Students Participate In Rocket Competition
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In the Harding University academic catalog, “rocket science” is not offered as a field of study. But rockets have recently brought together students and faculty from different majors and career concentrations to create something successful and learn valuable skills in the process.

Nine students and two faculty members are participating in the NASA-sponsored University Student Launch Program (USLP) in which students learn the process of designing a project from start to finish and produce a result. In this competition, the students are researching and building a rocket.

Dr. James Mackey, professor of physics, and Dr. Ed Wilson, professor of chemistry are the faculty advisers of the project. Student participants are sophomore Megan Bush, junior Sarah Christensen, junior Paul Elliot, sophomore Erin Fulks, junior Aaron Howell, senior Brett Keller, junior Pablo Oropin, Daniel Sewell and senior Stephen Wagner.

NASA unveiled the collegiate program at the USLP workshop at the Marshall Space Flight Center in Huntsville, Ala. in August. Students competing are required to write and submit a proposal for their project, which goes through the NASA approval process. The project must meet the same criteria similar to that of a project done by NASA engineers. Teams of students work together, each with a specific task, including rocket design, safety, budgeting and publicity. Throughout the nine-month process, students will be interviewed by NASA professionals and must submit reports, defend their progress and meet deadlines. The team must also build and maintain a Web site pertaining to their rocket’s construction and data. The team’s proposal was submitted Sept. 25 to the Marshall Space Flight Center; the launch competition will be April 12-15 in Huntsville.

The competition requires the rocket to go exactly one mile high, and penalties apply for the rocket falling short or going farther.

The rocket must meet specific criteria, including a payload, which is an instrument that tracks it and reports data back to earth.

The students involved know the final result isn’t as important as the knowledge and skills acquired along the way.

Brett Keller, the team Safety Officer, said the mile-high mark is not the most important thing.

“In reality it’s pretty difficult to get anything to perform exactly like that consistently, what it’s [one mile] that we’re aiming for,” Keller said. “We don’t realistically expect to get 5,280 feet. The more important thing is to get close, to fly a rocket that is reliable, safe and gives us scientific data.”

Wilson, Faculty Team Leader, said this project is valuable to the students because it teaches them how a proposal and design project would work.

“It’s a great opportunity for people learning to be professionals to learn how to go through a project from start to finish with all the paperwork, learning to get along with their fellow researchers, and coming up with a finished project they can compete with,” Wilson said. “It’s really good.”

Junior Sarah Christensen said her responsibilities as Project Leader include making sure deadlines are met, organizing meetings and solving problems.

Christensen said said her personal goal is to have everyone work together and enjoy themselves doing it.

“The rocket must fly one mile, no more and no less,” Christensen said. “This precision is going to require teamwork from everyone. We have experienced people and inexperienced people that can work together to achieve wonderful things. We all volunteered to do this project so we should make it as fun as we can.”

The team works together until things get done, Christensen said, and this is why the project will be successful.

“Everyone is in charge of different parts of the project, and unless each part is done, the rocket won’t get built,” Christensen said.

To achieve its goals, Christensen said the team works together every week to discuss future progress as well as work previously done.

Members of the team, Bush and Keller, as well as Wilson and Mackey, are seeking certification from the National Association of Rocketry (NAR) to be able to supervise rocket launches. Keller is already certified to the first level and will seek higher certification.

Keller said the rocket’s most important component is its hybrid motor, in which the solid fuel and liquid nitrous oxide are kept separate and mixed during flight.

Keller said in solid rocket motors, the fuel and oxidizer are premixed, which can be dangerous to handle and store. In liquid rocket motors, the fuel and oxidizer are liquids, which are mixed together during flight. This requires pumps and is overly complicated. Hybrid rocket motors combine the safety of unmixed fuels with the simplicity of solid rocket motors and are less highly regulated.

The rockets’ motors have been tested with oxygen and Plexiglas as fuel in safe, indoor conditions, but a rocket stand has been built outside to test larger rockets.

Wilson said he has been researching hybrid rocket motors for the past seven years, testing for efficiency and environmental output. Wilson said when he found out about the competition, he knew the project would be ideal for his students, especially Keller, who has maintained rocketry as a hobby for years.

The prize for the competition is a fully paid summer internship at the Marshall Space Flight Center. Wilson said everyone who completes the project is a winner because of the skills and knowledge acquired.

Funding for the project is primarily from NASA in the form of a grant to Wilson.

The students are also writing a proposal to submit to the Arkansas Space Grant Consortium for additional funding for rocket construction.

Wilson said the purpose of his grant is to develop sensors for rocket motors, to develop instruments to study the thrust of the motor and the burning efficiency and to study the environmental impact.

“For the last four and a half years, I’ve been giving students fellowships to do research to build a better hybrid rocket motor and to test the motor for environmental considerations,” Wilson said. “The advantage of the hybrid rocket motor is that it’s safe.”

The original grant was to Andrew Wright, a professor at University of Arkansas at Little Rock. The grant is shared among Harding, UALR and Hendrix College in Conway, Ark. Wright is the principal investigator and the other faculty involved are co-investigators, Wilson said. Originally the funding was for three years; NASA has since then approved funding for two more years. The team’s progress may be viewed online at www.harding.edu/engineering/usli.html.

http://www.harding.edu/thebison/index824.html