

Aerospace Seminar



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**Rocket Reusability is a Leap for
Long Duration and Remote Planetary Exploration**

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Since space exploration began, we have walked on the Moon, visited planets with probes, and Earth is orbited by space stations and satellites. Yet launching a satellite is still cost prohibitive. This is not surprising given the single use nature of rockets. A potent analogy is imagining air travel if planes were thrown out after every flight and ticket pricing was set accordingly.

Most large aerospace companies are pursuing reusability of their rockets, with a range of approaches and to various degrees. The push for airplane-like reusability – quick turn-around and multiple flights between inspections and repairs – would significantly alter the field and propel space exploration once it is achieved.

Reusability will revolutionize access to cis-Earth space for people and satellites, but may be even more important for the exploration of the planets. Establishing a framework for certifying equipment for reuse as well as having self-diagnostics for complex systems will affect not just cost and accessibility, but also where we can go and what we can do. The additional robustness of reusable vehicles can be applied to multiple launches, but also to long-term survivability on the surface of another planet, exploring remote locations with limited servicing capabilities, and relaunching a rocket to return a crew from Mars.



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Margarita Marinova has been contributing to space and planetary exploration, in both science and engineering capacities, for almost 15 years. Her overarching goal has been to advance human exploration through science and technology, leveraging the confluence of the two to further humanity's reach into our Solar System, gain deeper understanding of the Earth and its planetary neighbors, and improve rocket capabilities and reusability. In her future work, she is interested in continuing to advance these fields, while also applying these advancements to improve life on Earth.

Dr. Marinova received her BSc in Aerospace Engineering from MIT, and continued to obtain a Masters and PhD in planetary science from Caltech. She has worked at EADS Space Propulsion, NASA Ames Research Center, and SpaceX.