Summer REU and Internship programs, 2019
Annotated List by William Yslas Vélez, January 12, 2019

Information about summer REU programs are available at the NSF website:
http://www.nsf.gov/crssprgm/reu/list_result.cfm?unitid=5044

The AMS website lists internships with industry and national laboratories. There are many opportunities
for holding internships abroad. Mathematics majors should apply for these internships even though many
do not list mathematics as an area of interest. Mathematical training, with a modicum of programming
and science courses, is a great calling card.
http://www.ams.org/programs/students/emp-internships
Notice that there is a summer internship opportunity in Austria, https://phd.pages.ist.ac.at/isternship/

There are also summer programs in biostatistics. The following website provides information on some of
these summer programs.
http://www.nhlbi.nih.gov/research/training/summer-institute-biostatistics-t15

Mathematics majors, who have a background in programming and have taken a little biology or
chemistry, can be quite competitive for programs in biostatistics.

Many mathematics take courses in computer science. Mathematics majors who have a strong background
and interest in computer science should also look into summer REU programs that are funded through
Computer and Information Science and Engineering at NSF. Here is a link.
https://www.nsf.gov/crssprgm/reu/list_result.jsp?unitid=5049

The division of Education and Human Resources funds REU programs that focus on STEM education.
Here is a link to those programs.
https://www.nsf.gov/crssprgm/reu/list_result.jsp?unitid=10021

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Most of the REU programs in mathematics are for students in their junior year who have completed at
least one proof intensive course and at least some upper division course work in algebra, analysis or
linear algebra.

I have read over the descriptions of the proposed activities for the REU sites and commented on programs
that did not have the above-mentioned prerequisites. In particular, I looked for those programs that
students who have not started upper division courses could apply to. Many REU sites do not list the
minimum prerequisites or I may have overlooked some so please look carefully at the REU websites. In
cases where I could not determine prerequisites, I did not refer to them.

Most of the summer REU programs require some computing background, so I will not list it separately as
a requirement. This computing requirement may consist of either programming skills in some language or
facility with some computational package.

Some summer programs that do not appear on the NSF website

1. Brown University, ICERM (https://icerm.brown.edu/summerug/2019/)
2. USC Viterbi (http://gapp.usc.edu/sure)

Assist High School students

1. PROMYS (http://promys.org/counselors). This is a program for gifted high school students and math majors can apply to be counselors to work with these high school students.
2. John Hopkins Center for Talented Youth (http://cty.jhu.edu/jobs/summer/positions/index.html).

For Secondary Mathematics Education Majors

1. Illinois State University (https://about.illinoisstate.edu/reu/pages/default.aspx) Research Experiences for Pre-service and In-service Secondary Mathematics Teachers. The program will recruit eight undergraduate mathematics education majors.

For students interested in research on mathematics education

1. North Dakota State University (http://www.ndsu.edu/cider/reu/). Tracing the roots of undergraduate learning through discipline-based education research.

For Community College students: Of course, CC students can apply to any of the programs listed here. However, I found a program that specifically focuses on community college students.

1. Maricopa Community College (https://math.asu.edu/AM2REU).

For students who have completed two semesters of calculus

1. Arizona State University (https://mtbi.asu.edu/SummerProgram), Mathematical and Theoretical Biology Institute: The site says that students who have completed at least their sophomore year and have completed two semesters of calculus are eligible to apply.
2. Michigan State University (http://www.lymanbriggs.msu.edu/SURIEM/). Students must have completed two semesters of calculus.

For students who have completed two semesters of calculus and linear algebra

1. Grand Valley State University (http://www.gvsu.edu/mathreu/)

For students who have completed three semesters of calculus and linear algebra

For students who have completed three semesters of calculus, differential equations, and linear algebra

1. Kansas State University (https://www.math.ksu.edu/reu/sumar/index.html). The description states that they will accept some students early in their careers. They also state that they are interested in applications from community college students.
2. Texas A&M (http://www.math.tamu.edu/undergraduate/research/REU/) Some projects require statistics. No programming experience is required.

For most of these summer REU programs, students do not receive undergraduate college credit. However, for some students, obtaining such credit can be useful. There are a few programs that offer such credit.

Programs where students earn undergraduate credit for participating.

1. Boise State (http://math.boisestate.edu/reu/). Three units of undergraduate credit are awarded.
2. Oregon State University (http://math.oregonstate.edu/~math_reu/). 12 quarter units of undergraduate credit are awarded.

Statistics

1. American Statistical Association (https://drive.google.com/file/d/0B8hZWQ0xl_CkbTJHMFk5WTVicmc/view). The site does not state prerequisites. I think that a well-prepared sophomore would be competitive.
2. Oregon State University. For applications contact Dr. Javier Rojo (jrojo052@gmail.com)
3. University of North Carolina Wilmington (https://www.uncw.edu/math/reu/) Statistical Data mining and Machine Learning.

Industrial Mathematics

1. Institute for Pure and Applied Mathematics research program in industrial mathematics in Singapore. (http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-2019/)
2. IPAM (http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-2019/)
3. Worcestor Polytechnic University (http://labs.wpi.edu/cims/?utm_source=redirector&utm_medium=cims&utm_campaign=short_url)

Program for students who are deaf or hard-of-hearing.

1. Rochester Institute of Technology (https://people.rit.edu/bcjntm/REU.html). This award supports a summer undergraduate research experience program that is geared toward the needs of deaf and hard-

of-hearing scholars. The site will be based at National Technical Institute for the Deaf (NTID) at Rochester Institute of Technology.

International Opportunities or Programs Open to International Students

Several programs now state that international students may apply, though no funding is available for them since NSF restricts funding to U.S. citizens and permanent residents. International students who have the funds to enroll in summer classes at their undergraduate institutions might instead use those funds to participate in a summer research program. Some of the following programs allow international students to self-fund their participation or have funding available for a limited number for international students.

1. Auburn University (https://cws.auburn.edu/apspi/pm/mathreu). NSF funding is restricted to US citizens and permanent residents. Other self-funded students are welcome to apply. I am not sure if this program will run in 2019.
2. Clemson University (https://www.math.clemson.edu/ccnt/undergraduate/reu/) Funding is restricted to US citizens or permanent residents. In the past we have had international students fund themselves and we will again consider such applications.
3. DIMACS (http://dimacs.rutgers.edu/REU/). A small number of the participants will spend the last two weeks in DIMATIA in Prague.
4. Institute for Pure and Applied Mathematics research program in industrial mathematics in Singapore. (http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-2019/)
5. IPAM (http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-2019/)
6. Arizona State University (https://mtbi.asu.edu/SummerProgram), Mathematical and Theoretical Biology Institute. International students are accepted, but on a *very* limited basis.
7. University of Minnesota, Minneapolis (http://www.math.umn.edu/~reiner/REU/REU.html). Recently we have been able to provide what we consider a decent level of funding for international students.
8. Cold Spring Harbor Laboratory (https://www.cshl.edu/education/undergraduate-research-program/). Of course a background in the biological sciences is required. Students of any nationality are eligible for the program.
9. ICERM at Brown University Brown University, ICERM (https://icerm.brown.edu/summerug/) . Funding is available for a limited number of students who are not US citizens or permanent residents.
10. John Hopkins Center for Talented Youth has programs in other countries. (http://cty.jhu.edu/jobs/summer/sites_dates.html)
11. Williams College (https://math.williams.edu/small/)

Some REU programs in Mathematics and the Biological Sciences

1. Summer Program in Biostatistics & Computational Biology at the Harvard T.H. Chan School of Public Health (https://www.hsph.harvard.edu/biostatistics/diversity/summer-program/about-the-program/)
2. University of North Carolina Greensboro (http://www.uncg.edu/mat/bio-math/REU/)

3. Florida International University (http://research3.fit.edu/reu-biomath/index.php) The research projects are at the intersection of mathematics and biology.
4. Indiana University-Purdue University Indianapolis (http://math.iupui.edu/reu). Students will work with faculty from the mathematics and engineering departments. The topics for 2017 are focused on biological processes.
5. Ohio State University (https://mbi.osu.edu/education/summer-undergraduate-program/).
6. University of Connecticut Health Center (https://health.uconn.edu/quantitative-medicine/biomath/). Data and Models in the Biosciences.
7. University of Wisconsin-La Crosse (https://www.uwlax.edu/mathematics/activities/reu/). Ecological Systems.
8. Cold Spring Harbor Laboratory (https://www.cshl.edu/education/undergraduate-research-program/). Of course a background in the biological sciences is required.
9. Dordt College (https://www.dordt.edu/academics/research-and-scholarship/undergraduate-summer-research/statistical-genetics-and-biostatistics). Statistical Genetics and Biostatistics.
10. University of Pittsburgh, School of Medicine (http://www.tecbioreu.pitt.edu/). Computational Biology
11. National Institute for Mathematical and Biological Synthesis (http://www.nimbios.org/sre/).
12. Biostatistics and Medical Informatics, University of Wisconsin, Madison (https://biostat.wisc.edu/content/summer-research) Biomedical Data Science.

Programs with a focus on under-represented students

Many of the summer research programs indicate that they strongly encourage minority and female students to apply. The following programs specifically target minority students.

1. Committee on Institutional Cooperation (http://www.cic.net/Home/Students/SROP/Home.aspx)
2. MSRI-UP (http://www.msri.org/web/msri/education/for-undergraduates/msri-up)

Almost all REU programs are for students who are undergraduates. I did find some for students who graduate in May 2017.

Programs where graduates can apply

1. Park City Mathematics Institute (https://www.ias.edu/pcmi/uss2019).
2. Institute for Pure and Applied Mathematics research program in industrial mathematics in Singapore. (http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-2019/)
3. IPAM (http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-2019/)

Many of the national labs have internship programs. These internship programs can be for the summer or for a semester. As examples look at the following.

National labs and Government Agencies that may not appear on the AMS website

1. Lincoln Laboratory, MIT (https://www.ll.mit.edu/careers/student-opportunities/summer-research-program)
2. US Department of Energy (http://science.energy.gov/wdts/suli/how-to-apply/)
3. National Institute for Mathematical Biological Synthesis (http://www.nimbios.org/sre/)