Colorado Space Grant Consortium

Spring 2019 Positions

Space Grant is seeking students from all backgrounds & majors with an interest in gaining real world, hands-on experiences.

All levels of experience, first-year to graduate level, should apply. More positions will be posted in May.

http://spacegrant.colorado.edu/boulderstudents/howtogetinvolved
COSGC Student Recruiting

<table>
<thead>
<tr>
<th>Job Title: Recruiting Specialist</th>
<th>Position #: SR01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: Student Recruiting</td>
<td>Available Positions: 1-3</td>
</tr>
</tbody>
</table>

**Description:** COSGC is constantly working to create an inclusive community of students from all backgrounds into our statewide program. NASA specifically states that our student projects shall engage at least 40% women and 24% underrepresented students. Colorado Space Grant in Boulder works directly with student societies on the CU Boulder campus that support this community of students to recruit students into our Boulder program in addition to our online recruiting. The Recruiting Specialist will work with COSGC staff and the student societies at CU Boulder to hold information sessions at our CO Space Grant facilities as well prepare for a day long hands-on workshop with interested students in November/December of this semester.

**Minimum Requirements:**
- Previous experience with Colorado Space Grant programs (statewide or Boulder)
- Willing and able to learn quickly in a team
- Willing to work new and interested students

**Preferred/Optional Experience:**
- Familiarity with Colorado Space Grant goals and objectives
- Experience speaking and presenting in public

**Time Commitment:** Volunteer or stipend, 6-8 hours per week
Wearables Quest

Interested in creating new technology? We are building a team to create wearable technology (think: Fitbit) as part of the statewide Wearables Quest challenge. This Space Grant team will design, fabricate and test a piece of wearable tech that solves a real-world problem.

Teams can address predetermined challenges (such as building a glove that keeps its wearer from touching something too hot) or they can create a solution to a problem they’re passionate about.

For more information check out the Wearables Quest website: https://spacegrant.colorado.edu/statewideprograms/wearables-quest

<table>
<thead>
<tr>
<th><strong>Job Title:</strong> Wearables Quest Team Member</th>
<th><strong>Position #:</strong> WQ01</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong> Wearables Quest</td>
<td><strong>Available Positions:</strong> 3-6</td>
</tr>
</tbody>
</table>

**Description:** Team members will work on all phases of research and development of a novel piece of wearable technology. This project will culminate in a real prototype and a 5 minute video about the functionality of the wearable piece(s).

**Useful Skills**
- Sewing
- Basics of electronics

**Required Skills**
- Interest in wearable tech
- Self-starting
- Interest in learning new things

**Time Commitment:** Volunteer or stipend 6-8 hours/week
HASP

The High Altitude Student Platform (HASP) is designed to carry up to twelve student payloads to an altitude of about 36 kilometers with flight durations of 15 to 20 hours using a small volume, zero pressure balloon. HASP flight program is supported by the NASA Balloon Program Office (BPO) and the Louisiana Space Consortium (LaSPACE). Currently, HASP flies once a year in September from the Columbia Scientific Balloon Facility (CSBF) base in Fort Sumner, New Mexico.

This year’s COSGC team has proposed a secondary radiation shielding project, focusing on the use of novel materials to protect from harmful radiation that affects humans and hardware alike.

<table>
<thead>
<tr>
<th>Job Title: Project Manager</th>
<th>Position #: H01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: HASP</td>
<td>Available Positions: 1</td>
</tr>
</tbody>
</table>

**Description:**
The project manager is responsible for leading the team in all capacities. You will be working closely with the team to design, build and test the payload and will have a comprehensive understanding of each subsystem and the system as a whole. This position supports the educational nature of COSGC projects and will involve interaction with team members to ensure team members are being engaged and challenged. Some responsibilities include conducting team meetings, reporting project progress, managing the project budget and schedule, leading project reviews, and communicating with sub teams.

**Useful Skills**
- Engineering student
- Previous experience in a leadership role

**Required Skills**
- Knowledge of organizational tools
- Communication skills, ability to communicate technical concerns within a team and to non-technical personnel
- Experience on a team
- Learn quickly

**Time Commitment:** Volunteer or stipend 8-12 hours/week
<table>
<thead>
<tr>
<th><strong>Job Title:</strong></th>
<th>Science System</th>
<th><strong>Position #:</strong></th>
<th>H02</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong></td>
<td>HASP</td>
<td><strong>Available Positions:</strong></td>
<td>2-5</td>
</tr>
</tbody>
</table>

**Description:**
Materials analysis and experiment design for the secondary radiation payload. Students will be testing and proving the validity of their experiment methods. Responsible for data analysis post flight for integration into the final science report.

**Useful Skills**
- Familiarity with radiation science
- Experience with materials science

**Required Skills**
- Ability to perform scientific research and data analysis
- Work well on a team
- Learn quickly

**Time Commitment:** Volunteer or stipend 8-12 hours/week

<table>
<thead>
<tr>
<th><strong>Job Title:</strong></th>
<th>Structural Engineer</th>
<th><strong>Position #:</strong></th>
<th>H03</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong></td>
<td>HASP</td>
<td><strong>Available Positions:</strong></td>
<td>2-5</td>
</tr>
</tbody>
</table>

**Description:** The structural system houses all components required for the success of the mission and manages the heat produced by these systems. A person on this team would be responsible for using Solidworks and similar software to design and manufacture all components and work closely with other system teams to support their mission objectives.

**Useful Skills**
- Engineering student
- Solidworks experience
- Machining experience

**Required Skills**
- Work well on a team
- Learn quickly

**Time Commitment:** Volunteer or stipend 8-12 hours/week
<table>
<thead>
<tr>
<th>Job Title: Electrical Power System Engineer</th>
<th>Position #: H04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: HASP</td>
<td>Available Positions: 2-5</td>
</tr>
<tr>
<td>Description: The Electrical Power System (EPS) system is responsible for distributing the power supplied by the HASP platform to all other subsystems in order to support their mission objectives. EPS team members will be designing a power board to distribute this power as well as designing systems to measure environmental data and system health.</td>
<td></td>
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</tbody>
</table>
| Useful Skills: • Familiarity with C/C++ programming  
• Familiarity with Embedded Systems  
• Familiarity with printed circuit board layout software (Altium)  
• Coursework or experience working in circuits, control theory and Matrix Math  
• Microcontroller programming experience |
| Required Skills: • Familiarity with printed circuit board design  
• Previous experience working on a project involving electrical circuits  
• Student should work well on a team and able to learn quickly |
| Time Commitment: Volunteer or stipend 8-12 hours/week |

<table>
<thead>
<tr>
<th>Job Title: Systems Engineer</th>
<th>Position #: H05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: HASP</td>
<td>Available Positions: 1-2</td>
</tr>
<tr>
<td>Description: The systems engineer is responsible for ensuring that all of the subsystems integrate properly. They have to be familiar with every system on the payload and make sure that they are all compatible. They are also responsible for ensuring the proper integration of the entire payload with the platform and for filling out required documentation having to do with payload integration.</td>
<td></td>
</tr>
</tbody>
</table>
| Useful Skills: • Engineering student  
• Familiarity with different systems |
| Required Skills: • Work well on a team  
• Learn quickly |
| Time Commitment: Volunteer or stipend 10-14 hours/week |
**Job Title:** Software Engineer  
**Position #:** H06  
**Project:** HASP  
**Available Positions:** 2-3

**Description:**
The systems engineer is responsible for ensuring that all of the subsystems integrate properly. They have to be familiar with every system on the payload and make sure that they are all compatible. They are also responsible for ensuring the proper integration of the entire payload with the platform and for filling out required documentation having to do with payload integration.

**Useful Skills**
- Experience with microcontrollers
- Experience with Arduino microcontrollers
- Has taken or is currently enrolled in Data Structures

**Required Skills**
- Experience with C/C++ programming language
- Basic experience with software programming and interfacing that programming with hardware
- Work well on a team
- Learn quickly

**Time Commitment:** Volunteer or stipend 10-14 hours/week
Robotics Challenge:
Autonomous Rover in Mars-like Conditions

About the Project: This team will design and build an autonomous rover to participate at the April 13th Colorado Robotics Challenge at the Great Sand Dunes National Park. Rovers must be able to autonomously drive toward a beacon without the use of a GPS while avoiding obstacles and surviving the challenging Sand Dunes environment – including cold temperatures and fine, blowing sand.

<table>
<thead>
<tr>
<th>Job Title: Software Engineer</th>
<th>Position #: RC01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: Rover</td>
<td>Available Positions: 2-3</td>
</tr>
</tbody>
</table>

Description:
The software engineer is responsible for writing, debugging, and testing the programming code for the Challenge. This person will work with the electrical systems engineers to research components needed for a successful mission. During the Robotics Challenge, the software engineer will help troubleshoot any problems that may arise.

Minimum Requirements:
- Basic programming experience
- Basic experience with coding microprocessors

Preferred Experience:
- Experience with Debugging

Time Commitment: Volunteer or stipend 8-10 hours/week
<table>
<thead>
<tr>
<th><strong>Job Title:</strong> Electrical Systems Engineer</th>
<th><strong>Position #:</strong> RC02</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong> Rover</td>
<td><strong>Available Positions:</strong> 2-3</td>
</tr>
<tr>
<td><strong>Description:</strong> The electrical systems engineer will design and build the hardware and circuitry needed to control the rover. This person will research components and will also help in writing the programming code for the Challenge and for testing purposes. During the Robotics Challenge, the electrical systems engineer will help troubleshoot any problems that may arise.</td>
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<tr>
<td><strong>Minimum Requirements:</strong></td>
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<tr>
<td>• Experience with electrical systems (circuits course)</td>
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<tr>
<td>• Basic programming experience</td>
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<tr>
<td>• Soldering experience</td>
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<tr>
<td><strong>Preferred Experience:</strong></td>
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<tr>
<td>• Experience with Debugging</td>
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<tr>
<td>• PCB design</td>
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<tr>
<td><strong>Time Commitment:</strong> Volunteer or stipend 8-10 hours/week</td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>Job Title:</strong> Structural Engineer</th>
<th><strong>Position #:</strong> RC03</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong> Rover</td>
<td><strong>Available Positions:</strong> 2-3</td>
</tr>
<tr>
<td><strong>Description:</strong> Structural Engineers are in charge of the design and build of the structure so that it can withstand the environmental challenges and course obstacles as well as safely house electronics during the Challenge. During the Robotics Challenge, the structural engineer will help troubleshoot any mechanical problems that may arise.</td>
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<tr>
<td><strong>Minimum Requirements:</strong></td>
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<tr>
<td>• Experience with SolidWorks</td>
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<td>• Comfortable working with machinery, 3D printers, laser cutters, etc.</td>
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<tr>
<td><strong>Preferred Experience:</strong></td>
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<tr>
<td>• Experience in the ITLL Machine Shop.</td>
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<tr>
<td>• Structural testing (either software or physical)</td>
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<tr>
<td><strong>Time Commitment:</strong> Volunteer or stipend 8-10 hours/week</td>
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## RockOn!

<table>
<thead>
<tr>
<th>Job Title: Prep Team Member</th>
<th>Position #: RW01</th>
</tr>
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<tbody>
<tr>
<td>Project: RockOn 2019</td>
<td>Available Positions: 5-8</td>
</tr>
</tbody>
</table>

### Description:

The RockOn workshop is a six day hands-on workshop held every June at NASA’s Wallops Flight Facility. Approximately 90 college students and faculty participate each year. During the workshop, participants form teams of three and proceed to build a sounding rocket payload from a prepared kit over the first three days. The payload is then launched to 72 miles on a Terrier-Improved Orion sounding rocket on the fifth day. The payloads are recovered and the teams analyze their data. *The work this semester will focus on preparing the kits as well the handbook/teaching materials for the workshop. The goal is to have all the kits, handbooks, and equipment ready to ship by May 20, 2019. There will be at least one weekly meeting with the team plus common work hours at least twice a week.*

### Useful Skills

- Engineering student
- Attention to detail
- Some experience with either Arduino, electrical design, coding, PowerPoint, and/or machining

### Required Skills

- Work well on a team
- Learn quickly
- Very organized

### Additional Time Requirements

- **Preferred:** Available to assist in final preparations and shipping all materials to the Wallops Flight Facility during the summer (May and June).
- **Preferred:** Available to assist in the workshop at the Wallops Flight Facility in June (travel dates TBD).
- **Required:** Members of this team traveling to workshop are **required** to attend a walk-through where members construct a payload during a two day expedited workshop run-through taking place usually over Spring Break or over a weekend during the spring semester.

### Time Commitment:

Volunteer or stipend 5-12 hours/week
Be part of a team that designs and builds a sounding rocket payload that will go 98 miles into space. The team will choose a mission and design a payload during the fall semester, bringing the design to a Critical Design Review level by the start of spring semester. During spring semester, the team will build and test the payload preparing it for launch in August of 2019 from NASA’s Wallops Flight Facility.

**Job Title:** Structural Engineering Lead

**Project:** RocketSat

**Position #:** RS03

**Available Positions:** 1

**Description:** The structural system houses all components required for the success of the mission. A person on this team would be responsible for using Solidworks and similar software to design complex components to be manufactured and assembled using a variety of methods. You will be expected to machine components using a mill and lathe as well as other manufacturing methods ranging from using hand tools to 3-D printing. You will design, manufacture, document, and iterate on structural and mechanical subsystems under a strict timeline. You will work within the structures sub team and work closely with other system teams and industry partners to support their mission objectives.

**Useful Skills**
- ASEN or ME student
- Machining experience
- Knowledge or certified with CNC machines
- Proficient with Solidworks
- Knowledge of rigid body dynamics

**Required Skills**
- Work well on a team
- Learn quickly
- Manage time effectively

**Time Commitment:** Volunteer or stipend 8-10 hours/week
<table>
<thead>
<tr>
<th><strong>Job Title:</strong></th>
<th>Structural Engineer</th>
<th>Position #:</th>
<th>RS04</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong></td>
<td>RocketSat</td>
<td><strong>Available Positions:</strong></td>
<td>1-2</td>
</tr>
</tbody>
</table>

**Description:** The structural system houses all components required for the success of the mission. A person on this team would be responsible for using Solidworks and similar software to design complex components to be manufactured and assembled using a variety of methods. You will be expected to machine components using a mill and lathe as well as other manufacturing methods ranging from using hand tools to 3-D printing. You will design, manufacture, document, and iterate on structural and mechanical subsystems under a strict timeline. You will work within the structures sub team and work closely with other system teams and industry partners to support their mission objectives.

**Useful Skills**
- ASEN or ME student
- Machining experience
- Knowledge or certified with CNC machines
- Proficient with Solidworks
- Knowledge of rigid body dynamics

**Required Skills**
- Work well on a team
- Learn quickly
- Manage time effectively

**Time Commitment:** Volunteer or stipend 8-10 hours/week

<table>
<thead>
<tr>
<th><strong>Job Title:</strong></th>
<th>Avionics Lead</th>
<th>Position #:</th>
<th>RS04</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong></td>
<td>RocketSat</td>
<td><strong>Available Positions:</strong></td>
<td>1</td>
</tr>
</tbody>
</table>

**Description:** The Avionics team will be responsible for the control and electrical hardware and software for the payload. This includes selecting and configuring the computing hardware required, interfacing the various electronic components with each other, as well as developing communications and data handling protocol.

**Useful Skills**
- EE/ECE, CS or ASEN student
- Programming skills
- Experience with microcontrollers
- Soldering and Arduino experience

**Required Skills**
- Work well on a team
- Learn quickly

**Time Commitment:** Volunteer or stipend 8-10 hours/week
<table>
<thead>
<tr>
<th>Job Title: Avionics</th>
<th>Position #: RS05</th>
<th>Available Positions: 1-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: RocketSat</td>
<td>Description: The Avionics team will be responsible for the control and electrical hardware and software for the payload. This includes selecting and configuring the computing hardware required, interfacing the various electronic components with each other, as well as developing communications and data handling protocol.</td>
<td></td>
</tr>
</tbody>
</table>
| Useful Skills | • EE/ECE, CS or ASEN student  
• Programming skills  
• Experience with microcontrollers  
• Soldering and Arduino experience | |
| Required Skills | • Work well on a team  
• Learn quickly | |
| Time Commitment: | Volunteer or stipend 8-10 hours/week | |

<table>
<thead>
<tr>
<th>Job Title: Systems Engineer</th>
<th>Position #: RS06</th>
<th>Available Positions: 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: RocketSat</td>
<td>Description: The systems engineer is responsible for the payload mission as a whole and helping each sub team integrate properly and checking compatibility between sub systems. They are expected to understand, with at least familiarity, every sub teams responsibilities and what they are in charge of, in order to ensure compatibility for the entire payload with the platform. The systems engineer is required to plan the needed documentation for the system.</td>
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</tr>
</tbody>
</table>
| Useful Skills | • Engineering student  
• Familiar with avionics responsibilities and structural design/analysis  
• Able to communicate technical concerns within a team and to non-technical personnel | |
| Required Skills | • Work well on a team  
• Learn quickly | |
| Time Commitment: | Volunteer or stipend 8-12 hours/week | |
DemoSat: 
Experiment in the Near Space Environment

About the Project: COSGC is exploring the possibility of launching a high-altitude balloon payload to 100,000ft in the spring 2019 semester. We are looking for students interested in joining the team in order to determine whether a payload is possible.

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<thead>
<tr>
<th>Job Title: Team Member</th>
<th>Position #: DS01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: Balloon Payload</td>
<td>Available Positions: 4-6</td>
</tr>
</tbody>
</table>

Description: Students will learn about building a balloon payload, decide on their experiment, and work together to design, build, test, and launch the payload on a high-altitude balloon on April 6, 2019.

Minimum Requirements:
- Enthusiasm about experiments in near space.
- Availability to commit to at least 5 hours/week.
- Excited about learning new skills.

Preferred Experience:
- Previous Arduino experience is helpful, but definitely not required.

Time Commitment: Volunteer or stipend 4-7 hours/week
<table>
<thead>
<tr>
<th><strong>Job Title:</strong></th>
<th>Project Manager</th>
<th><strong>Position #:</strong></th>
<th>DS02</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong></td>
<td>Balloon Payload</td>
<td><strong>Available Positions:</strong></td>
<td>1</td>
</tr>
</tbody>
</table>

**Description:**
The Project Manager will provide leadership and coordinate team activities, set up project schedule, track the project budget, and liaise with Space Grant and DemoSat program leadership.

**Minimum Requirements:**
- Must have previously participated in a team that launched a high-altitude balloon payload.

**Preferred Experience:**
- Arduino programming
- Sensor integration, calibration, and data analysis

**Time Commitment:** Volunteer or stipend 8-10 hours/week
RockSat-C and RockSat-X are national sounding rocket programs run by Colorado Space Grants in conjunction with Wallops Flight Facility (WFF) that allows university teams to design their own sounding rocket payload and compete for a spot on the launch vehicle. The teams’ designs must comply with the respective user’s guides as well as Wallops Flight Facility restrictions. In addition, teams must complete monthly reviews and hit major deadlines related to the programs before launch at WFF in June.


Link to the RockSat-X User’s Guide: https://spacegrant.colorado.edu/rs-x-2019-team-resources/user-guide
Job Title: Assistant Student Program Manager  
Position #: RPM01  
Project: RockSat-C and RockSat-X  
Available Positions: 1-2  

Description: RockSat-C and X are two of COSGC’s sounding rocket programs where student teams from all across the United States have the opportunity to design, build, test, and launch their own experiment on a sounding rocket. The C and X assistants would work with and shadow the current RockSat-C and X student program managers to learn what goes into managing these programs and develop communication and management skills. Potential responsibilities could include updating the C and X websites, attending monthly video conference calls with C and X teams, and various other organizational and document-oriented tasks.

Minimum Requirements:
- Willing and able to quickly learn in a team
- Willing to work with students located across the United States
- Interest in management and supporting student teams
- Strong interpersonal skills
- Basic knowledge of electrical and mechanical systems
- Knowledge of the RockSat-C & RocketSat-X User’s Guide

Preferred/Optional Experience:
- Previous program or project management experience
- Strong organizational skills with an acute attention to detail
- Problem solving

Time Commitment: Volunteer or stipend 8-12 hours/week

Thanks for reading through all the positions offered this semester.

There may be other opportunities available in the coming days so feel free to check back in a few days.