STEAM - Student Thermal Energetic Activity Model

Project Description:
The Student Thermal Energetic Activity Model (STEAM) is a multi-year experiment in collaboration with the Southwest Research Institute (SwRI) to search for signatures of nanoflares and open-field transient release of the solar wind, as well as reconnection based coronal heating mechanisms from the Sun in soft and hard x-ray. The experiment is going on one of four satellites that is part of a NASA SMall EXplorer (SMEX) class mission, PUNCH. The planned instrument delivery is 2022 and planned launch is 2023.

We are looking for someone who can work on STEAM for a minimum of 4 semesters and can work during the summer of 2021 (current sophomores or juniors)

People selected for interviews will be expected to present a 10-15 minute technical presentation related to skills needed for the position.

Any recommended skills not already known can be learned through employment.

US Citizenship is required for all STEAM positions.
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<tr>
<th>Job Title: Avionics Team Member</th>
<th>Position #: ST_01</th>
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<td>Project: STEAM</td>
<td>Available Positions: 1</td>
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**Description:** The STEAM Avionics sub-team is responsible for developing the electrical and software interfaces with the commercial off the shelf x-ray spectrometers that will be used on STEAM. Students on this team help develop the electrical interfaces with the primary spacecraft. The tasks include FPGA code and testing, hardware integration into a custom PCB design, and testing and verifying hardware and design choices.

**Required Skills**
- Have previous project experience (e.g. prior Space Grant project, freshman projects, internships, etc.)
- Experience programming and integrating microcontrollers and computers into projects and payloads
- Electrical circuit design background (e.g. Current sensing resistors, Op-Amp, ADC, and comparator setups)
- General Programming Experience

**Recommended Skills**
- Code Development in Linux
- FPGA Experience
- VHDL/Verilog and Quartus/Vivado Experience (e.g. Testbench construction, implementing ADCs and other logic elements, and state machine and data packaging implementations)
- Altium PCB Software experience
- PCB Component Population experience
- Soldering, breadboarding, and prototyping experience
- Familiarity with Serial Interfaces: RS-232, RS-422, UART, SPI
- Familiarity with DC power conversion and regulation (e.g. Converters, Regulations, EMI Filters)

**Time Commitment:** 8 - 10 hours/week

**Type of Position:** Biweekly/hourly paid: $15/hour

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[http://spacegrant.colorado.edu/boulderstudents/howtogetinvolved](http://spacegrant.colorado.edu/boulderstudents/howtogetinvolved)  
Updated 09/03/2020 1:30 PM
**Job Title:** Structures  
**Position #:** ST_02

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<th>Project: STEAM</th>
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**Description:** The STEAM Mechanical sub-team is responsible for designing, analyzing, and manufacturing the structure of the instrument, working closely with Avionics and Science to ensure proper component integration. Additionally, this sub-team is responsible for developing an instrument level thermal design of STEAM, involving accurately modeling input and output heat transfer, and creating software models to justify the design. Finally, the Mechanical sub-team also works closely with PUNCH observatory engineers and mentors to ensure proper integration of STEAM into the larger satellite assembly, including designing within set standards for the instrument, and regularly delivering CAD and analysis models to the respective PUNCH teams.

**Required Skills**
- Have previous project experience (e.g. prior Space Grant project, freshman projects, internships, etc.)
- CAD experience (e.g. SolidWorks, Autodesk Inventor, NX, etc.)
- Familiarity with mechanical design/analysis through project or class experience
- Familiarity with heat transfer, or thermal design/analysis through project or class experience
- Basic machining experience (e.g. 3D printing)

**Recommended Skills**:
- Advanced machining experience (e.g. Metal shop, CNC)
- Familiarity with CAD drawings (Correct dimensioning and assembly view practices, GD&T, etc.)
- Finite difference or finite element thermal analysis (Thermal Desktop, ANSYS, SolidWorks Thermal, etc.)
- Finite Element Analysis (FEA) for physical loading/vibrational conditions (SolidWorks Simulation, ANSYS, etc.)

**Time Commitment:** 8 - 10 hours/week

**Type of Position:** Biweekly/hourly paid: $15/hour

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