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#### What I did on my Summer Vacation: Undergraduate Research in Japan

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*This report was prepared by Ms. Judy Brown, Senior at North Carolina State University, who spent the summer of 2008 at the University of Tokyo. Her activity was supported through the IREE (International Research and Education in Engineering) program from OISE (Office of International Science and Engineering) and ENG (Directorate for Engineering). Ms. Brown's major professor, Dr. Afsaneh Rabiei, is supported by a CAREER award from ENG's Division of Civil, Mechanical, and Manufacturing Innovation.*

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My name is Judy Brown, and I am a rising senior at North Carolina State University majoring in aerospace engineering. I recently had the opportunity to spend my summer doing research at The University of Tokyo through the NSF International Research & Education in Engineering (IREE) program. My research focus is to characterize some of the properties of new composite metal foam material invented at NC State University's Advanced Materials Research Laboratory directed by Dr. Afsaneh Rabiei. My time at The University of Tokyo was spent evaluating the composite metal foam behavior in bending and its acoustic emission behavior.



Before joining this project in January 2008, my experience was limited to classes and undergraduate labs. Working on a specific research project was new to me, and I have learned much through the experience.

My work on the project began with learning general properties of metal foam materials as well as the specific processing methods and performance of NCSU Composite Metal Foam. I worked with PhD student Lakshmi Vendra as my mentor during spring semester 2008 to produce samples for my coming visit to The University of Tokyo. The knowledge I gained during this period of my research has been so important as I traveled to The University of Tokyo and began to produce data over summer 2008.

This was my first time to leave the United States, and at the beginning I was a little bit scared. I was intimidated by the fact that I had to figure out how to live by myself in a foreign country, and scared of things like riding the Tokyo subway because I might get lost. But I also knew that if I never learned how to ride the subway, I would never see the sights of Tokyo, and what a waste it would be to travel all the way to Japan and be too scared to explore it. So my second day in Japan I took my map, made a plan, and off I went.

Since then I have seen so many things that were new and different. The sheer size of Tokyo was amazing to me—more people live here than in the entire state of North Carolina—and the city sprawls for miles. But learning to live in Japan has been fun, and my Japanese hosts have gone out of their way to make me feel welcome. Eating Japanese food (with chopsticks), navigating the train system, visiting famous landmarks and cultural sites on the weekends, practicing my Japanese with other students in my lab—I would not trade these experiences for anything and am so glad that I was brave enough to try them.

The stage of my research spent at The University of Tokyo has taught me similar things. I went through a period where I wondered if I would be able to do a good job producing data by myself. I wondered if full time research was something I enjoyed. I wondered if I wanted to go to graduate school. Adapting to a new environment raised many questions, so I resolved to do my best work and to learn from my experiences.

And I have learned so much! The more I worked on my project, the more interested I became in my results. Doing hands-on tests and interpreting the data aroused my curiosity, and I wanted to see if the next sample showed similar behavior to the data I had already gathered. It was also rewarding to see the samples I had helped to make during spring 2008 producing tangible data, and to know that the knowledge I gained during that time was helping me to succeed.

I've discovered that research is a lot more work than I ever expected, but it can also be very rewarding. And the results I am producing are important! It is very satisfying to know that because of the work I have done something more is known about the behavior of our material. This experience has answered my question: Yes, I do like doing research. And yes, I do want to go to grad school.

In fact, now I am looking forward to grad school as a chance to pick an area of engineering that interests me and to go investigate, rather than just something I should do since I've done well in undergraduate studies. And I know the experiences I have had here will help me to do well. It has been such a privilege for me to get this sort of experience as an undergraduate, both living in a foreign country and having my own part in a research project. The things I learned have laid a foundation for me to build upon, and I know that they will help me to approach my future endeavors with greater maturity.

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