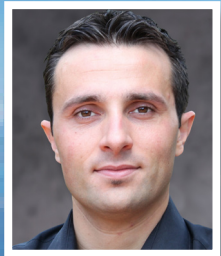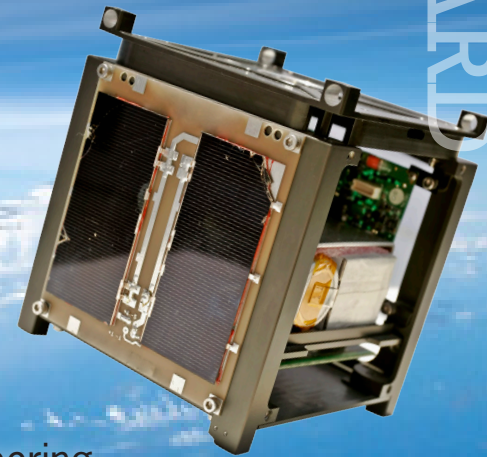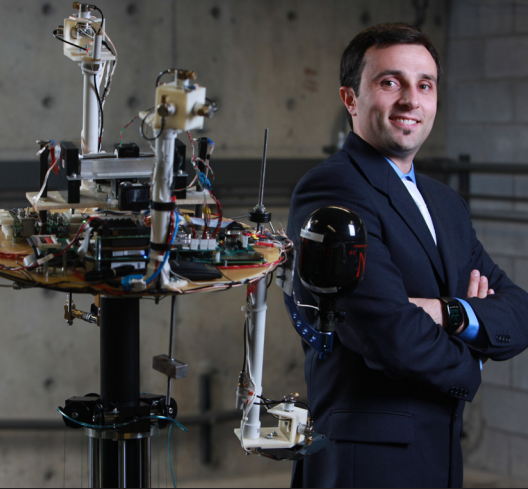# Bevilacqua Wins Young Investigator Award: Will Build Experimental Satellite for Monitoring Space Weather

Riccardo Bevilacqua
Assistant Professor
Department of Mechanical, Aerospace, and Nuclear Engineering

YOUNG INVESTIGATOR AWARD

RENSSELAER | SCHOOL OF ENGINEERING

"Using atmospheric drag to alter the trajectory of a satellite alleviates the need to burn propellant to perform such action," said professor Bevilacqua. "Decreasing the amount of required propellant will make satellites weigh less, which reduces the overall cost of launching satellites into orbit. By accurately predicting how much atmospheric drag a CubeSat will encounter, we will have more accurate control over its trajectory and maneuvers."

eng.rpi.edu

Riccardo Bevilacqua, recipient of a 2013 Young Investigator Award from the U.S. Navy's Office of Naval Research (ONR).

Bevilacqua will use the three-year, $510,000 award to further his research into creating highly maneuverable and inexpensive low-orbit satellites for space weather forecasting. For the ONR project, he will build a small satellite with several new capabilities. The shoebox-sized satellite, known as a CubeSat, will be equipped with a suite of sensors to monitor changes in wind direction, atmospheric ions, and atmospheric neutral densities during flight. Along with processing these measurements, the spacecraft's software will be able to use the collected data to forecast the atmospheric drag of future orbits.

The new project is titled "Measuring Spatio-temporal Variations in Upper Atmosphere via Drag Controlled Nano Satellites and WINCS (Winds-ion-neutral-composition-suite)." Results of the study could be an important step toward defining a new generation of satellites, and could lead to a better understanding and more advanced modeling of low-Earth orbit atmosphere dynamics.

This new project is a key component of Bevilacqua's overall research portfolio, which focuses on the guidance, navigation, and control of multiple spacecraft, and recently on high-atmosphere dynamics modeling and prediction.

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