

WHY SUPPORT RESEARCH AT NASA?

FOR STARTERS, SO WE CAN HELP ROBOTS TEACH THEMSELVES HOW TO NAVIGATE THE HARSH ENVIRONMENTS OF PLANETS.

Through more than \$4.37 million in research grants, Boston University has been helping the National Aeronautics and Space Administration (NASA) reveal the unknown so that what we do, and learn, will benefit all humankind.

■ ONE GIANT STEP FOR ROBOTS.

Future generations of NASA land/aerial robots will be required to operate in the harsh, unpredictable environments of extraterrestrial bodies. So how do we get them to overcome unpredictable hazards and continue on with their missions? That's where the human brain comes in. With the support of a NASA Space Technology Fellowship, a graduate student from Boston University is creating customized computer architectures on Field Programmable Gate Array (FPGA) chips. These architectures will draw inspiration from the brain in terms of their fault-tolerant structures and their approach to solving difficult navigational tasks. These increase the lifetime operation of future NASA robots as they push outward into the solar system and beyond.

■ IN A GALAXY CLUSTER FAR, FAR AWAY—480 MILLION LIGHT-YEARS AWAY, TO BE EXACT.

That's where the Abell 2052 galaxy cluster is located. And it's where researchers from Boston University are discovering key insights into the formation and evolution of galaxies. Using X-ray data from NASA's Chandra X-ray Observatory, researchers are studying the hot (30-million-degree hot!) gas that's sloshing back and forth in Abell 2052. So what are we really learning from all this sloshing? We know that it helps redistribute heavy elements, like iron and oxygen, which are forged in stars and expelled in supernova explosions. These elements are used in the future generations of stars and planets and are necessary for life as we know it.

■ THE WINDS OF CHANGE ARE COMING—FROM SATURN.

Led by a Boston University researcher, we are learning more about Saturn's auroral emissions and what they can teach us about conditions here on Earth. Using the Hubble Space Telescope to observe Saturn's auroral storms, and tracking the solar wind from measurements near the Earth out to Saturn, the team has found a clear correlation between the arrival of solar wind disturbances at Saturn and the occurrence of auroral storms.

We hope you'll give strong consideration to supporting funding for NASA. If you have any questions or would like to discuss further the role NASA plays in our daily lives, please visit [bu.edu/federal](https://www.bu.edu/federal).



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