

A U.S. AND JAPANESE STUDENT OUTLOOK ON THE IMPACT OF INTERNATIONAL RESEARCH INTERNSHIPS

C.A. Matherly¹, S.R. Phillips², M. Yamada³, and E. Brooks⁴

¹NSF-PIRE NanoJapan Program and the University of Tulsa, Tulsa, OK, U.S.A.

²NSF-PIRE NanoJapan Program and Rice University, Houston, TX, U.S.A.

³MEXT Long-Term Administrators Program, University of Tulsa and Hiroshima University, Hiroshima, Japan.

⁴MEXT Long-Term Administrators Program, Rice University and Tottori University, Tottori, Japan.

The U.S. and Japan are global leaders in nanotechnology. Stimulating cooperation between U.S. and Japanese researchers is critical to further advances, yet obstacles exist for international collaboration, primarily linguistic and cultural barriers. Yet, as reported by *Open Doors 2012*, engineering majors represent just 3.5% of U.S. students who study abroad. Japan's Ministry of Education (MEXT) reports that the total number of Japanese students studying in the U.S. has declined by 47% from 1999 to 2009; the last year that data is available. If the international nature of nanotechnology research demands that scientists have the skills to be able to collaborate in an international environment, there is a clear need to expand and develop international programs that address the unique needs of engineering and physics students for both Japanese and U.S. students. This talk will highlight U.S. and Japanese student experiences from three unique international research programs that seek to expand international opportunities for engineering and physics students. Through an analysis of study surveys and program assessments, we will compare and contrast the long-term impact of international research experiences on U.S. and Japanese students.

- The NanoJapan: International Research Experience for Undergraduates Program, established by a National Science Foundation Partnerships for International Research and Education (NSF-PIRE) grant in 2006 (OISE-0968405), is a twelve-week summer program through which twelve freshman and sophomore physics and engineering students from U.S. universities complete research internships in Japanese nanotechnology laboratories. By involving students with cutting-edge nanotechnology research projects, NanoJapan tightly integrates the international experience with students' academic program. NanoJapan aims to increase the numbers of U.S. students who pursue graduate study in nanoscience and cultivate a generation of globally aware engineers and scientists who are prepared for international research collaboration. Since 2006, a total of 106 American students have participated in NanoJapan.
- A grant from the Japan Society for the Promotion of Science Core-to-Core Program provides complementary support to NSF-PIRE researchers and students in Japan and is directed by Prof. Masayoshi Tonouchi of Osaka University. Since 2011, a total of 30 students have conducted short-term research internships at Rice University with partial support from the JSPS Core-to-Core program, including 25 students who participated in the 2011 Reverse NanoJapan Program.
- Hokkaido University's Center for Engineering Education & Development (CEED) Internship Program offers two international internship courses for graduate students in Department of Engineering and Department of Information Science and Technology. The internship gives students an opportunity to put into practice in the real world the skills and knowledge they have been developing in classes by supporting student travel and basis living costs during the internship abroad. Since 2008, 32 Hokkaido students have conducted short-term research at Rice University with funding from CEED.