

# Draper Design Methodology Research Interests

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## Introduction

Draper has a very strong history of advanced electro-mechanical design of extremely high performance systems. We continue to explore state-of-the-art methods to advanced design in harsh environments.

## Research Interests

### 1. *Novel Design Methodologies*

Advanced methods of electro-mechanical design that challenge the current way of ‘doing design’ are sought. We’d like to apply innovative design methods that have potential to achieve extreme performance, ultra-low SWAP, and / or ruggedized operation in harsh environments (e.g. Long-duration Space, Hypersonics)

Example areas might include:

- a) Minute deformation in extreme thermal environments
- b) Novel, low-SWAP electro-mechanical sensors
- c) MEMS Stirling engine

Draper may share specifics of particular interests once the collaborative research topic are has been agree to.

### 2. *Design Visualization and Trade Space Exploration*

Visual Communication of a complex, multi-dimensional, inter-related design space has proven very effective in improving design decisions and accelerating the design process. Novel methods and approaches for visualization of the design space, as well as tools and methods for exploring the tradespace within designs are sought. Again, Draper may share specifics of particular interests once the collaborative research topic are has been agree to.

### 3. *Generative Design*

Draper frequently works on complex engineering design problems that require tradeoffs and optimization across many criteria and constraints. Generative design algorithms can help engineers navigate these large trade spaces by automatically creating and optimizing diverse designs that can outperform manually designed systems across many variables

## *About Draper Laboratory (www.draper.com)*

*Draper is an independent, not-for-profit corporation, chartered to work on problems in the national interest. Draper is **seeking collaborative research partners from universities** to further the state of the art in key technologies of mutual interest. Research Whitepapers describing Draper’s technology interests and Technical Points of Contact can be found on the Draper Scholars webpage ([Draper Scholar Program | Draper](#)). The Draper Scholars Program funds thesis-bearing MS and PhD students at partner universities as one of the effective ways to progress the technology. Other means of collaborative research (e.g. joint proposals, sabbaticals, etc.) are also encouraged. Please contact [education@draper.com](mailto:education@draper.com) if you have further questions.*

(e.g. size, weight, power, materials, lifetime, etc.). We are seeking novel approaches to AI-driven generative design to increase performance, improve efficiency, or reduce time to manufacture in relevant engineering domains such as electro-mechanical systems, micro-electronics, and bio-engineering.

We would be targeting PhD students for the development of novel approaches; and MS students for the application of existing approaches to specific problems of interest to Draper.