Effective July 1, 2019
Recommendation: Engineering Advisory Board Subcommittee
Approved: Dean Rama Venkat

<u>Personal Shower Lotion Applicator</u>

Description: An expanded application for the garden siphon sprayers
https://www.natureslawn.com/hose-end-sprayer-instructions

Description: There are two Types of Hose-End Sprayers – Fixed Rate and Adjustable Rate. Hose-end sprayers siphon up the liquid from the container and mix it with water as the water passes through the spray nozzle. Adjustable Sprayers, have a dial that allows you to change the amount of product that will be siphoned per gallon of water.

Improved Application:

Design and build a device to apply water based solutions for personal application in a shower or bathtub. This device would be similar in technical operation to sprayers that exist for lawn and garden uses. While simple in technology, there is not a readily available market product for household personal application.
• Device would ideally be designed to hold 3 oz. of your favorite concentrated lotion;
• Spray water, lotion, or both simultaneously;
• Shower head would have multiple spray patterns: mist, shower and trickle;
• Finish design to match bathroom interiors, (chrome, bronze, nickel, etc..)
• Fits any shower pipe or flexible hose.

Practical Uses: to apply water based lotions, soaps, medications, sunscreen, bug spray or any water based solution.

Consumer Applications:

Disabled- bathing solution for individuals with restricted mobility, wheel chair bound, potential to replace sponge bathing; burn victims, skin poisons, etc….
Children- applying sunscreen to entire body, quickly and easily;
Adults- applying scented body lotions, moisturizers, bug sprays, sun screens, vitamins, etc…
Pets- to apply soap or medication to pets while washing, masking odors, etc…
Medical- applying medicated lotions to individuals with skin conditions, burns, poisons, etc..;
Plumbing Supply- any maker of shower head devices.

Known Market Competitors: None readily known, some types of U.S. patents on file

SAMPLE PROJECT IDEA PROPOSAL

Products Using Similar Technology: outdoor hose end sprayers examples include: Flo-Master Chameleon Hose End Sprayer and "Foaming Soap Nozzle" distributed by Schroeder & Tremayne, Inc.

Potential Consumer: An industry study revealed that almost two-thirds of the homes in the United States are equipped with the original fixtures that were installed when the house was built. Plumbing supply industry, individuals, hotels, outdoor specialty retailers, hospitals, pet owners and more. Example of a final type prototype, reservoir would be in the handle, trigger not shown. Device could be handheld, shown, or fixed design.
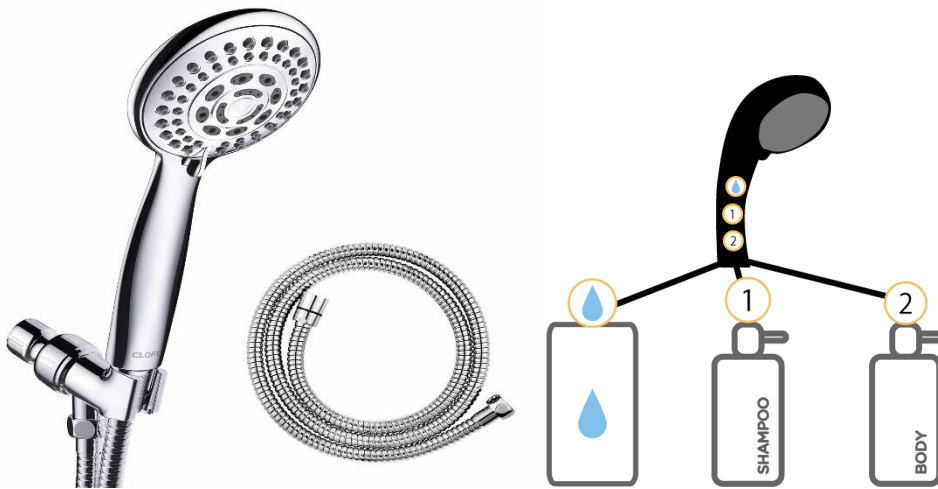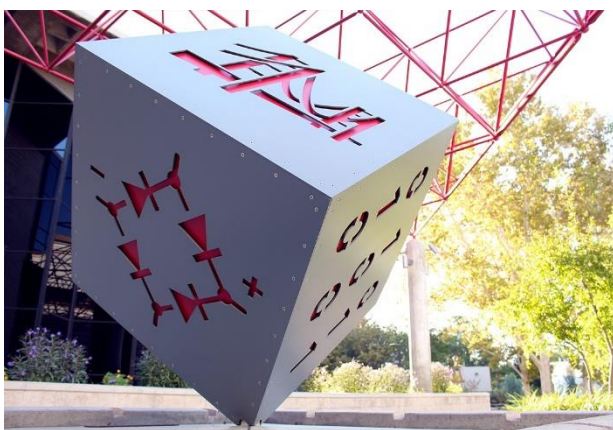

Similar type of siphon technology application

Chameleon Hose End Sprayer and Foaming *Soap Nozzle*

> **"Senior Design** is about being a catalyst among your peers. It's about taking great ideas and **working together** to see them into fruition."

Carrie Porterfield, COE Advisory Board Member

> **"Why not do something transformative** that can change the shape of Clark County & the diversification of the strip?"

Sean Howard, Vertical Vegas
Senior Design Student Team

> **"We've been able to work from each other's strengths & weaknesses,** and complement each other really well."

Michelle Lopez, Hailey's Hand 2.0
Senior Design Student Team