

IIIP GROUP PROGRAM 2019 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 3-July 26, 2019

Duration: 8 weeks

Number of students who will participate as Iacocca Interns: 5 (4 or 6 also possible)

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 to six full-time research internships at Nagoya Institute of Technology (NITech). Each Lehigh student will get personalized training and research experience by participating in a selected research group at NITech that matches his/her 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 Administrators in the Office of Research at NITech and the Program Leader, and (iii) experience during two runs of this program in (Summer 2016, 2017, 2018). 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.

Goals and Objectives

Japan is one of the top countries in Asia for science and engineering 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.

Internship Description and Schedule

Background. 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. The Program Leader is in contact with NITech administrators. NITech faculty visited Lehigh in September 2018 and expressed interest in initiating research collaborations with Lehigh faculty and discussed the possibility of Japanese MSc students visiting Lehigh as part of their new Creative Engineering Program. The continuation of the Iacocca program should help develop these additional goals.

This internship program originated from a 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.

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 will contact faculty who offer to supervise Lehigh students. Attached is the list of faculty that offered to supervise Lehigh students in 2018. In the two previous years of this program we provided internships to Lehigh students majoring in Computer Science (5), Bioengineering (2), Chemistry (2), Civil Engineering (1), Mechanical Engineering (1), Materials Science (1), and Physics (1).

The proposed program length is 8 weeks (June 3- July 26). Dr. Vavylonis will travel with the students to Japan and stay there for the first 10 days. The students will be assigned a research project that will be conducted with the 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 skills 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 and 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 previous years. Students participants in previous years enjoyed meeting other international students at their dorm. 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 two previous years were largely successful (based on the student feedback, final presentations and evaluations by NITech faculty and staff). From the first year of this program we learned to have a better gender balance of participating students and how to monitor student placement in Japanese labs. The program run smoothly in 2017 and 2018 so we propose to follow the same format. Students had a rich cultural experience with visits to sites in Nagoya, Kyoto, Fuji mountain, Nara, Tokyo, lessons in Ikebana, Tea Ceremony and Japanese language, attending Noh theater, and other. The research experience in Japan will directly help the professional goals of some students. One student from the 2016 group has been co-author in a publication (Papon et al. *Physica Status Solidi RRL* 10:749 2017) and there should be more from the 2017 and 2018 groups. The Japanese hosts enjoyed the program and were proud to have students from the US visiting NITech (in all years, the auditorium during the Lehigh student presentations was packed).

The participation of the Faculty Leader during the beginning of the program 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 in cash (registration, first month rent, utilities, etc). 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. She has been very successful mediating issues between students and faculty.