

## REPORT ON EXPEDITION / PROJECT

**Expedition/Project Title:** Proof of Concept: iChip in-situ culturing in hot spring environments

**Travel Dates:** June 10<sup>th</sup> – June 28<sup>th</sup>

**Location:** Nakabusa Onsen, Nagano Prefecture, Japan

**Group Members:** Vincent Rennie

**Aims:** To test the adapted protocol for the iChip device for its ability to  
withstand hot spring environments and culture the microbes in-situ

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### Introduction to the Expedition

This expedition has its origins in the last Davis Fund expedition in which I participated. On the last night before I left Iceland in July 2015, I went for drinks in Reykjavík with Professor Amanda Stockton and one of the staff scientists on her team, Thomas Cantrell. They revealed to me that their ambitions for testing the iChip lay beyond the tiny island of Iceland and that they were eager to test the device in other hot spring environments around the world. Given that I was going to study abroad the following academic year in Singapore, I decided to grab my opportunity and suggested to them that I could organize an expedition to Japan. They happily agreed and so full of hope and optimism I left Iceland to go back home.

Upon arriving home I realized the immensity of my task; organizing an entire scientific field expedition in a country where very little English is spoken is no small task! My original plan was to have the expedition team move from Tokyo all the way up to the north island (Hokkaido) but due to the fact that the acquiring of permits took much longer than expected due to some key communications, we were able to acquire only a permit for a single national park. Additionally, in March Amanda and Thomas decided that the objectives for the expedition needed to be shifted slightly and that a time-course study was now the primary scientific goal.

## Expedition Team Outcomes

The main objective of the expedition was a proof of concept of the iChip design's efficacy as a field sampling technique for hot spring environments. Bear in mind that this project does not necessarily have a strong financial backing from Georgia Tech University because it is not supported by a grant. This means that this expedition will prove key to gathering sufficient high quality data to convince committee's that this type of project should get backing. I am quite optimistic that this will be the case as our collaborators set up have extensively studied the sites that we worked in. This means that we already have lots of metagenome data that we can use as comparison for what genomic data that our iChip samples generate. This collaboration set up by Amanda as per my suggestion may prove to be very fruitful. The National Science Foundation (NSF) has recently put out a grant for projects that are collaborations between American and Japanese research groups, entertaining the possibility of future work by our team. The results from the iChip will not be available for some time as Amanda and Thomas were in Iceland for several weeks following this expedition. During the iChip removal process, it seemed although the very high temperature iChips were warped and thus unlikely to yield interesting data, the vast majority of the iChips were intact.



## **Personal Expedition Outcomes**

I found this expedition to be the single most enriching of my educational experiences. This expedition gave me the opportunity to apply the expedition planning and organisation skills that I had learned in the run-up to the July 2015 FELDSPAR expedition in. I learned a lot of valuable lessons not only about the planning of an expedition but also managing a team during an expedition. The team meetings were also a very enriching experience because it taught me a great deal about the planning and logistics that go into a scientific research expedition once it is already in progress. Although I was not the leader on the ground on this expedition (Amanda as professor naturally took on that role), I did get an idea of the different ways that one can try to overcome challenges and obstacles that the team encounters in a calm and rational way. I feel that this will prove vital during my PhD where I may be the primary person in charge during a team field excursion for my project.

I also learned a lot about the logic behind setting up rigorous field experiments. I had not anticipated the kind of foresight that is required to be able to assess all the possible flaws of a set up to insure that the experiment runs smoothly in the field. In terms of publications, I will be on the general expedition team paper as a secondary author and Amanda has suggested that they would like for me to do some writing for either a proposal or a small part in the general paper. Lastly, I have made many useful connections with other researchers and professors during this expedition, which may in the future give me the opportunity to do a PhD and continue to pursue a career in astrobiology.

## **Acknowledgements**

I would like to start out by thanking my friends and family for their continual support and help with preparing me for the expedition. I thank Amanda Stockton for giving me the opportunity to participate in this expedition. Lastly, I would like to extend my gratitude to Professor Richard Ennos and the rest of the Davis Expedition Fund committee for funding this project.