

**MEASURING THE VALUE OF AI IN SPACE SCIENCE AND EXPLORATION.** B. Blair<sup>1</sup>, J. Parr<sup>2</sup>, B. Diamond<sup>3</sup>, B. Pittman<sup>4</sup> and D. Rasky<sup>4</sup>, <sup>1</sup>NewSpace Analytics, Canterbury, New Hampshire, [planetminer@gmail.com](mailto:planetminer@gmail.com), <sup>2</sup>NASA Frontier Development Laboratory, Mountain View, California, [james@frontierdevelopmentlab.org](mailto:james@frontierdevelopmentlab.org), <sup>3</sup>SETI Institute, Mountain View, California, <sup>4</sup>Space Portal, NASA Ames Research Center, Moffett Field, California.

**Introduction:** The Frontier Development Laboratory (FDL) is a hands-on Artificial Intelligence (AI) accelerator that is taking an experimental approach to matching the enormous potential of AI and emerging deep data technology to NASA applications including lunar and planetary science. FDL is tackling knowledge gaps useful to the space program by forming small teams of industrial partners, cutting-edge AI researchers and space science domain experts and tasking them to solve problems that are important to NASA as well as humanity's future.

**Partnership with AI Industry:** The FDL program is fast-paced, embraces taking risks and trying out emerging cutting-edge AI and deep data tools provided by our industry partners. Corporate sponsors for the 2017 summer program include Nvidia, Intel, IBM, KX, Autodesk and Space Resources Luxembourg, and the research teams this year are hosted by the SETI Institute - located in the heart of Silicon Valley.

**2017 Program Overview:** This year's program organized five research teams that focused on AI-based science opportunities within the fields of Planetary Defense, Space Resources, and Space Weather. The 2017 summer program was an 8-week concentrated R&D deep-dive process that incorporates the latest developments in artificial intelligence and deep neural networks with daily updates on cutting-edge academic research as well as detailed industry partner case studies.

**Space Applications of AI:** Artificial Intelligence (AI) can help to close key NASA knowledge gaps, but can also shine a light on how developments in the private sector can directly contribute to tackling unresolved challenges in the planetary sciences. Two prior FDL sessions have demonstrated that meaningful progress could be industrialized by bringing together individuals at the doctorate and post doctorate level together to work on connected, but adjacent problems in a shared space mentored by senior scientists with a deep knowledge of the problems. AI is an emergent technology with widespread industrial applications that is generating new tools for making sense of unknowns. Use of AI can help NASA examine unstructured data from multiple sources and wavelengths, and revealing scientific detail as well as informing decisions the moment new discoveries are made.