

IIIP GROUP PROGRAM 2017 PROPOSAL

Group Program Information

Program Leader Name: Dimitrios Vavylonis, Department of Physics
Program Title: Summer research experience at Nagoya Institute of Technology
Country: Japan
Dates: June 1-July 25, 2017
Duration: 8 weeks
Total budget request: \$31,360

Number of students who will participate as Iacocca Interns: 4

No additional students beyond IIIP Program will be considered.

Host organization name: Nagoya Institute of Technology (NITech)
Address: Gokiso-cho, Showa-ku, Nagoya, Aichi, 466-8555 Japan

Host organization website: <http://www.nitech.ac.jp/eng/>

Host organization contact information:

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Executive Summary

The proposed program will provide four full-time research internships at Nagoya Institute of Technology (NITech). Each student will get personalized training and research experience by participating in a carefully-selected research group at NITech that matches the Lehigh students interest and background. This matching between students and advisors is possible through: (i) overlap of engineering and physical/ biological sciences majors and research areas between Lehigh and NITech, (ii) established contacts between top Administrators in the Office of Research at NITech and the Program Leader, and (iii) the experience during the first run of this program in the Summer of 2016. In addition to advancing the professional goals of the students in their field of study, an equally important goal of this program is to provide students with the cultural experience of visiting and living in a country in East Asia (that has different work habits and culture in research and industry compared to the US) and to provide students with an opportunity to develop international collaboration skills. The NITech research groups will similarly benefit by having graduate students and postdocs obtain experience with advising, mentoring and working with foreign science or engineering students.

Internship Description and Schedule

Background. Japan is one of the top countries in Asia for basic research and is an ideal country for both studying in a different academic environment as well as technical training. The aim of this internship program is to provide undergraduate or graduate students who are science majors in the College of Arts and Sciences or engineering majors in the College of Engineering and Applied Science with the opportunity of a research experience at a National University in Japan. These students may also be minors in Asian studies or Japanese or else students who want to become familiar with science and engineering in Asia.

NITech (Nagoya Institute of Technology) is a National Japanese university having a history of over 110 years. NITech has been growing as one of the leading engineering universities in Japan, and dedicated to serve as a Technology Innovation Hub for academia and industries worldwide, particularly in the fields of automobiles, aerospace, advanced materials, ceramics and information systems. This supports the expansion and development of the central region of Japan, where major companies have factories and headquarters, such as Toyota. The current majors at NITech are Life Science and Applied Chemistry, Physical Science and Engineering, Electrical and Mechanical Engineering, Computer Science, Architecture, Civil Engineering and Industrial Management Engineering, Nanopharmaceutical Science, Creative Engineering Education Program.

Lehigh and NITech share many common features, including a similar total number of faculty, undergraduates and graduate students. NITech is currently investing in its further globalization. This program could help establish a longer term collaboration between the two institutions. In 2016 the Program Leader met with NITech administrators and faculty interested in initiating research collaborations with Lehigh faculty and discussed the possibility of Japanese MSc students visiting Lehigh as part of their international experience degree requirement. The continuation of the Iacocca program should help develop these additional goals.

The basis for this internship program comes from an existing contact between Dr. Ikuko Fujiwara (University Research Administrator and Assistant Professor, supporting the enlargement of global research activities at NITech) and Dr. Vavylonis (Physics Professor, Lehigh) who have been research collaborators during postdoctoral studies at Yale University. Dr. Vavylonis has an active 4-year R01 NIH research grant to collaborate with Dr. Naoki Watanabe at Kyoto University and Dr. Akihiro Narita at Nagoya University (in the same city as NITech). Dr. Vavylonis has visited Japan many times, including a visit as a JSPS fellow in the summer of 2015.

Plan and Schedule. Each student from Lehigh University will belong to a different research lab that will be decided depending on the student's background and availability of research advisors. The NITech research office has contacted many groups who have availabilities in the areas of Organic Chemistry, Materials Science

(ceramics, batteries and other), Computer Science (voice recognition, negotiation), Biophysics, Civil Engineering (full scale testing) and Design. Attached is a list of faculty that offered to supervise Lehigh students in 2016.

The proposed program length is 8 weeks (June 1- July 25). Dr. Vavylonis will travel with the students to Japan and stay there for two weeks. The students will be assigned a research project that will be conducted with the direct guidance of graduate students and postdocs of the corresponding research groups, and the supervision of the Principal Investigators. Each internship will involve a training period of 2 weeks, followed by guided research work for 4-5 weeks, followed by 1 week of working on a summary of the work in a final powerpoint presentation. By working in these research groups, the students will obtain an understanding of the Japanese workplace and culture and increase their communication skill with non-native English speakers through the scientific research experience. The NITech research groups will similarly benefit by having graduate students and postdocs obtain experience with advising, mentoring and working with foreign science or engineering students.

Together with NITech personnel, we will organize cultural activities with the group of students throughout the program, with trips to historical sites, such as Kyoto, and a visit to the Toyota plant and museum. The students will be enrolled in Japanese language classes offered by NITech. They will be housed at the NITech International House as in 2016. Japan is known for its safety and for having an excellent health-care system. There are no health or safety issues in the Nagoya area at the time of writing of this proposal.

Outcomes from previous IIP Group Awards

The goals of the program during the first year were largely successful and as described above. This is based on the student feedback, final presentations and evaluations by NITech faculty and staff. Students had a rich cultural experience (visits to sites in Nagoya, Kyoto and Tokyo; lessons in Ikebana and Tea Ceremony, Japanese language, Noh theater, ...). The research experience in Japan will directly help the professional goals of some students, see for example two attached short presentations of a Materials Science and Computer Science major that participated in the program. The Japanese hosts equally enjoyed the program and were proud to have students from the US visiting NITech (the auditorium during the Lehigh student presentations was packed!)

We propose to keep the group number to four students. This is based on: (i) the anticipated availability of ~8 research advisors and ~21 student applicants. These numbers from 2016 allow a good placement of about 4 students. (ii) Four students is a good size to find accommodation at the NITech International House, for the group to travel together by bus or subway in the crowded cities of Japan, and to organize weekend travels.

The participation of the Faculty Leader during the first two weeks was important, to provide help with student arrival, to meet and discuss with the student research advisors during the initial stage of their projects and for the payment of many different fees such as registration, first month rent and utilities. Dr. Fujiwara who has extensive research experience in Japan and in the US (Yale, NIH) will help resolve any research-related issues that may arise during the program. For example, in 2016 we found that a physics major did not have a specific training required for experiments in the hosting NITech organic chemistry lab; however we were able to realign the research objectives through individual meetings between the student, Dr. Fujiwara, and the research advisor and remotely with Dr. Vavylonis.

Some students in the 2016 program relied on participants that had a much better knowledge of Japanese for communication. A bigger effort will be made next year to motivate all students to study Japanese prior to departure and to encourage them to practice communication with locals using google translate and develop their confidence during the first two weeks. Wi-Fi Router rental + personal smartphone worked well to establish communication among the members of the team and with their families in the US.

Student liability insurance will also be included in the budget, given an incident involving unintended damage to a research equipment that occurred during supervise research.