



Small Satellite Research Laboratory

Franklin College of Arts and Sciences
UNIVERSITY OF GEORGIA

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Personnel Budget



Reviewed By: Adams, Caleb

Approved By: Cotten, David

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Revision Table

Changes	Authors	Version
[2016/2/28] Initially made for SCR, includes all basic overviews of team structure and layout.	Adams, Caleb	1.0.0
[2016/12/16] Updates team structure to 4 core teams, data becomes research, consolidates software into the electronics team, and flight team becomes mission operations team. Describes new Lab Operations Team.	Adams, Caleb	1.1.1
[2016/12/19] Added team structure table and figures.	Cotten, David	2.0.0
[2017/11/03] Added Team members and updated graphs	Akintonwa, Michael	2.0.1
[2017/11/11] Updated member roles	Neel, Nicholas	2.0.2
[2017/12/11] Updated member roles	S. Godfrey Hendrix	2.1.0
[2017/11/21] Reviewed for FSR	Adams, Caleb	3.0.0
[2018/3/4] Reviewed for CDR	Cotten, David	4.0.0

Table of Contents

Table of Contents	3
Overview	4
The Path Forward	5
Team Breakdown	6
Undergraduate Team Breakdown:	6
Team Role Definitions:	11
Team Leads and Subteams:	12
Citations	15

Overview

We have two main structures in our small satellite research lab. One is our outward facing structure, and the other is our internal structure. The outward facing structure is made for the UNP so that it is clear who is accountable for what deliverables and tasks. This structure includes the Principal Investigator (PI), Program Manager, and Chief Engineer roles. In our case, we have an additional first officer to act as a Co-Program Manager/Co-Chief Engineer. This structure is to help our team better communicate with the UNP.

Our internal structure is what we use to operate on a daily basis. This structure includes the PI but does not include the exact Program Manager and Chief Engineer roles as described by the UNP. There is a Project Manager, who is an undergraduate of the Small Satellite Research Lab, in addition to two additional Program Managers who assume the roles of Co-Program Manager/Co-Chief Engineer. This group of three students makes up the core leadership structure of the lab. They are directly below the Project Manager in the leadership hierarchy. One of the Program Managers assumes the role of First Officer, a Co-Program Manager and Co-Chief Engineer, and the other one assumes the role of Chief Engineer, see Figure 1. The Co-leadership system within the main operational hierarchy of the research lab is built to insure a system of “checks and balances”. However, the Project Manager, otherwise known as the Program Manager to the UNP, reserves the right to take executive action on decisions in the lab after the review process has been given due time.

The general structure is as follows: The Project Manager helps to organize the two Program Managers. All three of them work together to find the goals of the organization outside of the 2-week sprints in the agile process. The Program Managers are in close communication with the Team Leaders and help with the 2-week development process and the Project Manager should be communicative with teams as often as possible. Within the structure there are 4 teams: the Electronics Team, the Mechanical Team, the Mission Operations Team, and the Research Team. There is also a 5th team known as the Lab Operations Team. The Lab Operations Team is not specific to any mission and exists for the entire lab. However, there may be members of the Lab Operations Team that are specific to the MOCI mission. These members help with documentation, finances, or other logistical operations. Team Leaders should be delegated tasks by the Program Managers or directly from the Project Manager. These tasks must then be subjected to the agile requirement process and then propagated to the team members.

The Project Manager shall be involved in all portions of the research and development process and each Program Manager shall be involved in all portions of research and development for their respective areas of management. Each Team Leader shall be involved in all aspects of the research and development in their teams. The Project Manager is solely responsible for any and all faults, late deliveries, design failures, or system failures and should report these to the PI during the weekly faculty meeting. It is the responsibility of the Project Manager to insure that the team is productive and does not fall behind schedule, as any team failure is ultimately a failure in leadership.

The Path Forward

If selected to move past Phase A in the UNP program the MOCI team has set up a path forward to ensure all leadership positions are filled with well trained, and capable students. As you will see in the following sections a large portion of team will be graduating during Phase B of the project, including leadership. Figure 1 shows the current leadership structure and Figure 2 shows the expected graduation rates of the entire team. Although many members will graduate by the Fall of 2018, the past three semesters have shown tremendous interest in the lab, over 150 applicants applied each of those semesters to join the lab.

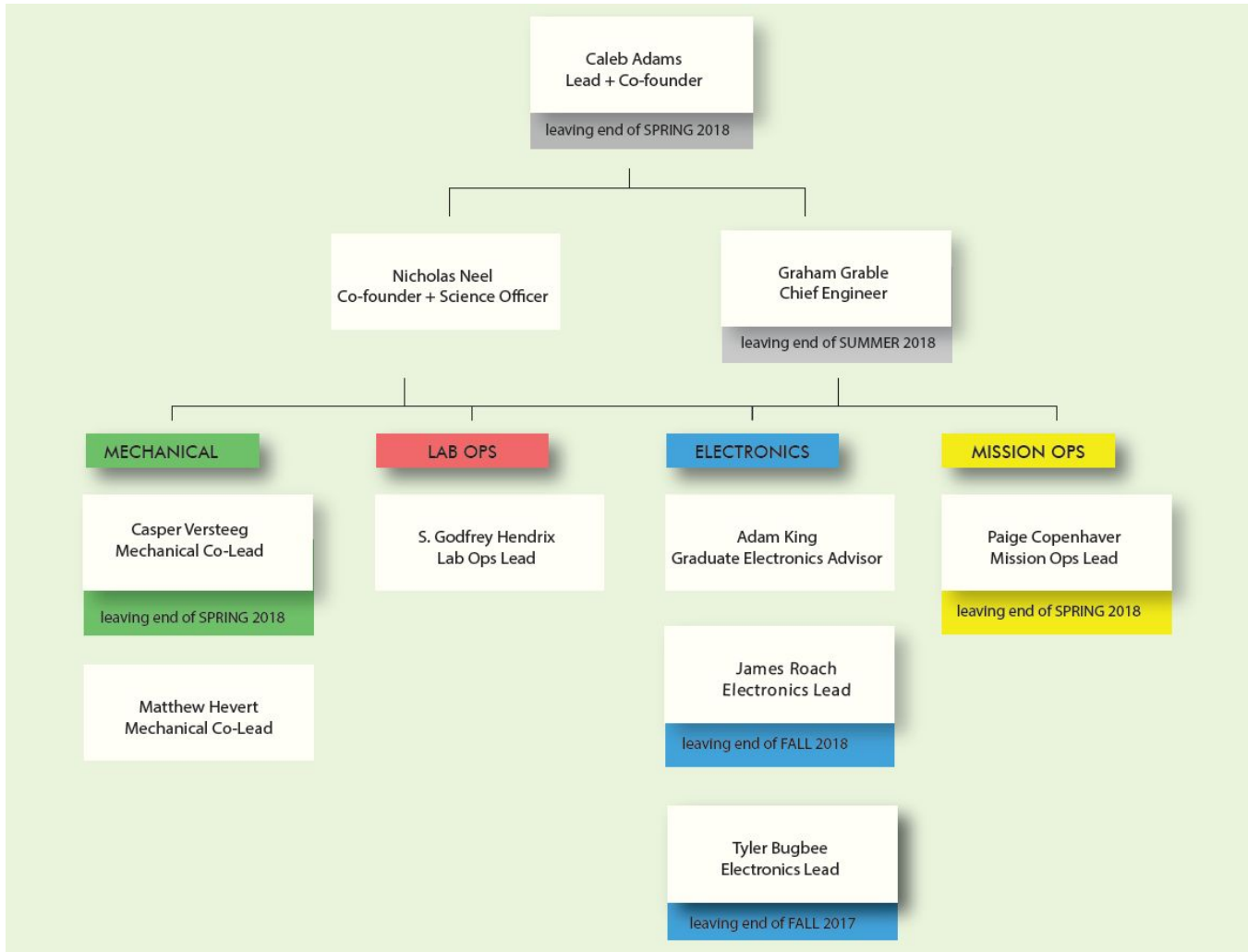
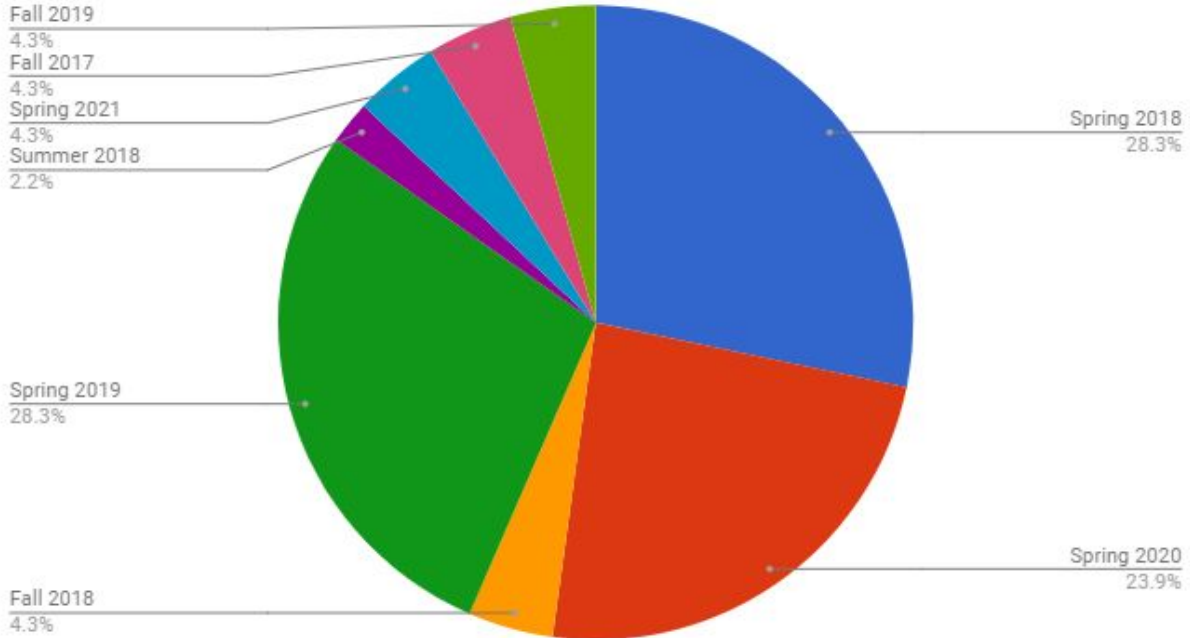


Figure 1: The current leadership structure and their graduation dates, if applicable.

Team Breakdown

Undergraduate Team Breakdown:

Expected Graduation Date



Expected Graduation Date

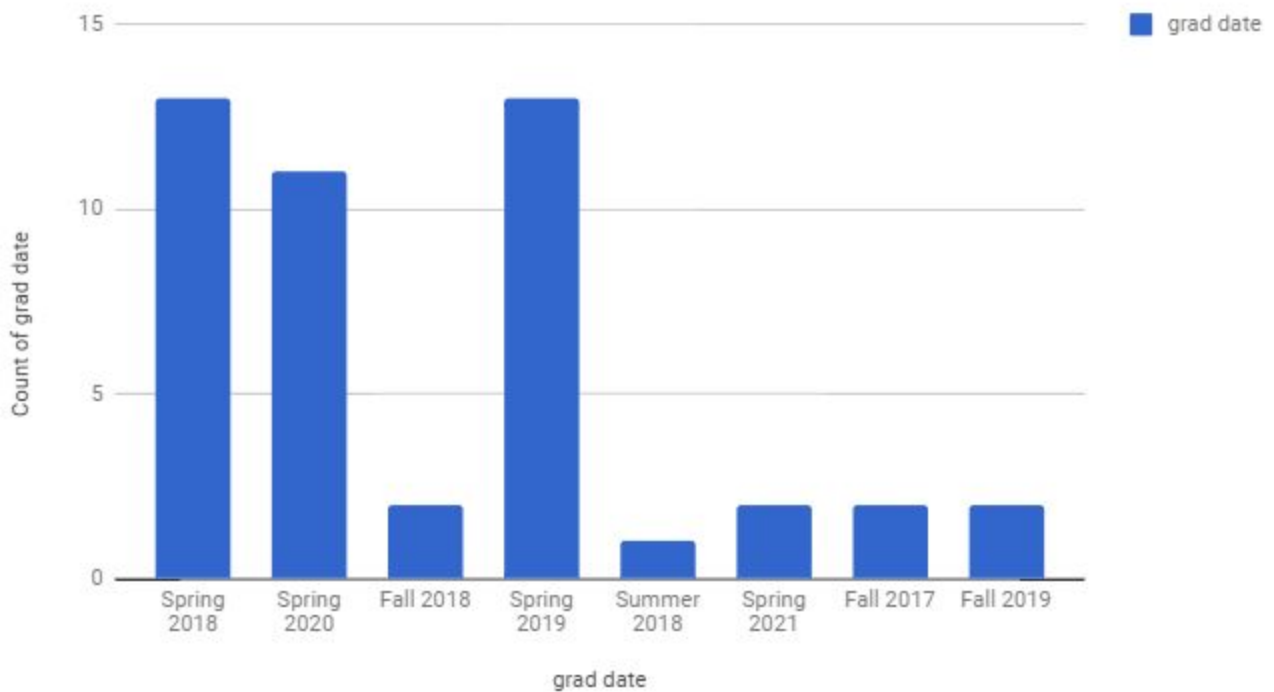


Figure 2: SSRL team breakdown by expected graduation semester as of Fall 2017.

By order of their last names, the undergraduate team members' fields of study, class year, and roles in the SSRL are as delineated below.

- Adams, Caleb
 - Fields of Study: Computer Science, 2018
 - Team Roles: Project Manager
- Akintonwa, Michael
 - Fields of Study: Advertising, 2019
 - Team Roles: Lab Operations Member
- Arogeti, Megan
 - Field of Study: Astronomy-Physics, 2020
 - Team Role: Mission Operations Member
- Barnes, Ethan
 - Field of Study: Computer Science, 2018
 - Team Role: Electronics Member
- Bjorkland, Paul
 - Field of Study: Agricultural Engineering, 2018
 - Team Role: Mechanical Member
- Bugbee, Tyler
 - Field of Study: Computer Science, 2017
 - Team Role: Electronics Member
- Buzzy, Michael
 - Field of Study: Mechanical Engineering, 2020
 - Team Role: Mechanical Member
- Conley, Jacob
 - Field of Study: Computer Systems Engineering, 2019
 - Team Role: Mission Operations Member
- Copenhaver, Paige
 - Field of Study: Physics & Astronomy, 2018
 - Team Role: Mission Operations Team Lead
- Courtney, John
 - Field of Study: Mechanical Engineering, 2020
 - Team Role: Mechanical Member
- Dave, Nandan
 - Field of Study: Computer Systems Engineering, 2019
 - Team Role: Electronics Member
- Davis, Natalie
 - Field of Study: Computer Systems Engineering, 2019
 - Team Role: Mission Operations Member
- Deal, Kaelyn
 - Field of Study: Mechanical Engineering, 2020
 - Team Role: Mechanical Member
- Ely, Michael
 - Field of Study: Mechanical Engineering, 2020
 - Team Role: Mechanical Member
- Endler, Niklas
 - Field of Study: Mechanical Engineering, 2020

- o Team Role: Lab Operations Testing
- Gavinales, Erick
 - o Field of Study: Electrical Engineering, 2019
 - o Team Role: Electronics Team Member
- Gilbert, Kayla
 - o Field of Study: Computer Science, 2018
 - o Team Role: Electronics Member
- Grable, Graham
 - o Field of Study: Mechanical Engineering, 2018
 - o Team Role: Chief Engineer
- Hamilton, Kyle
 - o Field of Study: Computer Science, 2017
 - o Team Role: Research Member
- Heavner, Nicholas
 - o Field of Study: Mechanical Engineering, 2018
 - o Team Role: Lab Operations Testing
- Heimerl, Justin
 - o Field of Study: Mechanical Engineering, 2020
 - o Team Role: Mechanical Member
- Hendrix, Godfrey
 - o Field of Study: Computer Systems Engineering, 2020
 - o Team Role: Lab Ops Team Lead
- Hevert, Matthew
 - o Field of Study: Mechanical Engineering, 2020
 - o Team Role: Mechanical Team Lead
- Huynh, Ashley
 - o Field of Study: Computer Science, 2019
 - o Team Role: Lab Operations Member
- Huynh, Derek
 - o Field of Study: Computer Science, 2019
 - o Team Role: Lab Operations IT
- Hwang, Paul
 - o Field of Study: Graphics Design, 2018
 - o Team Role: Lab Operations Member
- Ilango, Nirav
 - o Fields of Study: Geography and Computer Science, 2019
 - o Team Role: Research Team Lead
- King, Adam
 - o Fields of Study: B.S. and M.S. Computer Science, 2019
 - o Team Role: Electronics Advisor
- Le Corre, Megan
 - o Field of Study: Mechanical Engineering, 2017
 - o Team Role: Mechanical Team Lead
- Leicher, Bjorn
 - o Field of Study: Astronomy-Physics, 2020
 - o Team Role: Mission Operations Member
- Lieu, Cindy
 - o Field of Study: Management of Information Systems, 2018

- Team Role: Lab Operations Member
- Lin, Alex
 - Field of Study: Computer Systems Engineering, 2021
 - Team Role: Mission Operations Member
- Martinez, Aaron
 - Field of Study: Computer Science and Mathematics
 - Team Role: Electronics Member
- Miller, Trey
 - Field of Study: Computer Science, 2020
 - Team Role: Electronics Member
- Murray, Tyler
 - Field of Study: Electrical Engineering, 2019
 - Team Role: Electronics Member
- Neel, Nicholas
 - Field of Study: B.S. Mathematics, 2017; M.S. Geography 2019
 - Team Role: First Officer
- Ngo, Khoa
 - Field of Study: Mechanical Engineering, 2019
 - Team Role: Mechanical Member
- Norris, Sabrina
 - Field of Study: Linguistics, 2020
 - Team Role: Lab Operations Outreach
- Parker, Jackson
 - Field of Study: Biological Engineering, 2018
 - Team Role: Electronics Member
- Patel, Nir
 - Field of Study: Mechanical Engineering, 2020
 - Team Role: Mechanical Member
- Pham, Thoai
 - Field of Study: Electrical Engineering, 2019
 - Team Role: Lab Operations Testing
- Roach, James
 - Field of Study: Computer Science, 2018
 - Team Role: Lab Operations Team Member
- Summey, Kaitlin
 - Field of Study: Computer Systems Engineering, 2019
 - Team Role: Electronics member
- Veazey, Clark
 - Field of Study: Astronomy and Physics, 2018
 - Team Role: Mission Operations Member
- Versteeg, Casper
 - Field of Study: Mechanical Engineering, 2018
 - Team Role: Mechanical Lead
- Wells, Luke
 - Field of Study: Mechanical Engineering, 2019
 - Team Roles: Mechanical Member
- Whilden, Sydney
 - Field of Study: Astronomy and Physics, 2019

- Team Role: Mission Operations Member
- Williams, Byron
 - Field of Study: Applied Mathematics, 2018
 - Team Role: Mission Operations Member
- Yang, Christine
 - Field of Study: Mechanical Engineering, 2017
 - Team Role: Mechanical Member

Major Distribution

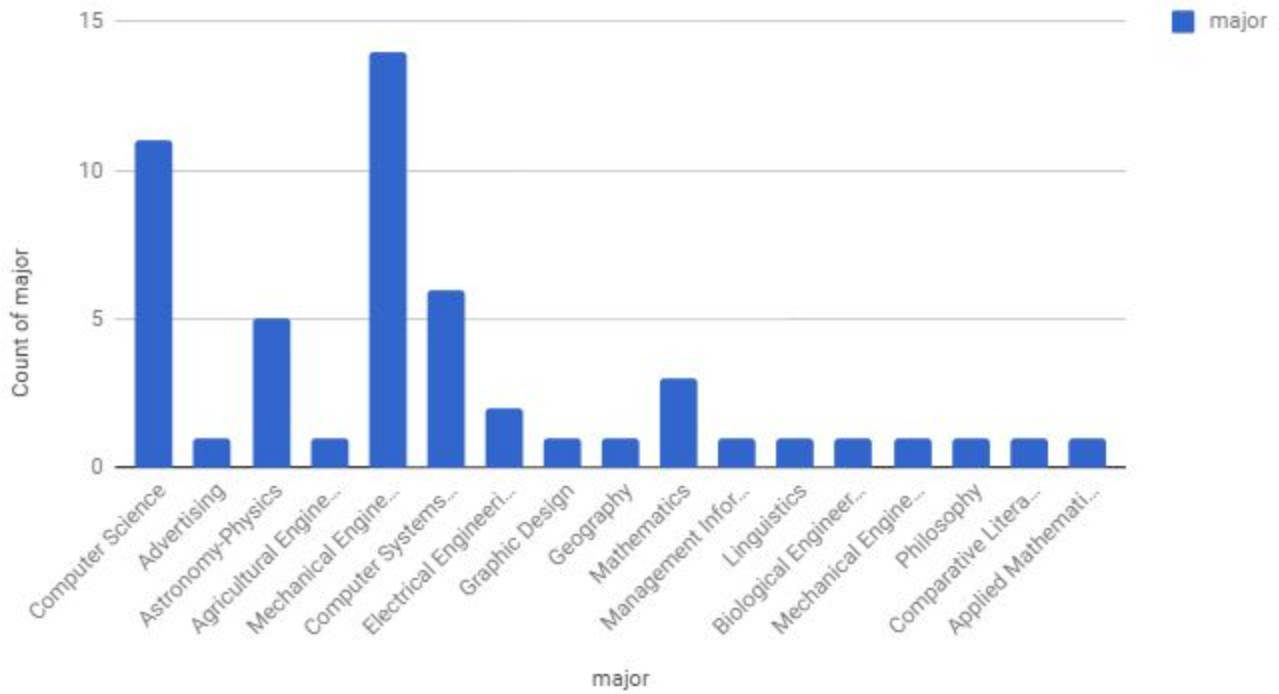


Figure 3: Team structure displayed as a function of major as of Fall 2017. There are more majors than team members due to some students having multiple majors.eee

Major Distribution

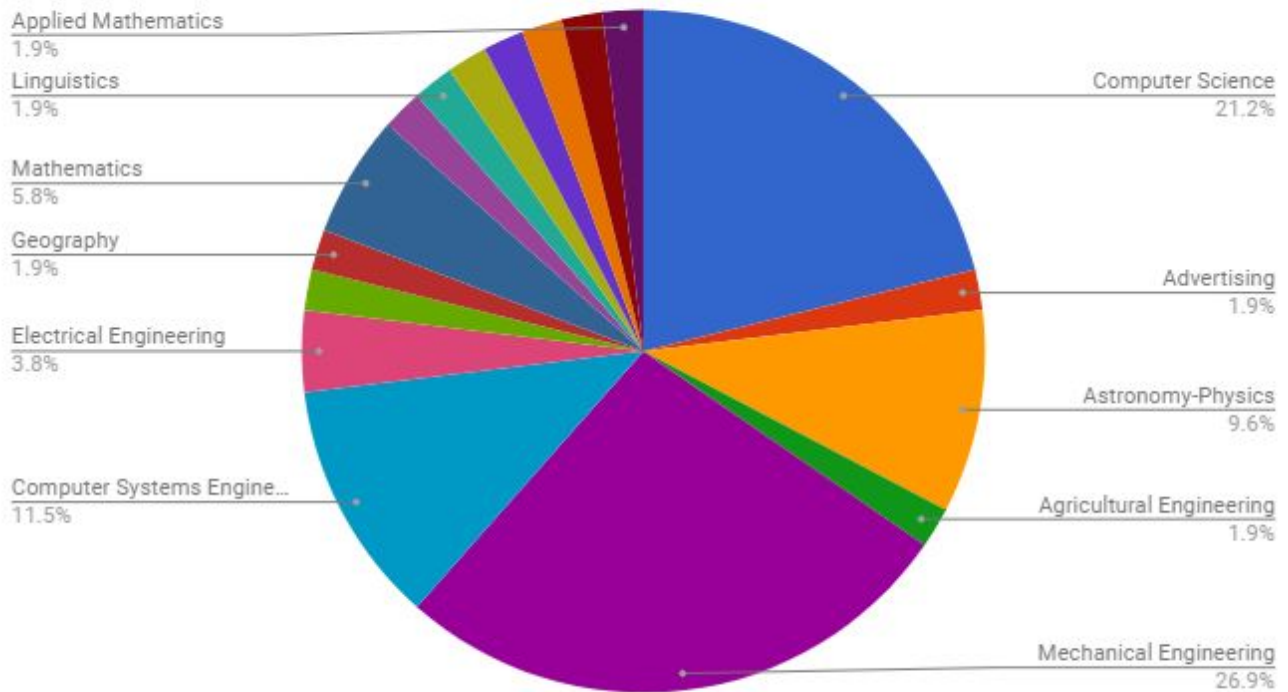


Figure 4: Team Roles in the lab as of Fall 2017

In order to ensure efficient progression of the CubeSat project, the undergraduate team roles are defined as follows in descending hierarchical order:

Team Role Definitions:

- **Project Manager**
 - Accountable for all aspects of project, fiscal and technical
 - Facilitate communication between leadership, teams, faculty, and UNP
 - Ensure a balanced workload among leadership, teams, and faculty
 - Monitor progress of entire team
 - Complete all and any unfinished tasks as necessary
- **Program Manager/Chief Engineer**
 - Accountable for all technical aspects of project
 - Ensure appropriate, efficient execution of technical roles
 - Maintain lines of communication with all other team leads
 - Report progress and review schedules with the project manager
 - Complete all and any unfinished tasks as necessary
- **Team Leads**
 - Accountable for the technical aspects of their respective team
 - Ensures that technical roles are executed appropriately and in a timely manner
 - Provide line of communication between project manager and team members
 - Report progress and review schedules with project managers

- Maintain knowledge of all subteam material
- Take on responsibilities of their team's members when necessary
- Team Member
 - Collaborate with other team members
 - Communicate progress and share knowledge with other team members
 - Complete necessary tasks in a timely manner
 - Report progress to appropriate team lead

The responsibilities of each CubeSat team and sub-team are deconstructed as follows:

- Project Manager: Caleb Adams
 - Accountable for all aspects (some fiscal, some technical)
 - Communicates between all Program Managers and PI to determine best options for obtaining parts, delegating portions of the project, etc
 - Responsible for maintaining all communications, workflows, progress, etc.
 - Communication with Faculty, Undergraduate, Leadership, University Officials, and UNP
 - Picks up all slack
- Chief Engineer: Graham Grable
 - Accountable for the technical aspects of the project
 - Ensures that technical roles are executed appropriately
 - Communications between all team leads
 - Report progress and review schedules with Project Manager
 - Picks up all slack
- First Officer: Hollis Neel
 - Accountable for the scientific aspects of the project
 - Ensures that mission goals are executed appropriately
 - Communications between all team leads
 - Report progress and review schedules with Project Manager
 - Picks up all slack
- Team Leads: Matt Hevert, James Roach, Paige Copenhaver, Godfrey Hendrix
 - Accountable for the technical aspects of the team
 - Ensures that technical roles are executed appropriately
 - Communications between the Project Managers and their team members
 - Report progress and review schedules with Project Managers
 - Knowledge of all subteam material
 - Picks up all slack

Team Leads and Subteams:

- Electronics Team: James Roach
 - Solar Subteam:
 - Knowledge of PCB design/manufacturing
 - Max powerpoint tracking
 - Energy conversion
 - Responsible for integrating the solar cells with an MPPT and the general power systems
 - Responsible for energy storage from the solar cells

- Power distribution to the various subsystems (ACS, MPUs, MCUs, sensors, etc)
 - Sensors Subteam
 - Signals and sensor calibration
 - Microcontroller and Microprocessor
 - Transmission protocols (UART, I2C ... etc)
 - Circuit analysis
 - Simulations software
 - E&M interference/shielding
 - Determines the power requirements of the cubesat and ensures that the subteam is meeting those goals (collaborates with the ACS and hardware electrical subteams to figure out the power consumption of the craft)
 - Power quality
 - Analysis Subteam
 - Data tracking and health logs
 - Virtualization and containers
 - Linux
 - Analytics software tools
 - Flight Software Subteam
 - Facilitates information transfer between programs written by the communications subteam and controls subteam
 - Responsible for the implementation of the Attitude Control System in software
 - Communicates with the other controls subteams (structural and hardware)
 - Members will ensure that the cubesat will be able to communicate to the mission control center over RF
 - Organizes with the communications hardware subteam
 - Maintaining and building the Embedded systems to run minimized linux and CFS or MCU with RTOS
 - Applications scheduling
 - Memory management
 - C, Linux, systems programming, networking
 - CCSDS Protocol
- Mechanical Team: Matt Hevert
 - Structure Subteam: Megan LeCorre
 - Responsible for the structural implementation of the cubesat
 - Design and manufacturing of the frame and internal structure
 - Rapid prototyping
 - Machine shop training
 - Design CAD
 - Thermal SubTeam Casper Versteeg
 - Responsible for thermal analysis of the cubesat
 - run thermal simulations on different components
 - ensure convergence of components with stack
- Mission Operations Team: Paige Copenhaver
 - Orbital Subteam
 - Orbital mechanics
 - Physics/Math experience
 - Aerospace/Atmospheric drag
 - Orbital software with models and simulation

- Attitude Subteam: Sydney Whilden
 - Remote operation
 - ADACS knowledge
 - Orbital mechanics and physics
- Communications Subteam: Clark Veazey
 - Networking
 - CCSDS protocol
 - Linux scripts and and command sequences
 - Understanding of CFS/RTOS/MCU output
 - Remote operation experience
 - Telemetry digestion
- Controls Subteam: Graham Grable
 - Networking
 - CCSDS protocol
 - Linux scripts and and command sequences
 - understanding of CFS/RTOS/MCU output
 - Telemetry digestion
- Lab Operations Team: Godfrey Hendrix
 - Finance Subteam
 - Detailing, capturing, analyzing and computing costs and expenses for:
 - Travel
 - Equipment
 - Operation costs
 - Documentation Subteam:
 - Technical writing skills & scientific knowledge
 - Organization
 - Research ability
 - Legal knowledge and secretarial abilities
 - Web Services:
 - Backend development
 - Website upkeep
 - Internal service management and support
 - General IT help
 - Testing Subteam:
 - Ensures that the cubesat meets the guidelines for structural integrity
 - Stress and Statics knowledge
 - Physics
 - Setting up test 'rigs'

Citations

-N/A