Colorado Space Grant Consortium

Fall 2017 Positions

Space Grant is seeking students from Aero, CS, EE/ECE, ME, ATOC, the sciences and engineering or anyone with an interest in gaining real world hands-on experiences.

All levels of experience from Freshman to Graduate students should apply.

http://spacegrant.colorado.edu/boulderstudents/howtogetinvolved

The current opportunities are with:

DigitalGlobe™

The Colorado Space Grant Consortium

PolarCube – Help build a satellite system that will improve our understanding of climate change including over Polar regions.

Ground Station – Track satellites and talk to them while using our radio system.

Computer Systems – Build an understanding of how computer systems work. Learn how Linux and Windows servers can work together.

Lab Team – Help build tools for Space Grant student teams and help bring knowledge and skills to SG Projects. This interdisciplinary team is looking for enthusiastic students. We will explore ideas around building a CubeSat program.

C-BASE – A team learning to launch sounding balloon to the EDGE of SPACE.

Student Recruiting – Be a team member who learns new skills and who will then teach others those skills which are applicable to any engineering or science field.

CryoAerosol – Build an aerosol/dust collector that will be deployed in polar and high mountain regions to quantify dust, black carbon, and bioaerosols that are contributing to snow and glacial melting. Knowledge of aerosols and dust are an important contributor to understanding climate change. Mechanical and engineering skills are needed.

RocketSat – Be a team member to design a sounding rocket payload that will go 72 miles into space. This team will design a payload project in Fall 2017 and bring the design to a Critical Design Review level by semester’s end. The payload will be flown in summer 2018. We will be exploring collaborations with NASA centers and industry.
Digital Globe
Deploy Team members are needed starting August to November 2017. Please complete an interest form if you are interested.

On-Call Student Satellite Calibration Technician

About the Company
DigitalGlobe is a leading provider of commercial high-resolution earth observation and advanced geospatial solutions that help decision makers better understand our changing planet; in order to save lives, resources and time. Sourced from the world’s leading constellation, our imagery solutions deliver unmatched coverage and capacity to meet customers’ most demanding mission requirements. Each day customers in defense and intelligence, public safety, civil agencies, map making and analysis, environmental monitoring, oil and gas exploration, infrastructure management, navigation technology, and providers of location-based services depend on DigitalGlobe data, information, technology and expertise to gain actionable insight. DigitalGlobe is a public company listed on the NYSE as DGI.

Summary
Assist remote sensing scientists at DigitalGlobe in field work to calibrate Earth observing satellites. Gain hands-on experience in the operation of field equipment for satellite radiometric assessment including field spectrometers, Sun photometers and weather instruments. DigitalGlobe is looking for students to perform on-call scientific field work. Field deployments can occur up to four times per week. The team will start in September and work will continue through mid-November. Deploys will typically begin at 9:30 am and end anywhere between 2:00 – 4:00 pm (dependant upon work to be done that day). We are seeking students who can ideally commit to 2-4 days a week during a normal school week this fall. You can pick which days you want to work depending on your schedule from a list of potential dates given 2-4 weeks in advance. This way you can schedule your availability around classes and mid-term weeks for instance. If the weather or sensor availability prevents a deployment, you will be notified 24-hours before the attempt of the cancelation. If a deploy is canceled last minute (e.g. that morning, due to weather), you will receive 2 hours of pay. Hands-on training will be provided in the field.

Responsibilities
- Deploy and operate scientific field equipment
- Potential for handling and assessment of field data
- Be on-call for 9:30AM to 4:00PM work up to 4 days a week.

Job Requirements
- Must be able to pick up moderately heavy equipment
- Must be able to work outdoors for extended periods of time
- Must be reliable and punctual
- Undergraduate and graduate-level students encouraged
- Must be a US Citizen

Compensation
Competitive starting pay rate with potential increases based on experience, performance and tenure.

Contact
Michele Kaester at DigitalGlobe (mkaester@digitalglobe.com) or Brian Sanders with the Colorado Space Grant Consortium (brian.sanders@Colorado.EDU). This position will be filled through the Colorado Space Grant Program. http://spacegrant.colorado.edu/

www.digitalglobe.com
## Lockheed Martin

**Lockheed Martin in Littleton, CO**

<table>
<thead>
<tr>
<th><strong>Job Title:</strong> Electrical Part Analysis</th>
<th><strong>Position #:</strong> E01</th>
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<tbody>
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<td></td>
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</tbody>
</table>

| **Project:** Lockheed Martin | **Available Positions:** 1-2 |

### Description:
Position for Spring 2018. The student will work with the Design Assurance group at Lockheed Martin. The student will review electrical part test data, both mechanical and electrical results and insure success criteria is met before accepting the data and populating a database. This position is interdisciplinary in nature. The student will also likely develop software tools, likely in VBA, and perform data analysis. The student will have exposure to hardware and while working with industry engineers.

### Minimum Requirements:
- US person status and ability to travel to Littleton CO during the spring semester M-F 7am-6pm and able to work 8-10hrs/week.
- Ability to continue working during the Summer for roughly 40 hours per week
- Mechanical, Electrical, or Aerospace Major or other relevant experience
- Good communication skills, professionalism
- Data manipulation and coding familiarity within Excel
- Good analytical thinking and problem solving skills
- Ability to program in VBA or quickly learn

### Preferred Experience:
Completion of Sophomore level classes

### Time Commitment:
8-10hrs/week during the Spring Semester with the possibility of continuing this project to 40 hours/week during the summer. Option to work up to full time during academic breaks. **Paid Internship. We are seeking interested candidates now but the opportunity may not start until later in the semester.** Interviews are currently planned for February. This is a longer term opportunity which would extend into summer.

### Contact Information:
Brian Sanders [brian.sanders@colorado.edu](mailto:brian.sanders@colorado.edu)
## C-BASE
### Colorado BAlloonsat Space Enterprise

<table>
<thead>
<tr>
<th>Job Title:</th>
<th>Team Member</th>
<th>Position #:</th>
<th>01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project:</td>
<td>C-BASE</td>
<td>Available Positions:</td>
<td>8-12</td>
</tr>
</tbody>
</table>

### Description:
The Colorado BAlloonsat Space Enterprise (C-BASE) team will be the first of its kind at Colorado Space Grant. The team will have two overall goals for the academic year. One: Help the Edge of Space Sciences (EOSS) organization and membership complete their mission. Two: Help Colorado Space Grant acquire skills to conduct launch and recovery efforts internal to CU Space Grant program. This second goal will be tested with a tethered launch with EOSS oversight by December 2017 and an actual FAA exempt balloon launch with EOSS oversight by May 2018.

Team members will be expected to do the following over this semester:
- Attend weekly meeting with COSGC staff
- Attend regular team meetings
- Attend bi-weekly meeting/teleconference with EOSS mentors
- Obtain HAM radio license
- Attend 1-2 EOSS member meetings per semester
- Support all EOSS launches in fall and spring semesters
- Figure out a better name for this team

Some of the areas that team members will contribute their time while on this project:
- Payload/beacon development and maintenance
- Ground station set-up, staffing, and tear-down
- Tracking and recovery including land owner research/contacting
- Flight coordination
- Predictions/forecasting
- Fill operations (including gas order, pickup, and return support)
- FAA coordination and paperwork filing
- Supply ordering and inventory management
- Documentation
- Membership and recruiting

### Minimum Requirements:
- Any interested CU student from any background of study
- Willing and able to learn quickly in a team environment
- Fan of any Star Trek TV show or movie and must have watched at least 3 hours of Voyager. Must be able to have a detailed discussion about said 3 hours with Chris Koehler
- Available to work on a few Saturdays (launch support)

### Preferred Experience:
- Previous experience launching a BalloonSat (Gateway to Space or other)
- Familiarity with BalloonSat systems and construction, radio communications, soldering, testing, and documentation

### Time Commitment: 8-12 hours/week Volunteer
## COSGC Student Recruiting

<table>
<thead>
<tr>
<th>Job Title:</th>
<th>Recruiting Specialist</th>
<th>Position #:</th>
<th>SR01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project:</td>
<td>Student Recruiting</td>
<td>Available Positions:</td>
<td>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 on-line 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
- Watched Star Wars (1977) and are prepared to discuss it with Chris Koehler

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

### Time Commitment:
Credit or Volunteer, 6-8 hours per week
CryoAerosol

Become a team member to build an aerosol/dust collector that will be deployed in polar and high-mountain regions to quantify dust, black carbon, and bioaerosols that are contributing to snow and glacial melting. These dark particles absorb more solar radiation than the surrounding snow and ice, thereby changing the radiative energy balance of the surface by reducing albedo and resultantly, enhancing melt. Dust on snow is a major issue in Southwestern Colorado, leading to a three-week advance in peak snowmelt, which reduces the total snowmelt inputs into the Colorado River. Additionally, the darkening caused by these aerosols are one of the primary factors influencing melt of the Greenland Ice Sheet. The aerosol collector will be tested at the CU Mountain Research Station in Spring 2018 and later deployed in the polar regions such as Svalbard, Greenland, and the McMurdo Dry Valleys of Antarctica. Partnering with NSIDC, NASA teams and local industry, the team will build a system to test in Spring 2018.

<table>
<thead>
<tr>
<th><strong>Job Title:</strong></th>
<th>Systems Engineer and Project Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Position #:</strong></td>
<td>CA-1</td>
</tr>
<tr>
<td><strong>Project:</strong></td>
<td>CryoAerosol</td>
</tr>
<tr>
<td><strong>Available Positions:</strong></td>
<td>1 paid, 2+ volunteers</td>
</tr>
</tbody>
</table>

**Description:**
The systems engineer will also serve as the project manager. This person will be 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. As project manager, they will help recruit/interview students in the following positions described below, ensure the team meets deliverable deadlines, as well as liaise with the Principle Investigator on the science objectives. They will also lead ~ 2 volunteer students who will assist in the systems engineering aspects.

**Useful Skills**
- Engineering student
- Familiarity with different systems

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

**Time Commitment:** 8-14 hours/week for Project Manager, 6 – 10 hours for Volunteers
### Structural Engineer

<table>
<thead>
<tr>
<th>Job Title:</th>
<th>Structural Engineer</th>
<th>Position #:</th>
<th>CA-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project:</td>
<td>CryoAerosol</td>
<td>Available Positions:</td>
<td>1 paid, 2+ volunteers</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 and manufacture all components and work closely with other system teams to support their mission objectives.

**Useful Skills**
- ASEN or ME student
- Machining experience

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

**Time Commitment:** 8-12 hours/week for Paid Appointment and Volunteers

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### Electrical System Engineer

<table>
<thead>
<tr>
<th>Job Title:</th>
<th>Electrical System Engineer</th>
<th>Position #:</th>
<th>CA-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project:</td>
<td>CryoAerosol</td>
<td>Available Positions:</td>
<td>1 paid, 2+ volunteers</td>
</tr>
</tbody>
</table>

**Description:**
The Electrical System (ES) engineer is responsible for designing and building the electrical power system for the CryoAerosol Collector, as well as to interface the platform to all other subsystems in order to support their mission objectives. ES team members will design a power board to distribute this power as well as designing systems to measure environmental data and system health.

**Useful Skills**
- ASEN, EE, or ECE student
- Circuit design skills
- Experience with Altium or similar software
- Skin with high electrical resistivity

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

**Time Commitment:** 8-12 hours/week for Paid Appointment and Volunteers
## PolarCube

<table>
<thead>
<tr>
<th>Job Title:</th>
<th>Embedded Systems Engineer</th>
<th>Position #:</th>
<th>PC01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project:</td>
<td>PolarCube</td>
<td>Available Positions:</td>
<td>1-2</td>
</tr>
</tbody>
</table>

### Description:
The Embedded Systems Engineer will work with the Avionics hardware to ensure operation on the hardware level. Duties include writing on-board C++ code for each subsystem and debugging the subsystem’s hardware. The Embedded System's Engineer will work closely with the Avionics Lead to design, populate, bring up and debug the subsystems of PolarCube. A desire to dive deep into the hardware level operations and how the lowest level of code impact performance is necessary.

### Minimum Requirements:
- ASEN, EE/ECE, or CSCI Student
- Familiarity with C++
- Experience with debugging PCBs
- Willing and able to learn quickly in a team environment

### Preferred Experience:
- Altium familiarity

### Time Commitment: 8-12 hours/week Credit or Volunteer

<table>
<thead>
<tr>
<th>Job Title:</th>
<th>Avionics Engineer</th>
<th>Position #:</th>
<th>PC02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project:</td>
<td>PolarCube</td>
<td>Available Positions:</td>
<td>1-2</td>
</tr>
</tbody>
</table>

### Description:
The Ground Segment Engineer(s) will design and implement architecture to allow communication between the Ground Station and satellite. Duties will include refinement of existing high-level architecture, and implementation of Python and bash scripts to parse and save data from the satellite. The Ground Segment Engineer(s) will work closely with the Flight Software team and the Ground Station team to create a CONOPs for flight passes, and be heavily involved in testing leading up to launch.

### Minimum Requirements:
- ASEN, EE/ECE, or CSCI Student
- Familiarity with C/C++, Python, bash programming
- Willing and able to learn quickly in a team environment

### Preferred Experience:
- Systems engineering experience
- Knowledge of Linux command line

### Time Commitment: 8-12 hours/week Credit or Volunteer
<table>
<thead>
<tr>
<th>Job Title: EPS engineer</th>
<th>Position #: PC03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: PolarCube</td>
<td>Available Positions: 1-2</td>
</tr>
</tbody>
</table>

**Description:**
The Electrical Power Engineer will implement and test architecture to verify the regulation and distribution of electrical power from its generation by the on-board solar panels, through conditioning to storage in the batteries and regulation and distribution to the entirety of the satellite systems. Duties will include understanding the EPS architecture, designing tests to verify the proper functioning of the system and modifying the subsystem code as necessary. This system is in an advanced state of development, and we are looking for someone to work with the current EPS engineer to finalize verification of the flight hardware.

**Minimum Requirements:**
- ASEN, EE/ECE, or CSCI Student
- Experience testing PCBs
- Willing and able to learn quickly in a team environment

**Preferred Experience:**
- Basic electrical systems knowledge
- Knowledge of batteries

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

<table>
<thead>
<tr>
<th>Job Title: Testing Engineer</th>
<th>Position #: PC04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: PolarCube</td>
<td>Available Positions: 1-2</td>
</tr>
</tbody>
</table>

**Description:**
The Testing Engineer(s) will work with the Systems Engineer to develop and run the tests necessary to get PolarCube to flight ready status. Duties include developing tests to ensure nominal satellite operations and capturing all testing information in written documentation.

**Minimum Requirements:**
- ASEN, EE/ECE, or CSCI Student
- Attention to detail
- Clear communication and analysis skills

**Preferred Experience:**
- Systems Engineer experience

**Time Commitment:** 8-12 hours/week Credit or Volunteer
<table>
<thead>
<tr>
<th>Job Title: Mechanical Engineer</th>
<th>Position #: PC05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: PolarCube</td>
<td>Available Positions: 1-2</td>
</tr>
</tbody>
</table>

**Description:**
The Mechanical Engineer will manage and update the SolidWorks Model of PolarCube and be responsible for ensuring the unhindered integration of every component. Duties include machining components, managing the CAD model, and integration of the structure of the satellite.

**Minimum Requirements:**
- ASEN, EE/ECE, or CSCI Student
- Experience with SolidWorks
- Fast learner

**Preferred Experience:**
- Machining ability
- Can use a torque wrench
- Experience with delicate and precise mechanical structures

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

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**Ground Station**

<table>
<thead>
<tr>
<th>Job Title: Ground Station Engineer</th>
<th>Position #: GS01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: Ground Station</td>
<td>Available Positions: 2-3</td>
</tr>
</tbody>
</table>

**Description:** Work with the PolarCube team to fulfill their communication needs and create a mission operations design for their mission. You will also obtain your Ham Radio License (very easy to do so) during the semester, if you don't already have one. Great way to get your foot in the door and get to know more about programs around Space Grant. No specific experience is required however we need people who are excited about the project and willing to learn what they need to know. You will track satellites, transmit with radios and work on large scale mechanical systems. Your work will be diverse.

**Minimum Requirements:**
- Interest in satellite communication and operation
- Willing and able to learn quickly in a team

**Preferred/Optional Experience:**
- Familiarity with a programming language

**Time Commitment:** Credit or Volunteer, 6-8 hours per week
# Computer Systems

<table>
<thead>
<tr>
<th>Job Title: Server Manager</th>
<th>Position #: CS01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: Computer Systems</td>
<td>Available Positions: 2</td>
</tr>
</tbody>
</table>

**Description:** This is a great way to learn about Space Grant and gain great exposure to many projects. Learn about computer systems from Windows and Linux servers to network setup. We have a great amount of diverse computer systems and you will gain hands-on experience by learning how they work and how to keep them working. Not a lot of previous experience is required - you will learn all the skills necessary on the job.

**Minimum Requirements:**
- A quick learner and willing to ask questions.
- Can spell Linux ☺
- The ability to coordinate with several different Space Grant teams
- Willingness to learn and adapt

**Preferred/Optional Experience:** Experience with a command line interface, Shell Programming

**Time Commitment:** 6-8 hours/week Volunteer

<table>
<thead>
<tr>
<th>Job Title: Website Manager</th>
<th>Position #: CS02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project: Computer Systems</td>
<td>Available Positions: 1</td>
</tr>
</tbody>
</table>

**Description:** This is another great way to learn about Space Grant and gain great exposure to many projects. Learn about how to manage, maintain, and create content on a large website. You will gain hands-on experience working directly with the Space Grant website and working with student teams to help them update information on the website to inform the public about our student projects. Not a lot of previous experience is required - you will learn all the skills necessary on the job.

**Minimum Requirements:**
- A quick learner and willing to ask questions.
- The ability to coordinate with several different Space Grant teams
- Willingness to learn and adapt

**Preferred/Optional Experience:** Web development, Joomla, or other Content Management System experience

**Time Commitment:** 6-8 hours/week Volunteer
# Lab Team

<table>
<thead>
<tr>
<th>Job Title:</th>
<th>Lab Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position #:</td>
<td>L01</td>
</tr>
<tr>
<td>Project:</td>
<td>Lab Team</td>
</tr>
<tr>
<td>Available Positions:</td>
<td>3-6</td>
</tr>
</tbody>
</table>

**Description:** Build Stuff and Learn Stuff. The Lab team will get a broad spectrum of experiences helping to build Space Grant infrastructure and hopefully bring greater knowledge to Space Grant students. Tasks will range from learning about test equipment to helping to improve resources for Space Grant projects. This is a very interdisciplinary team. Learning about Arduinos might be part of the mix of tasks. Additionally this team will support statewide COSGC educational programs. We may also evaluate other longer term educational efforts for student hardware build projects. We may also start looking at

**Minimum Requirements:**
- Student should work well on a team
- Able to learn quickly
- Desire to teach others
- Attention to detail
- Willingness to put energy and time into diverse projects

**Preferred Experience:**
- Microcontroller and embedded systems development experience
- Familiarity with C/C++ programing or mechanical CAD tools
- Soldering skills
- Previous student hands-on project experience

**Time Commitment:** 6-12 hours/week, Paid team lead, Credit or Volunteer
# RocketSat

<table>
<thead>
<tr>
<th><strong>Job Title:</strong> Science System Engineer</th>
<th><strong>Position #:</strong> R01</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong> RocketSat</td>
<td><strong>Available Positions:</strong> 2</td>
</tr>
</tbody>
</table>

**Description:**
Help to identify a payload missions. Work with the team to define the project scope, identify mission objectives, and develop the system requirements and build partnerships with science and organizing team. You will be working closely with the rest of the team to define a RocketSat mission and project.

**Useful Skills**
- Payload and mission build experiences on a
- Familiarity with programing
- Experience with mechanism design

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

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

<table>
<thead>
<tr>
<th><strong>Job Title:</strong> Structural Engineer</th>
<th><strong>Position #:</strong> R02</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project:</strong> RocketSat</td>
<td><strong>Available Positions:</strong> 1</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 and manufacture all components and work closely with other system teams to support their mission objectives.

**Useful Skills**
- ASEN or ME student
- Solidworks experience
- Machining experience

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

**Time Commitment:** 8-12 hours/week Volunteer
### Avionics

**Job Title:** Avionics  
**Position #:** R03  
**Project:** RocketSat  
**Available Positions:** 2

**Description:**  
The avionics system is primarily responsible for controlling the payload. The Avionics team also provides the computing resources and support for the other subsystems. Avionics team members are responsible for developing communications protocols and data storage methods to be used by the payload in flight, as well as selecting hardware for data processing and communications.

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

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

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

### Systems Engineer

**Job Title:** Systems Engineer  
**Position #:** R04  
**Project:** RocketSat  
**Available Positions:** 1

**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**  
- Engineering student  
- Familiarity with different systems  
- Able to communicate, especially technical concerns, within a team

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

**Time Commitment:** 10-14 hours/week Volunteer
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.