It was my last weekend in Sendai, a nice clear Friday night drawing to a close after a long day at the International Conference for Fluid Dynamics and a slow dinner with colleagues. We stood at the train station, ready to part ways. "Do you have any advice for these young researchers?" one of my professors asked Dr. Sullivan of Purdue University. Dr. Sullivan nodded his head, "Dream big. Do your best. Do it now."

If there was one guiding principle that best describes my internship in Japan, it was this: Do it now.

Professor Nagai's lab is currently undertaking a large investigation into designing an airplane that could be used in Mars exploration. Such an airplane could cover greater distances than the Rover while still obtaining high-resolution information. Because of the difference in atmosphere and conditions between Mars and Earth, no suitable aircraft currently exists. Designing such an airplane, then, requires extensive experimentation of current and new wing/airplane configurations as well as an iterative design process. The two themes of my research during the internship period both focused on this project: examining the effect of propeller downwash on the aerodynamic performance of an Ishii wing and low Reynolds number effect on the aerodynamic performance of an Ishii wing using pressure sensitive paint. Both of these themes challenged me to learn to utilize new experimental techniques, different experimental facilities, and new model and design fabrication methods. My internship also required me to collaborate and work with other researchers in an environment and lab atmosphere that I was not accustomed to. In many ways, at the start of it all, I wasn't entirely sure where to begin.

Ask questions. Offer your suggestions. Offer to help. Be curious. Go investigate. Don't worry. Countless people in various circumstances gave me this kind of advice, all with the unspoken encouragement: "Do it now."

Following this advice took me on a research journey that challenged me and helped me develop into a better researcher. "Do it now" led me to investigate a new fabrication method for airfoils previously unused in the lab (i.e. using a 3D printer). "Do it now" led me to dedicate long hours for the propeller slipstream experiments and to focus on getting good, high-quality data (experimentation time took upwards of 50 hours). "Do it now" caused me to talk to the students I needed to in order to observe pressure sensitive paint application on test models and to learn about its various experimental uses. "Do it now" is what allowed me to learn to use the facilities of the low turbulence wind tunnel for the propeller slipstream experiments and the Mars Wind Tunnel for the Reynolds number effect investigation. "Do it now" kept me working hard and putting in the necessary hours so that I could complete the research I needed to.

However, "do it now", or the spontaneity of the present, also allowed me to enrich my internship experience beyond what I had anticipated. During Open Campus at Tohoku University, I spent two days touring all of the other labs in

engineering, asking questions and learning generally about the caliber of research that is conducted in all of the university's facilities. It gave me a greater understanding too of different labs and research atmospheres. Another time, ne evening, I walked into one of the lab rooms and found the recent PhD graduate explaining his experimental method to two other students. By sticking around and participating, I was able to learn something entirely unrelated to my internship or my personal research and to gain further insights into experimental design. I spent one day at the JAXA Kakuda Space Center's Open House, where I asked questions about developments in space technology in Japan as well as public opinion about the space program. At the International Conference of Fluid Dynamics, I attended multiple sessions in a variety of fields. All of these experiences gave a better well-rounded understanding of the field of aerospace engineering in an international setting.

"Do it now" also provided me with opportunities to learn about Japanese culture outside of the lab. I attended Tanabata Festival and the Jozenji Streetjazz Festival in Sendai. I attended Obon Festival in Matushima. Per suggestion, I even joined an English conversation group where I could make friends and help others improve their English. One evening, some of the colleagues from my lab invited me for an impromptu dinner out where we ate sushi and talked and had a genuinely good evening all around. All of these experiences were rewarding and completed the internship experience.

So, on that last Friday evening, when Dr. Sullivan gave me his wisdom-laden advice, I glanced around at my colleagues and professors, at the people walking around and past us, at the sights of the city, all of which had become so familiar to me, and I smiled. One cannot underestimate the power of planning and preparation. However, some things we simply cannot plan for, some things we cannot anticipate. Those are the things we must do, in the moment. Those are the experiences that will never leave us the same.

I would like to thank the Global COE for giving me this opportunity to come to Nagai Sensei's lab for this internship involved in the research of the Mars airplane. I would also like to thank Nagai Sensei and Asai Sensei for their support and advice as well as their students who taught me much about research and engineering and also about diligence and perseverance.

Erin M Reed

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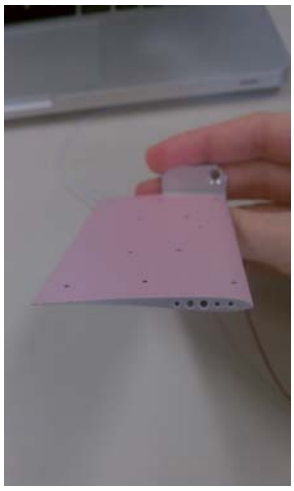


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