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Designing STEAM Kits for Children in Hospital Settings

This project will work to design meaningful Science, Technology, Engineering, Art, and Math (STEAM) experiences for children who are patients in long term hospital settings. This development of STEAM Kits will engage young patients in interesting and informative activities while meeting hospital standards regarding infection control and safety.



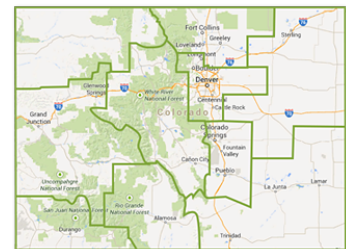
The project is a partnership between the CU Boulder Department of Mechanical Engineering (ME), CU Science Discovery, Idea Forge, and Children's Hospital Colorado (CHC) Volunteer and Risk Management Staff. CU ME Department faculty member Dr. Daniel Knight and Idea Forge Director Dr. Daria Kotys-Schwartz are overseeing the project with assistance from CU Science Discovery Director of Summer STEM Programs, Brian Jernigan.

Each year, the hospital serves 13,000 children who come from economically and ethnically diverse backgrounds from around the state of Colorado and beyond. Patient needs range from emergency room visits to isolation in cancer wards for months at a time. It is estimated that that among these patient's, 9,000 are school age. Education opportunities for children are provided through donations and volunteers.

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Each floor of the hospital is equipped with a crafts room and is staffed with over 3000 volunteers throughout the year. These volunteers will be trained by CU to operate and maintain activities and equipment designed by CU students.

During the summer of 2016, CU Boulder Science Discovery undergraduate mentors worked to develop a pretotype of the STEAM Kit. The design incorporated a rigorous needs assessment of stakeholders into a working model of the STEAM Kit. The design was tested at an outreach event at Children's Hospital in summer 2016. The pretotype STEAM Kit was then transferred to a mechanical engineering senior design team to develop a high-resolution, trade-show ready prototype. The senior design team approached the product using an empathy design cycle and developed a physical model that teaches basic circuits and logic concepts. The team developed the product to satisfy safety, educational milestones, engagement, sustainability, and budget requirements. The prototype was refined into a final design over the course of the academic year and shown at the Mechanical Engineering Design Exposition in April 2017. The year 1 prototype was then transferred to Science Discovery.

The outreach award was extended to a second year and partnered with the Idea Forge and CHC, ME senior design students are working to refine the prototype of the STEAM Kit for delivery to the Children's Hospital in spring 2018. The project is also partnering with a rural hospital in Colorado to build kits for those young patients.

CHC volunteers worked closely with the project team at all stages to ensure that the STEAM Kits can be used with patients within the CHC's strict criteria and constraints concerning a safe environment for patients. Advance testing and evaluation of the prototype kits took place through the CU Science Discovery summer camp programs as well as Boulder Valley School District schools in Lafayette, including Ryan Elementary and Rainbow Child Care Center. This allowed CU student design teams to test their designs in a less formal environment than the CHC.

This is a public program.

*For more information, please visit the **program website**.*

Mechanical Engineering Capstone Design

Science Discovery

 **Sponsoring Units**

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Program Categories**Program Keywords**

Topics:

Education (K-12)
Education (Pre-K/Early Learning)
Engineering
STEM (Science, Technology, Engineering, Math)

Program Types:

Service Learning Course

Audiences:

Children & Youth (outside school)
Special Needs
Individuals

- design
- engineering
- STEAM
- kits
- Science Discovery
- Children's Hospital
- Mechanical Engineering
- Daniel Knight
- Daria Kotys-Schwartz
- Brian Jernigan
- Boulder Valley School District
- Idea Forge
- science
- technology
- art
- math

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