

**Summer REU and Internship programs, 2018**  
**Annotated List by William Yslas Vález, January 1, 2018\**

Information about summer REU programs are available at the NSF website:

[http://www.nsf.gov/crssprgm/reu/list\\_result.cfm?unitid=5044](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, is a great calling card.

<http://www.ams.org/programs/students/emp-internships>

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](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](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/2018/>)
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 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 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. CUNY Herbert H. Lehman College (<https://sites.google.com/site/treespaceworkinggroup/reuprogram>). The description says that students need one year of college-level mathematics or computer science is required. The research deals with mathematical biology. I am not sure if this program is running in 2018.
3. Michigan State University (<http://www.lymanbriggs.msu.edu/SURIEM/>). Students must have completed two semesters of calculus.
4. St. Mary's College of Maryland (<https://mbi.osu.edu/education/summer-undergraduateprogram/>). They specifically state that they want students in the early part of their university studies.

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

1. Grand Valley State University (<http://www.gvsu.edu/mathreu/>)
2. University of North Carolina Greensboro (<http://www.uncg.edu/mat/bio-math/REU/>) Some programming skills required. Topics will in mathematical biology.

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

1. Oregon State University (<http://stat.oregonstate.edu/reu>).

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

1. Kansas State University (<http://www.math.ksu.edu/reu/sumar/>). 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 received.

### **Statistics**

1. American Statistical Association (<http://www.stat.colostate.edu/statdepartment/2018%20ASA%20REU%20Flyer.pdf>). The site does not state prerequisites. I think that a well-prepared sophomore would be competitive.
2. Lafayette College (<https://math.lafayette.edu/opportunities/reu/>).
3. Oregon State University (<http://stat.oregonstate.edu/reu>).
4. University of North Carolina Wilmington (<https://www.uncw.edu/math/reu/>) Statistical Data mining and Machine Learning.

### **Industrial Mathematics**

1. NC State University (<https://www.math.ncsu.edu/REU/index.php>). I am not sure if this program will run in 2018.
2. IPAM (<http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-2018/>)

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

1. Rochester Institute of Technology (In late December the website was not active). 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. 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.
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/>). The DIMACS/DIMATIA REU program offers an opportunity for students to interact with representatives from our sister site DIMATIA at Charles University. Five or six students from DIMATIA will spend the summer at DIMACS conducting research. Three to five DIMACS students are selected to spend the final week and a half of the program at DIMATIA at Charles University in Prague, Czech Republic. Students selected to participate in this program generally exhibit strong interests in combinatorics.
4. Institute for Pure and Applied Mathematics research program in industrial mathematics in Hong Kong. (<http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-hong-kong-2018-2/>)
5. IPAM (<http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-2018/>)
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>). The website states that non-citizens will receive a stipend of \$4000, from which room and board expenses for dormitory and meal plan are deducted.
8. Cold Spring Harbor Laboratory (<http://www.cshl.edu/education/urp>). 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
10. (<https://icerm.brown.edu/summerug/2018/>). Funding is available for a limited number of students who are not US citizens or permanent residents.
11. John Hopkins Center for Talented Youth has programs in other countries.
12. ([http://cty.jhu.edu/jobs/summer/sites\\_dates.html](http://cty.jhu.edu/jobs/summer/sites_dates.html))

## Some REU programs in Mathematics and the Biological Sciences

1. Florida International University (<http://research3.fit.edu/reu-biomath/index.php>) The research projects are at the intersection of mathematics and biology. I am not sure if this program will run in 2018.
2. Georgetown University, Department of Biology. Environmental Science and Policy.
3. (<http://biology.georgetown.edu/REU>) Environmental Science and Policy in the nation's Capital.

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/>). I am not sure if this program will run in 2018.
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 (<http://www.cshl.edu/education/urp>). Of course a background in the biological sciences is required.
9. Dordt College (<http://www.dordt.edu/academics/programs/math/statgen/>). Statistical Genetics
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/msri\\_ups/806](http://www.msri.org/msri_ups/806))
3. North Carolina State U, REU+ (<https://math.sciences.ncsu.edu/undergraduate/reu-at-nc-state/research-experience-for-underrepresented-undergraduates-reu/>). I am not sure if this program will run in 2018.

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://pcmi.ias.edu/program-uss/2018>). The topic for summer 2018 will be Harmonic Analysis and the prerequisites are listed as multivariable calculus, linear algebra and introductory real analysis.
2. IPAM (<http://www.ipam.ucla.edu/programs/student-research-programs/research-in-industrial-projects-for-students-rips-2018/>)

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 (<http://www.ll.mit.edu/college/summerprogram.html>)
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/>)
4. Domestic Nuclear Detection Office Summer Internship Program, Homeland Security (<http://orau.gov/dndo/>)