

Alfred University team set to compete next week in 2018 Mars Ice Challenge

5/31/18



Alfred University is one of nine institutions scheduled to participate next week in the 2018 Mars Ice Challenge. The competition, sponsored by the National Aeronautics and Space Administration (NASA), has teams designing, building and testing prototype systems capable of extracting water from the simulated Martian subsurface ice.

The team of engineering students from Alfred University co-advised by Seong-Jin Lee, assistant professor of mechanical engineering, and Wallace Leigh, professor of electrical engineering will compete in this year's event, which will be held June 5-7 at NASA's Langley Research Center in Hampton, VA.

Alfred University alumnus Jacob Towsley (M.S., 2009, electrical engineering) is serving as industrial advisor to the team. A total of 22 Alfred University students from the mechanical, renewable energy and ceramic engineering programs comprise the team. This marks the second straight year Alfred University has been a finalist team in the Mars Ice Challenge. Alfred was one of seven schools that participated in the inaugural 2017 event last June.

The competition is held as part of the Revolutionary Aerospace Systems Concept Academic Linkage (RASC-AL) program, sponsored by NASA and managed by the National Institute of Aerospace (NIA). The program aims to engage students and faculty in relevant, real-world aerospace work. The RASC-AL Special Edition: Mars Ice Challenge is a technology demonstration competition specifically targeting novel methods for accessing water frozen under the surface of Mars.

Organizers of the 2018 Mars Ice Challenge will post live events on the [NASA 360 Facebook page](#). The live events, roughly 25 minutes each, will provide coverage of the competing teams. In addition, daily coverage of the competition will be provided on the [Mars Ice Challenge Facebook page](#).

The hashtag #MarsIceChallenge will be used to provide updates throughout the competition, and behind-the-scenes coverage will be provided on Snapchat (@NASA).

NASA and NIA announced the scope of the 2018 competition in July 2017. Lee said Alfred's team began meeting at the beginning of the 2017-18 school year, developing a concept and organizing groups for specific tasks. By November, the team put together a proposal for its Mars Ice Challenge project, which it named Sub-Surface Archimedes Screw, or SASS.

The device is modeled after the machine designed by ancient Greek scientist Archimedes, which consisted of a helix, or auger, enclosed in a cylindrical shaft. When placed into a water source, the auger is turned, carrying water to the top of the shaft. At the time of its invention, the Archimedes screw was used primarily to transport subsurface water into irrigation systems.

The device proposed by the Alfred team will have an opening halfway up the shaft, allowing drilled surface material to

fall off until the screw reaches the subsurface ice. At this point, the gap will close as the auger enters the ice, allowing the ice to be pulled up and out of the shaft, where it will be deposited into a hopper, melted and run through a filtration system. A heating system that uses electrical charges running through wire mesh in the hopper and also in the filters will melt the ice. The filtration system works in stages of progressively finer filters, starting with a ceramic filter and followed by graphene filters.

More than 50 colleges and universities nationwide submitted proposals for the Mars Ice Challenge, with finalists chosen after a review by NASA officials. In addition to Alfred University, the following schools were chosen as finalists in the 2018 Mars Ice Challenge: Carnegie Mellon University, Colorado School of Mines, Massachusetts Institute of Technology, Northeastern University, Rowan University, University of Tennessee, Virginia Polytechnic Institute, and West Virginia University (two teams entered).

Each finalist team received a stipend, which helps covers travel expenses and the cost of materials needed to build, integrate and test their prototype water extraction systems during a three-day competition. Final scoring will be based on their ability to drill through each layer of the simulated subsurface to extract and collect the water found in the ice. Teams must adhere to specific requirements and must submit a technical paper, capturing innovations and design, and a technical poster, detailing the team's "path-to-flight" explanation for how their Earth-based system would be modified for the Martian environment.

Alfred University is in elite company, as one of only four institutions the others are University of Tennessee, Colorado School of Mines, and West Virginia University to be selected a finalist for both the 2017 and 2018 competitions.

For more information on the Mars Ice Challenge, visit the following:

<https://www.nasa.gov/press-release/langley/students-to-drill-deep-in-nasa-s-mars-ice-challenge>

<http://rascal.nianet.org/Mars-ice-challenge/>

https://www.nasa.gov/feature/RASC-AL_Special_Edition

https://www.nasa.gov/sites/default/files/atoms/files/summary_report_-_2017_mars_ice_challenge_tagged.pdf