NASA Spaceward Bound New Zealand 2015: Advancing Astrobiology Curriculum Via Teacher-Scientist Collaboration in the Taupo Volcanic Zone. L. Offer[1], I. H. Mogosanu[2], J. G. Blank[3], K. A. Campbell[4], J. Pollock[5], K. Hodgson[6], A. Phelps[7], K. Silburn[8], [1]New Zealand Astrobiology Initiative (NZAI), Wellington NZ, Lucinda@astrobiology.kiwi; [2]NZAI & Blue Marble Space Inst. Sci. (BMSIS), Wellington NZ, [3]NASA Ames Research Center & BMSIS, Moffett Field CA; [4]University of Auckland, Auckland NZ & NZAI; [5]New Zealand Association of Science Educators, Christchurch NZ; [6]Western Heights High School, Rotorua, NZ, [7]Almaty Intl. School, Almaty, Kazakhstan, [8]Casula High School, Sydney AU; and the participants of Spaceward Bound New Zealand.

Introduction: NASA's Spaceward Bound program brings scientists and teachers together in the field to exchange fresh perspectives, collect samples and make scientific measurements, and give teachers rich experiential knowledge to take back to the classroom. Locations are chosen around the world for their scientific relevance to Astrobiology (usually as Mars analog sites) and Earth and Space Sciences. The program originated at NASA Ames Research Center in 2006 with over 20 expeditions to date. A balanced makeup of teachers and researchers attend, and most of the latter are conducting NASA-supported Astrobiology projects.

The inaugural Spaceward Bound New Zealand (SBNZ) expedition, in mid January 2015, was based at the Te Takinga Marae, located on the North Island, ~15km east of Rotorua, in the heart of the Taupo Volcanic Zone (TVZ). With proximity to both private and commercial geothermal settings, the week-long expedition included a multinational group of 50 participants, comprised of 20 scientists, 15 teachers, and 15 students. Participants were divided into groups based on expertise and interests, and invited to six themes: 1) Extreme Life Science, 2) Planetary Science, 3) Planning to Live on Mars, 4) Planetary Protection, 5) Technology, Rockets, and Robots, and 6) Arts, Culture and Indigenous Knowledge as a means of communicating Astrobiology. The themes were created to support future curricula design for both New Zealand's *Planet Earth and Beyond* strand for years 1-13 which covers dynamic Earth, its resources, and environment for life, and the newer *Earth and Space Science Standards* for years 12 & 13 which offers a higher level customized course that can focus on subjects such as astronomy and geology for example. The Technology, Rockets, and Robots group, while not specifically part of an Astrobiology course, are tools that we use today and in the future to conduct remote science.

Investigations: An investigation of alkali-chloride systems, thermophile communities, and microstromatilites was conducted at a hot creek near the Nag Awa Purua (Rotokawa II) geothermal power station, a site of on-going research by Campbell and others (ref). Rovers and a drone equipped with a camera and sampling apparatus were deployed in geologically interesting settings for use and operation. Examples of sites for observation included hot pools at Kuirau Park, and Hot Water Creek at Waimangu Volcanic Valley demonstrated the thermal gradient story of the TVZ. These areas of hot spring activity combined biology and geology to show visually, and very visibly how living at high temps is extreme and unusual compared to most environments today. As a group, and calling on the diverse backgrounds of the participants, we considered how modern textures of microbial structures (mats, balls, other periphyton materials) and silica-rich sinter deposits (e.g., flat plates, cones, spherical concretions) correlated with a range of physical conditions within the geothermal pools. They postulated how and which materials might be preserved over geologic time and serve as biomarkers of ancient climates and environments. We considered all shared hypotheses and approved or dismissed them based on in situ observations and discussion.

Due to the hazardous aspects of the geothermal settings, many of the field trip activities were observational; participants used cameras and remote probes to measure T, pH, Cl-, etc. Some sinter and microbial samples were collected for later analysis. New Zealand scientists familiar with the settings provided were in attendance for SBNZ, including microbiologist Steve Pointing (Auckland U. Tech), Kathy Campbell (U. Auckland), and volcanologist Julian Thomson (GNS Science), guided small groups in tours of Mt. Tongariro and Ngauruhoe volcanoes, and of sulfur-encrusted fumaroles in Rotokawa.

Deliverables: SBNZ educational deliverables include videos, photographs, infographics, and activity and lesson plans; these are being refined post-expedition. This talk will include an overview of the educational aspects of SBNZ and introduce samples of digital resource materials that will be available, for general access/use, at the NZAI website. To culminate our collaboration with an international body of scientists, teachers, and students in a unique and scientifically valuable landscape, we are committed to advancing New Zealand's curriculum and share what we learned with the broader Astrobiology community.