



\$1.8 MILLION

NASA Funding at Vanderbilt in FY 2018

NASA's TESS mission will use a map developed at Vanderbilt

When NASA's Transiting Exoplanet Survey Satellite (TESS) launches from Florida's Cape Canaveral on a mission to identify potentially habitable planets orbiting nearby stars, it will carry with it a map, of sorts, developed at Vanderbilt. TESS is looking for small, rocky, Earth-like planets and the Vanderbilt team has been working since 2012 to narrow down the field from 470 million stars to the 250,000 most likely to host a planet like our own. The work to sift through such a massive volume of data was done by Vanderbilt undergraduates, graduate students, and postdoctoral scientists associated with the Vanderbilt Initiative in Data-intensive Astrophysics, as well as students, developers, and data visualizers associated with the Frist Center for Autism and Innovation. Focusing on the nearest stars means that any new worlds that TESS discovers will be close enough for future telescopes, like the James Webb Space Telescope, to detect and measure the thin atmospheres of those planets.

VU astronomer heads U.S. study team for space-based gravitational wave detector

A Vanderbilt professor of astrophysics has been appointed by NASA's Astrophysics Directorate to be chair of the U.S. Laser Interferometer Space Antenna (LISA) Study Team, a group of 18 scientists who will advise NASA on science issues related to the proposed space observatory. LISA, which is designed to take the fledgling field of gravitational wave astronomy to the next level, is an international scientific effort led by the European Space Agency in collaboration with NASA. LISA will detect gravitational waves produced by mergers between black holes millions of times more massive than the sun. LISA is also designed to track neutron stars and stellar mass black holes in orbit around the massive black hole at the heart of the Milky

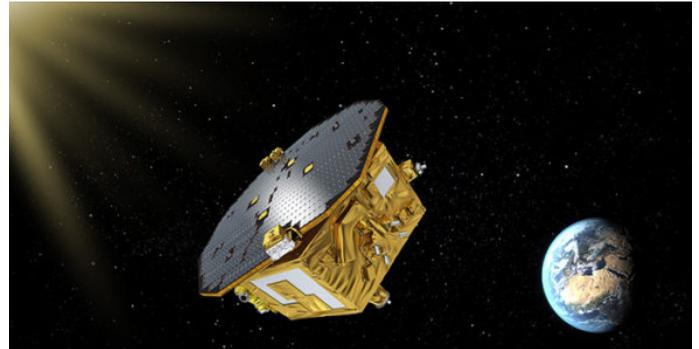


Illustration of one of the three satellites that will form the Laser Interferometer Space Antenna (NASA)

Way and will map tens of millions of tightly bound binary star systems throughout the galaxy. The space-based system will be able to detect gravitational waves at lower frequencies and longer wavelengths than Earthbound detectors. The \$1 billion-plus project consists of three satellites linked by laser beams, tentatively scheduled for launch in 2030.

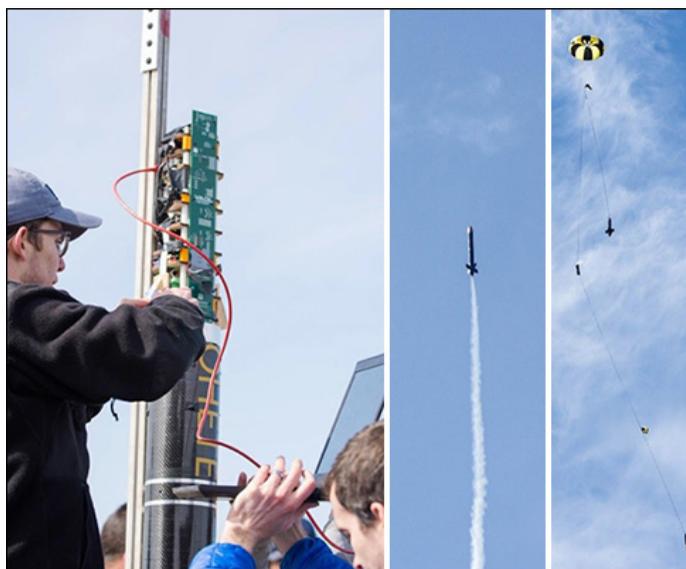
Modeling risk to make future air travel safer

Statistically airline travel is the safest mode of transportation but that doesn't make the list of what can go wrong any less troubling. Low visibility, bird strikes, incorrect landing approach speed, runway debris, airframe icing, engine fires, unexpected weather, and sensor malfunctions are but a handful of potential accident causes. They are also among more than 60 incident scenarios identified by an ambitious NASA project to develop the next generation National Airspace System, known as NextGen NAS.

Vanderbilt risk and reliability engineering experts will be involved in simulating many of them. They are playing a key role in a \$10 million, five-year project to integrate complex data sources that will be the future of air traffic management systems. The project is part of NASA's Aeronautics University Leadership Initiative, which gives top academic centers and their industry collaborators a larger role in shaping best practices and translating them into commercial use. NASA and the grant recipients want to identify, quantify, and prioritize risks that can be best anticipated and address those that would do the most to improve safety.

Student rocketeers earn top prize in NASA contest

The Vanderbilt Student Launch team, comprised of engineering students from the Vanderbilt Aerospace Design Laboratory, won the NASA University Student Launch Competition for an unprecedented fifth time - following up on their eighth Payload Design Award. The team designed a novel two-part rocket with sectional roll control that enables the forward payload section to steadily image ground targets while the bottom section compensates for the rocket's natural roll. Vanderbilt returned to its winning ways after having placed second overall last year, following a string of four championships from 2013 to 2016. The NASA Student Launch is a NASA-conducted and aerospace industry-evaluated engineering design challenge built around a NASA mission. It is an intense eight-month contest involving payload and rocket designs, project reports, design reviews, outreach activities, and website design, followed by a grand finale launch in April.



Final instrument check on SEÑOR COHETE before sending it away and recovering it safely at the 2017-2018 NASA Student Launch Competition April 8 at Bragg Farms in Toney, Alabama. (Photo: Vanderbilt University)

Tennessee Space Grant Consortium

Vanderbilt is the lead institution for the Tennessee Space Grant Consortium (TSGC), which is comprised of 15 affiliate institutions from around the state. The goal of the Space Grant Consortium is to inspire students from K-12 through the graduate level to pursue careers in NASA-related fields and the greater STEM arena. The TSGC provides scholarships and fellowships to undergraduate and graduate students at the affiliate institutions, as well as sponsors competition teams, promotes research and teacher training, and supports Tennessee students at NASA summer programs and similar activities. At Vanderbilt, the TSGC also supports Vanderbilt Student Volunteers for Science, which brings hands-on science lessons to local elementary and middle school students.