# Machine Learning for Space and Planetary Exploration

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Today's spacecraft serve as our robotic explorers. They orbit the Earth, visit other planets, and drive on the surface of Mars. Early spacecraft collected data and sent it back without examining the contents. Today we have developed machine learning and data analysis methods that allow spacecraft to assess the data and its contents prior to transmission, so that the most interesting or valuable observations are sent back first. The Mars Science Laboratory rover is able to select its own targets for the ChemCam laser spectrometer and collect new data based on its decisions. We have also developed methods for novelty detection to explore the unknown, like the surface of Jupiter's moon Europa. The same techniques help us to quickly sift through massive archived data sets to identify features of interest as well as unusual or unexpected observations that can refine or overturn our current understanding of planetary processes and the evolution of the universe.

Short Biography:
Dr. Kiri L. Wagstaff is a principal researcher in machine learning at NASA's Jet Propulsion Laboratory and an associate research professor at Oregon State University. Her research focuses on developing new machine learning and data analysis methods for use onboard spacecraft and in data archives for planetary science, astronomy, cosmology, and more. She earned her M.S. and Ph.D. in Computer Science from Cornell University, followed by an M.S. in Geological Sciences (University of Southern California) and an MLIS in Library and Information Science (San Jose State University). She received the Lew Allen Award for Excellence in Research, the NASA Exceptional Technology Achievement Medal, and is Senior Member of the Association for the Advancement of Artificial Intelligence. She is passionate about keeping machine learning relevant to real-world problems.