TO: Dr. Rick Miranda, Vice President of Academic Affairs

FROM: Patty George, Professor of Mathematics

DATE: August 5, 2016

SUBJECT: REQUEST FOR SABBATICAL LEAVE

I. REQUEST FOR SABBATICAL LEAVE.

I am applying for a one-year sabbatical leave for the 2017-2018 academic year at 100% compensation. I have been employed full-time at Cerritos College since fall semester 1998, and this is my first sabbatical leave request.

II. PURPOSE OF LEAVE

I propose to research career development opportunities for STEM students at Cerritos College. Internships and summer programs offered by educational institutions as well as those offered by private companies and governmental organizations provide crucial support to career development. These programs provide students with fantastic opportunities to learn about careers in STEM areas. With regard to internship opportunities, Monster.com, a leader in digital recruiting, offers this advice:

> "If you're on the fence about whether or not to pursue an internship during college, the statistics alone should convince you to do one. Employers overwhelmingly point to internship experience as the most important factor they consider in hiring new college graduates for full-time positions, and they have a variety of self-serving reasons for feeling that way."
>
> http://www.monster.com/career-advice/article/students-benefits-internships

Among the many benefits of internships, Monster.com reports the following:
1) interns are able to gain industry knowledge that they wouldn't learn anywhere else; 2) they are able to accumulate evidence of their abilities; 3) interns are able to make critical professional contacts; 4) they improve their confidence; and 5) the intern may possibly land a full-time job. (See Appendix A) In fact, a few Cerritos College alumni have experienced exactly those benefits.

Not long after I read this article on Monster.com, Gerardo Franco, a previous Cerritos College student dropped by my office and said that his internship at Raytheon had led to a full-time job. Furthermore, he explained that Raytheon was now funding his education at UCLA. I later interviewed him to get more information about the benefits of participating in internships. His responses confirmed what I have heard from many interns. The experience is invaluable and life altering. I am looking forward to researching the many career development opportunities available to STEM students at Cerritos College.

The purpose of my sabbatical leave is to explore STEM undergraduate research, career development and internship programs. I plan to focus on, but not limit my research to, programs that recruit mathematics students. The programs will be those at colleges and universities as well as those at governmental agencies and private companies. I will identify and collect information about these programs and share the findings with the Cerritos College community. In addition to this, I also plan to research similar opportunities designed for professional development of STEM faculty.

Specifically, the sabbatical leave is designed to accomplish the following:

A. Compile an annotated guide of STEM undergraduate research, career development and internship programs for students, and describe professional development opportunities for STEM faculty. This guide will be created for the use of students, faculty, counselors and the Cerritos College community, and will be posted on the SEM and STEM web pages. The annotated guide will describe for each program the following:

1) Goals as stated by the program.

2) Personal contact information from mentors involved with the target program.

3) Skills and knowledge expected of STEM undergraduate researchers, interns, faculty or employees.

4) Short-term and long-term benefits of each program as determined by the research.

5) Financial concerns such as stipends, earnings, meals, transportation, accommodations, and other monetary benefits or costs.

6) Support for individuals from underrepresented populations.

7) Information on how to apply including what constitutes a complete application and potential deadlines.

B. Develop a process, in coordination with Cerritos College counselors, for following up student internship experiences. Data from this research will be shared with Cerritos College students, faculty, counselors, and community members. It will be used to create and maintain pipelines for future internships and careers.

C. Increase female participation in internship programs, by introducing female STEM majors to female STEM professionals at conferences, career fairs and in internships. Investigate funding for females and diverse populations to support the attendance or participation in fairs and conferences.

III. SPECIFIC OBJECTIVES

A. Internships and summer research opportunities provide students with valuable experiences. In some cases, interns have the opportunity to work with researchers and employers who are known and respected world-wide. Internships allow students to develop communication skills, and teach students how to work with a variety of types of people – people with STEM backgrounds and those without. These programs allow students to see how the skills and knowledge learned in school are adapted in the workplace to solve real world problems. In addition to this, students participating in career development programs, internships and summer research, attend organizational and informational meetings, and may publish papers related to the research. One of our former Cerritos College students, Josemari Feliciano, participated as an intern in two summer research programs. In the first program at CSU Fresno, he was acknowledged in a scientific paper, "Inverting the Enantioselectivity of a Carbonyl Reductase via Substrate-Enzyme Docking-Guide Point Mutation." In a second internship program at UC Berkeley/Genentech, he was a coauthor of a scientific paper, "A Bifunctional Small Molecule Targeting ACC2 and SOCS3 for the Treatment of Type 2 Diabetes." I am thrilled that one of our Cerritos College students would have had the chance to contribute to this caliber of research. Since leaving Cerritos College, Mr. Feliciano has been taking courses at Harvard University, and has been gracious enough to return to Cerritos College and share his summer research experiences with my Cerritos College mathematics classes.

Research internships at universities may help interns with transfer university placement, but are also valuable with graduate school placement. Interns working with universities, corporate employers or government entities may be able to establish a future career with that organization. Recently, I spoke with a former Cerritos College student, Harsh Shah. Mr. Shah participated in two internships while an undergraduate. In his first internship with the University of Houston, he performed research in nanotechnology. Then Mr. Shah did a second internship with Form Factor, Inc. By doing one internship at a university and another in a private company, he was able to compare work as an academic with work for a private corporation. This led him to accept a job at Intel, where he has been working for the past five years. Harsh Shah claimed that the internships were key in helping him get employment at Intel. He claimed that work experience and GPA were important for gaining employment. The research internships gave him that opportunity to build his work experience, and develop skills that are attractive to employers.

While many employers require job applicants to apply for jobs online, some organizations provide opportunities for job seekers to be hired based on referrals from within the organization. By developing a system of mentorship consisting of Cerritos College alumni – alumni such as Gerardo Franco, Josemari Feliciano, and Harsh Shah – who have worked in organizations that hire STEM professionals, we may be able to increase the numbers of students who pursue internships which establish pathways for future job placement. Mentors, like Mr. Franco, Mr. Feliciano and Mr. Shah, could help build a pipeline to organizations such as Raytheon, Genentech, and Intel.

In order to compile an annotated guide of STEM student internship opportunities, I will visit colleges and universities, as well as government and private employers to establish connections, observe active programs, interview researchers, employers and interns.

The National Science Foundation currently lists 59 different programs associated with Research Experiences for Undergraduates (REU) in the area of mathematics. (See Appendix B) The American Mathematical Society also has an extensive list of summer research programs. (See Appendix C) Some of these programs are listed with both the NSF and the AMS. However, many of the institutions offering summer research programs or career internships from the California State University and University of California systems are not included in those lists, and these programs will be included in the annotated guide created during this sabbatical leave. Private universities and colleges such as USC, Harvey Mudd, Cal Tech, and Stanford University also conduct summer research internships. I intend to visit these schools to interview directors, researchers and student participants. I will observe activities performed by interns, prepare an annotated guide and, when possible, take film clips that can be shared on the Cerritos College SEM and STEM websites. Students from Cerritos College who have participated in these opportunities have gained invaluable experiences. And many of these programs appreciate students who have come from Cerritos College. One year, one of the directors for the program at UC Berkeley contacted me to say that if we had more students like those that we had sent, keep sending them!

Internships with potential future employers also provide outstanding opportunities for Cerritos College students. To better prepare students for STEM careers, I plan on visiting at least ten employers that offer internships. Internship programs are available from employers such as CH2M Hill, the Department of Energy, Edison, Google, Intel, Lockheed-Martin, Microsoft, Raytheon, Saint Jude's Medical Supplies, Texas Instruments, and Zillow. I propose establishing long term contacts with interested companies with the intention of Cerritos College sending at least one intern per year to each cooperating organization. The American Mathematical Society website publishes a list of employers that provide undergraduate internships, and I will also select some of those listed to visit. (See Appendix D) Employers and governmental agencies offer paid and unpaid summer internships. Locally, employers such as Applied Minds, Blizzard Entertainment, Boeing, Edison, Farmers Insurance, Google, Honda, Honeywell, Tri Alpha Energy, Raytheon, Uber, and United Health Group currently hire undergraduate interns with interests in mathematics. (Listings of internships in California: http://www.indeed.com/q-Mathematics-Intern-l-Los-Angeles,-CA-jobs.html) I will contact internship coordinators from organizations such as these, determine the goals and benefits of the program, identify contacts and mentors, interview interns, include and record information related to income or costs associated with the internships. I will also collect information concerning support and mentorship of people who are traditionally underrepresented in areas requiring mathematical sciences.

Careers in STEM often require employees to move out of state or to relocate internationally. Moving away from friends and family can be an intimidating experience –- especially for those students who may have never travelled out of state. Travelling out of state for an internship or for a summer research program enhances not only the life of the student, but enriches the Cerritos College community in general. It is valuable for students to have experiences that take them away from their home territory temporarily. It requires students to get out of their comfort zone, to learn about the similarities and the differences in education, career and cultures. Undergraduates who participate in these career development programs may be able to better understand the role of community college education in the development of the individual as a national and international citizen. A summer internship provides students with a tremendous chance to experiment with travel, to live away from home, and to learn more about workplace culture. Not

only does the travel benefit the student, but it also enriches the lives of the Cerritos College community upon return.

To collect contact information and to learn more about the internship programs available, I also to plan to travel out of state to collect information. I plan to organize at least three regional trips out of state. At this time, I am planning to visit the following regions and organizations.

1) East and Midwest regions
Educational institutions such as the University of Pittsburgh, Carnegie Mellon University, Cornell University, Harvard University, Yale University, MIT, and Vanderbilt University.

Other agencies such as AXA and the Hershey Company.

2) South and Southwestern regions
Educational institutions such as University of Arizona, and Arizona State University, UT Austin, Houston University, Rice University, Texas A and M, and Tulane University

Other agencies such as The National Security Agency, the Federal Reserve Bank of St. Louis, Olson associates, and Sandia Laboratories.

3) Pacific Northwest and Midwest regions
Educational institutions such as the University of Nebraska, Oregon State University, the University of Oregon, the University of Washington, and Seattle University.

Organizations such as Amazon, Boeing, CH2MHill, and Hewlett-Packard.

Many students are unaware or perhaps lack the confidence to apply to internships outside of California. By gaining an indepth understanding of the research experience or internship, and by creating personal contact with directors and participants of these programs, I hope to be able to help Cerritos College increase the level of student participation.

Knowledge and skills required for STEM careers is rapidly expanding. This is one reason that it is essential for mathematics teaching faculty to continue professional development throughout their careers. While visiting these institutions, I will also be collecting information about mathematics faculty professional development. Carnegie Mellon University (Appendix E), MIT (Appendix F), and Stanford University (Appendix G) are some of the institutions that have extensive lists of video or online courses. These courses are free for students who do not request a certificate, but are delivered by some of the most well-known mathematicians and STEM researchers in the world. The schedule for 2017-2018 has not yet been published, but I plan to complete at least three courses, and prepare a review of those courses to be included in the annotated guide. The review will include information about how the course may supplement STEM preparation for Cerritos College students or enhance professional development for Cerritos College faculty. Since the annotated guide will be electronic and posted on the SEM and STEM

websites, it will be possible for other faculty members to contribute to the database.

To further develop my own skills and knowledge in the area of STEM and STEM careers, I plan to explore the programs that offer research for teaching faculty. One program that I would like to attend is the Mathematics in Industry Study Groups.

> Initiated in Oxford in 1968, Study Groups with Industry provide a forum for industrial scientists to work alongside academic mathematicians on problems of direct industrial relevance. They are an internationally recognised method of technology and knowledge transfer between academic mathematicians and industry, usually lasting one week. (http://miis.maths.ox.ac.uk/how/)

Study groups meet for one week to explore problems in industry. These study groups take place all over the world at different times of the year. In addition to this, the Department of Energy Visiting Faculty Program, Fermilab Community College Internship (DOE), Lawrence Livermore Laboratories, NASA Education Associates Program, Oakridge Institute for Science and Education (Orise), and the NSA Mathematical Sciences Program also offer research opportunities for teaching faculty. I will describe these programs in an annotated list to be included on the SEM and STEM websites at Cerritos College.

B. One of the best motivators for encouraging students to apply to these career development programs has been hearing about the experiences of other students. Over the past several years, I have invited students such as Karla Abuyen, Alejandra Carranza, and Josemari Feliciano to speak to my classes and share their summer research experiences. The reception of these speakers has been great, leading more students to look into the possibility of participating in a summer program.

In coordination with counselors at Cerritos College, I hope to continue this practice and expand this by developing workshops in which faculty, counselors, mentors and past student participants can inform the campus community about the research and career development opportunities for STEM students. These workshops will include discussion of the application process, getting letters of recommendation, and financial concerns as well as descriptions of the benefits of the programs.

In order to determine the skills and knowledge expected of applicants for STEM internships and careers, I will be conducting a survey of past interns and then, at each institution I contact, will be surveying researchers, administrators and interns, summarizing these results and adding this to the annotated list of institutions offering internships.

I would like to set up a mentorship program in which Cerritos College students who have participated in internships and summer programs have the opportunity to share their experiences one on one with Cerritos College students. These mentorships should help develop pipelines between Cerritos College and target organizations for future internships and careers. The mentors would be past interns, and possibly current employees, of organizations hiring STEM professionals. A mentor would assist in recruiting Cerritos College students as interns, assist them in gaining summer internships, and advise the students on the workplace culture.

Organizations, such as Microsoft, have an online job application process, but they also have an employee referral process. Having a contact inside such organizations may make it easier for us to place interns and may facilitate job placement for Cerritos College alumni.

C. To increase female participation in internship programs, I plan to introduce female STEM majors to female STEM professionals at conferences and career fairs. I will seek funds to take a group of Cerritos College students, an equal number of male and female, to the California STEM Symposium. I also want to organize a trip to the NACAC National College Fairs STEM conference. Several of the interns I spoke with mentioned that the career fair was how they found their second internships. These were career fairs at the transfer university, and these fairs are often not open to students from other campuses, but some job fairs are open to all and those will be targeted.

IV. PREPARATION

Over the years, I have frequently recommended students apply to Research Experiences for Undergraduates offered by the National Science Foundation. I have shown classes and individuals how to find internships on the NSF sites and I have helped guide them through the application process.

I have also invited STEM students and professionals to my classes to share their experiences. Some of those who have presented are the following:

> Karla Abuyen, participated in a STEM Research Experience for Undergraduates at USC, and was invited to discuss the experience and present the conclusions of her research.
>
> Alejandra Carranza , participated in STEM Summer Programs, and was invited to lead discussions about being a STEM leader, "My Secrets to Success as a STEM Major."
>
> Vanessa Cazares, a Cerritos College STEM student, was invited to class to present her Spring 2015 Scholar's Honor's Math project.
>
> Joseph Fausto, a STEM student, was invited to lead a brief discussion concerning student government, the math club and being a STEM major.
>
> Allison Fujii and Clara Ross-Jones, Counselors for Career Services at Cerritos College, were invited to address STEM specific counseling services.
>
> Jose Feliciano was invited to present "Why Perform Research?"

This past spring semester, as part of the Women's History month, I invited five females in STEM to present their STEM experiences to my learning community course.

I have also created a questionnaire and have begun to interview people who have done STEM internships. At this point, I have interviewed Gerardo Franco (NASA and Raytheon intern), Harsh Shah (Intel intern and now full-time employee with Intel for five years), Jennifer Kersh (CH2M-Hill intern), and Melissa Kersh (Zillow and Arista

Networks). From these few interviews, I have already begun to collect valuable information. For example, every one of them mentioned that one of the most important qualities of the internship was learning to communicate. Being able to talk to engineers, having to work on problems in a group, and being able to present results formally, were agreed to be critical skills that they had not learned in school.

I have begun to identify internship and summer research programs at institutions of higher learning, at governmental and non-governmental agencies. I plan to begin contacting summer internship programs in January of 2017 in order to arrange times to visit the sites of the internships during the sabbatical leave.

I regularly attend professional meetings where I attend talks that focus on mathematics, mathematics education, technology and STEM. I annually attend the California Mathematics Conference in Palm Springs, and attend the CMC^3-South mini-conference and annual conferences. I am a member, current board member and former president of the CMC^3-South. I also attend the CMC^3 Annual Meeting – this is a sister organization of the CMC^3 South. This is where I most recently heard Keith Devlin speak about technology and math education, and why I intend on taking his online course offered by Stanford University Online.

I also annually attend the AMATYC conference where this year, in addition to covering many interesting topics in mathematics, there will be a feature presentation concerning women in STEM, and a presentation concerning mathematical modeling. Both of these should be helpful in preparing me for my sabbatical.

In addition to this, I have begun to research funding for travel grants and registration expenditures for undergraduate students so that they can attend career fairs and professional conferences. The Mathematical Association of American publishes a list of resources for underrepresented groups. (See Appendix H.)

V. PLANNING ITINERARY

August - October 2017

Interview past interns.

Visit internship and summer research locations in the Northeast, Midwest, South and Southwest regions, observing, when possible, internship activities, interviewing researchers, mentors, internship coordinators and interns and establishing contacts for Cerritos College students. I will also determine transportation requirements, lodging and associated costs of the programs.

Identify mathematics students and students with math related majors to attend STEM related conferences and STEM career fairs in Fall 2017 and in Spring 2018. Ideally, the cohort will have an equal number of males and females, and represent the diversity of the Cerritos College campus.

Organize a booth at the Cerritos College STEM Open House to describe summer internship and research programs.

Attend the California STEM symposium.

Attend Fall STEM career fairs with a cohort of Cerritos College students.

Attend the CMC^3-South conference.

November – December 2017

Complete at least one online course and prepare a review of that course.

Visit internship programs that offer internships at times other than summer, observe internship activities, interview researchers, mentors, internship coordinators and interns, and establish contacts for Cerritos College students. Determine transportation requirements, lodging and associated costs and benefits of the programs.

Work with faculty and counselors to identify participants and interns for summer 2018 programs.

Attend the California Mathematics Council conference in Palm Springs.

Attend the AMATYC annual conference in San Diego.

Attend the CMC^3 conference in Monterey.

January - February 2018

Attend the American Mathematical Society Conference in San Diego.

Complete at least one online course and prepare a review of that course.

Visit internship programs that offer internships at times other than summer, observe internship activities, interview researchers, mentors, internship coordinators and interns, and establish contacts for Cerritos College students. Determine transportation requirements, lodging and associated costs and benefits of the programs.

Work with faculty and counselors to identify participants and interns for summer 2018 programs, and assist students in finding programs and completing applications.

Work with counseling to create a presentation concerning summer programs at Parent Night.

Begin to organize data collected for formal presentation.

March - April 2018

Attend the CUE Conference in Palm Springs.

Complete at least one online course and prepare a review of that course.

Visit internship programs that offer internships at times other than summer, observe internship activities, interview researchers, mentors, internship coordinators and interns, and establish contacts for Cerritos College students. Determine transportation requirements, lodging and associated costs and benefits of the programs.

Attend spring STEM career fairs a cohort of Cerritos College students.

Have data organized so that data collected in May can be easily integrated.

May 2018

Visit internship programs in the Pacific Northwest and Midwest, observe internship activities, interview researchers, mentors, internship coordinators and interns, and establish contacts for Cerritos College students. Determine transportation requirements, lodging and associated costs and benefits of the programs.

Prepare the final form of the annotated guide so that it can be placed on the SEM and STEM web pages, and so it can be emailed to all SEM faculty and SEM counselors by the end of fall semester 2018.

VI. SERVICE AND PRACTICAL APPLICATION

At the conclusion of my sabbatical, I will have compiled an annotated guide of STEM career development activities related to summer research programs and internships. The annotated guide will describe the goals of each program and include personal contact information from administrators and mentors associated with the target programs. The guide will detail skills and knowledge expected of STEM undergraduate researchers, interns, faculty or employees, and provide examples of short-term and long-term benefits of each program. Additionally, financial concerns such as stipends, earnings, meals, transportation, accommodations, and other monetary benefits or costs will be shared. Further information regarding support for underrepresented populations will also be included.

An important result of this project will be that it expands the pipelines to future STEM internships, summer programs and careers. Participation in these types of programs may become more feasible to a larger number of students when the community learns that many of these opportunities include the costs of room, board, a travel stipend of about $500 and a stipend for participation of at least $4000. By sharing the benefits of these programs with the Cerritos College community, we can increase student participation.

By sharing the information with the Cerritos College community at events like Parent Night, Transfer Night and the STEM Open House, we may attract more people who are interested in beginning their education at a community college.

Another desired result will be that the number of female mathematics students participating in conferences, career fairs, summer research and internships programs will increase.

This sabbatical will benefit students by providing them with information concerning internship opportunities in mathematics and related areas. The handbook will be placed on the SEM and STEM web pages, and an electronic copy of the handbook will be sent to all STEM faculty and counselor so that they can share this information with the students.

This sabbatical will benefit faculty by providing them with information about student internships, faculty research opportunities, and online courses for professional development. This research will also contribute to the Cerritos College mathematics department by informing faculty about the latest research being conducted, the skills and knowledge expected of transferring students and workplace interns, and important qualities required of the rapidly expanding and changing work environment.

This sabbatical will benefit the Cerritos College community by creating channels of communication between Cerritos College and organizations offering summer research and internship opportunities. Cerritos College students who participate in such programs will be better prepared for transfer. They may gain a better understanding of working in industry and of workplace culture. The experience may help them determine whether graduate school or beginning a career better fits their long-term goals. Cerritos College students who participate will be able to demonstrate evidence of their abilities – important for transfer, graduate school placement and future job placement. Students who participate in these programs will have the ability to make professional contacts that can improve their networking potential. By participating in an internship or summer research program, students will be able to develop greater confidence in their abilities. Ultimately, students participating in these opportunities will be able to contribute to the community intellectually by developing their knowledge base and economically by have qualities that will make them attractive to employers.

VII. REPORT ON SABBATICAL LEAVE

By the end of fall semester 2018, I will have prepared and submitted a report to the sabbatical leave committee verifying that the objectives of the sabbatical leave have been met.

Appendix A

For information from monster.com

From https://www.monster.com/career-advice/article/students-benefits-internships

“Students Describe the Benefits of Internships”

If you're on the fence about whether or not to pursue an internship during college, the statistics alone should convince you to do one. Employers overwhelmingly point to internship experience as the most important factor they consider in hiring new college graduates for full-time positions, and they have a variety of self-serving reasons for feeling that way.

How do you benefit from taking part in an internship? Here's what a few of your fellow students and recent graduates had to say:

Gain Industry Knowledge You Won't Learn Anywhere Else
"Being able to talk with people working in the industry I'm studying to work in is priceless," says Jared Smith, a 24-year-old junior at Shasta College, beginning his second Web development internship for Redding Electric Utility in California. "I was able to spend the day in the control room at the power station, which was amazing for me. I was also able to see the data that is going to be important to me in my career. I learned about things I'll never find in the classroom. Now I can focus on my studies and strive for the knowledge I'll need in tomorrow's workforce."

Accumulate Evidence of Your Abilities
Eugenia Sozzi, a 21-year-old senior at the Catholic University of America, majoring in human resource management, says her recently completed internship at the Federal Energy Regulatory Commission in Washington, DC, "Gave me many opportunities to test and refine my skills." She spent her summer creating, implementing and managing a new internship program for the organization.
As a visionary, she says, "I had to create a program from scratch, setting down its foundations through a mission and vision statement and creating the core aspects of the program accompanied by the supporting details. As a saleswoman, I needed to sell this program to the supervisors and directors who had better things to be doing than supporting this program and even allocating resources to it."
Now, Sozzi says she can demonstrate her leadership talents to future employers, her ability to work well with different types of people and her skills in seeing projects through from start to finish.

Make Critical Professional Contacts
"One of the benefits I took away from my internship was the personal references I can use when [future] employers ask for them," notes 22-year-old Michael Charron, a recent communications graduate of Worcester State College who interned for the Worcester Telegram & Gazette newspaper during his senior year. "That's important, because now I have an actual reference letter from a work-related person rather than a family friend. Plus, I've also been able to do some networking and get prospective leads on other workplaces that might be hiring."

Your Confidence Will Improve

Michelle Jost is a 22-year-old senior at the University of Wisconsin at Madison who will graduate in December 2001 with a degree in conservation. She's interned as an animal educator at the New England Aquarium in Boston, as an assistant for Natural Health magazine in Boston and as an attractions hostess at Walt Disney World's Animal Kingdom in Orlando, Florida.
"How have my internships benefited me?" says Jost. "I'm in the process of finding a job right now, and my resume rocks! I'm not concerned about finding a great position in the field I want. I'm going as a Disney-trained, internationally published educational presenter who has the New England Aquarium as my main reference. So I have the confidence of someone who's been in my field for several years, and I have the names, references and organizations to back me up."

Possibly Land a Full-Time Job

Forty-seven-year-old Wendy Stubbs is now a career development specialist at the University of South Dakota, thanks in great part to the internship she completed at the USD Career Development Center last year as a graduate student. Meanwhile, 24-year-old September McIntyre, who just finished her master's degree in public relations at the University of North Texas, landed her new job as a public relations specialist for BSMG Worldwide in Dallas following a six-month internship with the company.
Research shows that 85 percent of companies use internships and similar experiential education programs to recruit for their full-time workforces.

Appendix B

National Science Foundation – Research Experiences for Undergraduates
Focus on Mathematical Sciences

From https://www.nsf.gov/crssprgm/reu

Site Name	Site URL	City	State	Research Topics/Keywords
An Undergraduate Research Program in Combinatorics and Number Theory	http://www.d.umn.edu/~jgallian/REU.html	Duluth	Minnesota	Combinatorics, Number Theory
Applied ResearCH In ModEling and Data-Enabled Science (ARCHIMEDES) Program	http://appliedmath.ucmerced.edu/summer-research	Merced	California	Mathematical Sciences (Modeling and Data-Enabled Sciences)
California State University, Fresno Research Experiences in Mathematics	http://www.fresnostate.edu/csm/math/summer-programs/reu/index.html	Fresno	California	Mathematics, statistics. Subfields: complex analysis and zeros of analytic functions, combinatorial knot theory, combinatorics and discrete geometry, survival analysis and statistical modeling.
Differential/ Difference Equation Models and Number Theory	http://www.utc.edu/Academic/Mathematics/reumath/	Chattanooga	Tennessee	Differential equation and difference equation models and distributions in number theory
Emerging Scholars Research Experience for Undergradua	http://faculty.smcm.edu/sganzell/reu/	St. Mary's City	Maryland	Mathematics: Image Analysis, Epidemiological Modeling, Knot Theory, Discrete Geometry, Graph

tes				Theory.
Fairfield REU in Mathematics and Computational Science	http://www.fairfield.edu/reu	Fairfield	Connecticut	Algebraic Number Theory, Group Theory, Analysis of Wind-Driven Ocean Gyres, Dynamical Systems, Hyperbolic Geometry, Low-dimensional Topology, Combinatorial Quantum Group Theory, Control Theory
Interdisciplinary Research in Mathematics, Computing, and Biology	https://sites.google.com/site/treespaceworkinggroup/reu-program	Bronx	New York	Mathematics (Discrete Math, Graph Theory, Combinatorics, Prob, Stat, and Metric Geometry). Biology (Phylogenetics and Evolution).
Inverse Problems	http://www.math.washington.edu/~reu/	Seattle	Washington	Inverse Problems, Network Theory
Investigations in Geometry and Knot Theory	http://www.math.csusb.edu/reu	San Bernardino	California	differential geometry, knot theory
IUPUI REU Program in mathematics with applications to medical sciences, biophysics, and inverse problems	http://math.iupui.edu/reu	Bloomington	Indiana	Applied Mathematics, Medicine, Physics, and Inverse Problems.
Mathematical and Theoretical Biology Institute	http://mtbi.asu.edu/	Tempe	Arizona	applied mathematics, mathematical biology
Mathematics Research Experience for Pre-service and for In-service	http://www.math.ilstu.edu/reu		Illinois	Discrete Mathematics

Mathematics Research Experience for Undergraduates	http://people.clarkson.edu/~tino/reu.html		New York	Algebraic Graph Theory, Spatial Graph Theory, Analysis, Algebra
National Research Experiences for Undergraduates Program	http://www.maa.org/programs/faculty-and-departments/underrepresented-groups/nreup	Washington	District Of Columbia	Multiple (varies by campus)
NSF-REU in Extremal Graph Theory and Dynamical Systems at RIT	http://people.rit.edu/~dansma/index_files/NSFREU.htm	Rochester	New York	Graph Theory, Dynamical Systems
Partial Differential Equations and Dynamical Systems	http://my.fit.edu/~abdulla/reu/	Melbourne	Florida	Nonlinear Partial Differential Equations, Inverse Free BoundaryProblems and Optimal Control, Dynamical Systems and Chaos Theory
Research Experience for Undergraduates in Mathematics at Missouri State University	http://math.missouristate.edu/reu	Springfield	Missouri	algebra, analysis, combinatorics, and dynamical systems
Research Experiences for Undergraduates: Mathematical Research at Lafayette College	http://math.lafayette.edu/opportunities/reu/	Easton	Pennsylvania	Mathematics, applied mathematics, and statistics.
Research Experiences for Undergraduates in	http://faculty.csuci.edu/cynthia.wyels/REU/index.html	Camarillo	California	analysis, linear algebra, applied math, algebra, combinatorics

Mathematics at CSU Channel				
Research Experiences in Mathematics for Undergraduates and Teachers	http://www.csuchico.edu/math/REUT.shtml	Chico	California	knot theory, modeling, number theory, algebra, and statistics
Research for Undergraduates Summer Institute of Statistics (RUSIS at Reno)	http://www.unr.edu/math/people/javier-rojo	Reno	Nevada	Main fields: Probability and Statistics. Subfields: Dimension reduction (big data), Random matrices, Survival analysis with high dimensional data, extreme value theory.
REU: Educating for the grand challenges at the intersection of biocomplexity and high-performance computing	muii.missouri.edu/reu_bigdata	Columbia	Missouri	Computational biology, high-performance computing, parallel computing, bioinformatics, genomics, evolutionary biology
REU Site: A Distributed REU in the Mathematical Biosciences	http://mbi.osu.edu/education/summer-undergraduate-program/	Columbus	Ohio	Mathematical biology
REU Site: Applied Math Research Experience -- Theory, Applications, and Numerics		Houston	Texas	Applied Mathematics, Partial Differential Equations
REU Site: Arithmetic Geometry and Number Theory at	http://www.mathcs.emory.edu/~ono/REUs/	Atlanta	Georgia	Arithmetic Geometry and Number Theory

Emory University				
REU Site: Complexity Across Disciplines	http://diamond.boisestate.edu/reu/	Boise	Idaho	Mathematics, Biology, Computer Science, Combinatorics, Group Theory, Game Theory, Complexity, Cryptography, Computability Theory, Genomics, Genetics.
REU Site: Diverse Undergraduate Research Experiences in Statistics	http://magazine.amstat.org/blog/2016/04/01/asareu16/	Alexandria	Virginia	Statistics
REU Site: Environmental science and policy in the nationís capital	http://biology.georgetown.edu/REU	Washington	District Of Columbia	biology, biosciences, environmental science, public policy, ecology, population biology, mathematical modeling, climate change, geoscience
REU Site: Interdisciplinary Program in High Performance Computing	http://hpcreu.umbc.edu/	Baltimore	Maryland	Mathematics and Statistics; Scientific and Parallel Computing.
REU Site: Interdisciplinary Scientific Computation at Ohio Wesleyan University	http://reu.owu.edu	Delaware	Ohio	Astronomy, Computer Science, Mathematics/Statistics/Neuroscience and Physics
REU Site: Iowa State University Mathematics REU	http://orion.math.iastate.edu/reu/	Ames	Iowa	matrix theory, graph theory and combinatorics, numerical analysis, probability, and applications of mathematics to engineering and sciences
REU Site: Mathematica	http://www.uncg.edu/mat/bio-math/REU/	Greensboro	North Carolin	Mathematics, mathematical biology

l Biology at the University of North Carolina at Greensboro			a	
REU Site: Mathematics, Applied Mathematics, and Statistics Research Experience for Undergraduate: MAPS-REU	http://www-math.umd.edu/maps-reu.html	College Park	Maryland	Mathematics (Algebra/Number Theory, Applied Harmonic Analysis, Chaotic Dynamics, Geometry, Mathematical Biology, Probability and Random Processes, Quantum Dynamics); Statistics
REU Site: Mathematics Research for Undergraduates at James Madison University	http://educ.jmu.edu/~vanwykla/reu/	Harrisonburg	Virginia	Statistics, applied and pure mathematics
REU Site: Modeling and Industrial Applied Mathematics	http://www.math.ncsu.edu/REU/index.php	Raleigh	North Carolina	Modeling, Industrial Applied Mathematics
REU Site: Modeling and Simulation in Systems Biology	http://cqm.uchc.edu/biomath/	Farmington	Connecticut	Mathematics, Mathematical Biology.
REU Site: MSRI Undergraduate Program (MSRI-UP REU)	http://www.msri.org/up	Berkeley	California	Mathematics is the main field. Combinatorics, geometry, and computational algebra are the subfields.
REU Site: Purdue Research in Mathematics	http://www.math.purdue.edu/people/bio/egoins/PRiME.html	West Lafayette	Indiana	Algebraic Geometry, Probability, Number Theory.

Experience (PRIME)				
REU Site: Research at the Intersection of Biology and Mathematics	http://research.fit.edu/reu-biomath/	Melbourne	Florida	Ecology, Evolution, Cell and Molecular Biology, Data Mining, Applied Statistics, Stochastic Processes, Biomathematics, Mathematical modeling, Developmental Biology
REU Site: Research Challenges of Identifying Integer Sequences Using the OEIS		Allentown	Pennsylvania	Number Theory, Combinatorics, and Graph Theory
REU Site: Research Experience for Undergraduates in Algebra and Discrete Mathematics at Auburn University	http://www.dms.auburn.edu/~jendaov/2016reu.htm	Auburn University	Alabama	Algebra and Discrete Mathematics (graphs and hypergraphs, number theory, information and coding theory)
REU Site: Research Experiences for Undergraduates in Mathematics at Indiana University	http://www.math.indiana.edu/reu/	Bloomington	Indiana	Geometry (differential, coarse, Euclidean), dynamical systems (ODE, complex analytic, billiards), topology, logic, analysis, combinatorics, group theory, mathematical biology.
REU Site: REU in Discrete and Applied Mathematics	http://www.lymanbriggs.msu.edu/SURIEM	East Lansing	Michigan	discrete mathematics; probability and statistics; mathematical modeling.
REU Site:	http://www.sci.sdsu.edu/math-	San	Californ	Mathematics, and

San Diego State University Mathematics Research Experience for Undergraduates	reu/index.html	Diego	ia	closely related fields.
REU Site: Seattle University Mathematics Early Research (SUMmER)	http://www.seattleu.edu/scieng/math/reu/	Seattle	Washington	Combinatorics, Knot Theory, Geometry
REU Site: Undergraduate Research in the Mathematical Sciences and Their Applications	http://www.math.tamu.edu/REU/	College Station	Texas	1st Program involves math bio with emphasis on applications to complex ecosystems, infectious and other diseases. 2nd: theory and application of wavelets. 3rd: comp algebra and algebraic geometry.
REU Site: University of Wisconsin-La Crosse REU in Mathematical Ecology	http://www.uwlax.edu/Mathematics/Summer-2016-REU/	La Crosse	Wisconsin	Mathematical and Theoretical Ecology
REU Site: Wake/Davidson Experience in Number Theory Research	http://college.wfu.edu/mathreu/	Winston-Salem	North Carolina	Number theory; elementary number theory, elliptic curves, quadratic forms, modular forms, and algebraic number theory.
REU Site: Willamette Mathematics Consortium Research Experiences for Undergraduates	http://reu-ret.hosted.willamette.edu	Salem	Oregon	Ring and matrix algebra, statistics and random processes, graph theory and combinatorics

REU Site at University of Washington Bothell	http://www.bothell.washington.edu/stem/engineering-math/reu	Seattle	Washington	Mathematics (both pure and applied topics)
REU Site at UT Tyler	http://www.uttyler.edu/math/reu.php	Tyler	Texas	combinatorics on words, network reliability, and chemical graph theory
REU Site Team Research in Computational and Applied Mathematics	http://www.mrsec.harvard.edu/education/reu.php	Cambridge	Massachusetts	Applied Math and Applied Computation
The University of Chicago Mathematics REU	http://math.uchicago.edu/~may/REU2016/	Chicago	Illinois	Geometry, topology, number theory, discrete mathematics, probability, analysis, logic, etc. Participants write papers on topics they choose themselves, with guidance from mentors.
The Williams College SMALL REU Program	http://math.williams.edu/small/	Williamstown	Massachusetts	Mathematics and statistics; algebra, analysis, ergodic theory, geometry, knot theory, mathematical biology, mathematical physics, number theory, probability, statistics, topology
UCSB Mathematics Summer Research Program for Undergraduates	http://www.math.ucsb.edu/REU	Santa Barbara	California	Mathematics
Undergraduate Research in	http://www.math.oregonstate.edu/~math_reu/index.html		Oregon	Mathematics and Theoretical Computer Science,

Mathematics and Theoretical Computer Science				including Number Theory, Probability, and Algorithms
Univ. of Minnesota School of Mathematics Summer REU in Combinatorics	http://www.math.umn.edu/~reiner/REU/REU.html	Minneapolis	Minnesota	Combinatorics
Valparaiso Experience in Research by Undergraduate Mathematicians	www.valpo.edu/mathematics-statistics/academics/verum-summer-research-program/	Valparaiso	Indiana	Mathematics, including combinatorics, biomathematics, and statistics
Winthrop University-REU: Bridging Applied and Theoretical Mathematics	http://www.birdnest.org/wureu	Rock Hill	South Carolina	algebraic geometry, differential equations, phylogenetics, and cancer biology

Appendix C
American Mathematics Society –
Research Experience for Undergraduates Summer Programs

From http://www.ams.org/programs/students/emp-reu

Arizona State University	Research Opportunities for Undergraduates
Auburn University	REU Program in Algebra and Discrete Mathematics
Boise State University	Complexity Across Disciplines (CAD)
Boston University	PROMYS program at Boston University (for Counselors)
Brown University	RTG: Integrating Dynamics and Stochastics
California State University, Channel Islands	REU in Analysis, Applied Mathematics, and Graph Theory, in partnership with U. Hidalgo (Mexico)
California State University, Chico	Research Experiences in Mathematics for Undergraduates and Teachers
California State University, Fresno	REU in Mathematics (Zeros of Analytic Functions and Time Series and Bayesian Analysis)
California State University, San Bernadino	Investigations in Geometry and Knot Theory
Carleton College and St. Olaf College	Summer Mathematics Program for Women Undergraduates
Clarkson University	Joint venture in REU with SUNY Potsdam
Clemson University	REU in Computational Number Theory and Combinatorics
Committee on Institutional Cooperation	Summer Research Opportunities Program
Cornell University	Summer Program for Undergraduate Research (SPUR) summer 2016: Analysis on fractals, Topological methods in discrete geometry, and Nonlinear heat equations
DIMACS	Research Experience for Undergraduates at DIMACS
Dordt College	Undergraduate Research in Statistical Genetics and Biostatistics
Emory University	Summer institute for training in Biostatistics (SIBS)
Emory University	Arithmetic Geometry and Number Theory at Emory University
EDGE - Enhancing Diversity in Graduate Education	Summer Program for Women in Graduate School
Fairfield University	REU Program in Mathematics and Computer Science
Florida Institute of Technology	REU Program in Partial Differential Equations and Dynamical Systems
Florida Institute of Technology	Research at the Intersection of Biology and Mathematics
George Washington University	Summer Program for Women in Mathematics
Grand Valley State University	REU in Wavelets, Hausdorff Metric Geometry, and other topics
Harvard University	Summer Program in Biostatistics & Computational Biology
Harvard University MRSEC	REU Site Team Research in Computational and Applied Mathematics
Homeland Security	STEM Summer Internship Program
Hope College	REU in Algebra, Probability, Statistics, Statistical Genetics,

	and Analysis
Illinois State University	Mathematics Research Experience for Pre-service and for In-service
Institute for Computational and Experimental Research in Mathematics (ICERM)	Brown University undergraduate research in Dynamics and Stochastics
Illinois Institute of Technology	REU Program in Computational Mathematics
Indiana University	Research Experience for Undergraduates
Indiana University-Purdue University	IUPUI REU Program in mathematics with applications to medical sciences, biophysics, and inverse problems
Institute for Pure And Applied Mathematics (IPAM)	Research in Industrial Projects for Students (RIPS) at UCLA
Iowa State University	REU in Mathematical Biology, Discrete Mathematics, and Dynamical Systems
Kansas State University	Summer Undergraduate Mathematics Research at K-State
Lafayette University	Research Experiences for Undergraduates: Mathematical Research at Lafayette College
Louisiana State University	CCT REU: Interdisciplinary Research Experience in Computational Sciences
Louisiana State University, Baton Rouge	REU in Dessins (2-dimensional ribbon/fat graphs), Braids and Knot Theory and Ihara Zeta Functions of Graphs
Louisiana State University, Louisiana Tech University, and Southern University at Baton Rouge	CIMM REU (Consortium for Innovation in Manufacturing and Materials)
Lyman Briggs College	REU in Discrete and Applied Mathematics
Marshall University	2016 REU in Combinatorics
Mathematical Biosciences Institute	2016 Undergraduate Research Program (REU Program)
Mathematical Sciences Research Institute	Undergraduate Program in Berkely, CA
Miami University (Oxford, Ohio)	The Summer Undergraduate Mathematical Sciences Research Institute
Michigan State University	Summer REU in Experimental Mathematics
Missouri State University	REU in Algebra, Combinatorics, Numerical Analysis, and Differential Equations
Mount Holyoke College	The Summer Mathematics Research Institute
National Institute for Mathematical and Biological Synthesis	REU at the Interface of Mathematics and Biology
National Institute for Standards and Technology (Boulder, CO)	Summer Undergraduate Research Fellowship (SURF) Program for Undergraduates in science, technology, mathematics, and engineering
National Security Agency	The Director's Summer Program
North Carolina State University	REU In Modeling and Industrial Mathematics
North Dakota State University	Growing up STEM Program
Ohio Wesleyan University	Interdisciplinary Scientific Computation in Astronomy, Computer Science, Mathematics, Statistics, and Physics

Oregon State University	Ecosystem Informatics Summer Institute
Oregon State University	REU in Analysis of Algorithms, Geometry, Population Dynamics, and Topology
Pacific Undergraduate Research Experience in Mathematics (PURE Math)	REU at the University of Hawaii-Hilo
Princeton University and the Institute for Advanced Study	Summer Program for Women in Mathematics
Purdue University	Purdue Research in Mathematics Experience (PRIME)
Rutgers University	DIMACS REU
Sam Houston State University	Research Experience for Undergraduates in Mathematics Program
San Diego State University	Undergraduate Research Experience
Sante Fe Institute	Edward A. Knapp Undergraduate Fellows
Seattle University	SUMmER program (Seattle University Mathematics Early Research program)
St Mary's College of Maryland	Emerging Scholars Research Experience for Undergraduates
SUNY Potsdam	Joint venture in REU with Clarkson University
Texas A&M University	REU with three focus choices
UCLA - Logic Center	Undergraduate summer school in mathematical logic
University at Buffalo, SUNY	Summer Undergraduate Research Experience (SURE) in Biomedical Sciences
University of California, Merced	Applied Mathematics Summer Undergraduate Research Program
University of California, Santa Barbara	UCSB Mathematics Summer Research Program for Undergraduates
University of Chicago	Mathematics REU 2016
University of Connecticut	Research Experience in Cyber and Civil Infrastructure Security for Students with ADHD: Fostering Innovation
University of Maryland	MAPS REU
University of Maryland, Baltimore County (UMBC)	Interdisciplinary Program in High Performance Computing
University of Michigan	REU in Mathematics
University of Michigan, Department of Biostatistics	Summer Institute on Big Data, Human Health and Statistics
University of Michigan, School of Public Health	Transforming Analytical Learning in the Era of Big Data (Big Data Summer Institute)
University of Minnesota – Duluth	Summer Program of Undergraduate Research in Discrete Mathematics, Combinatorics, and Graph Theory
University of Minnesota - Twin Cities	Summer REU in Combinatorics
University of Missouri	Educating for the grand challenges at the intersection of biocomplexity and high-performance computing
University of Nebraska, Lincoln	REU in Applied Mathematics
University of North Carolina, Greensboro	Mathematical Biology at the University of North Carolina at Greensboro
University of Southern	SURE program at the Viterbi School of Engineering

California	
University of Texas at Tyler	Research Opportunities for Undergraduates
University of Utah	Research Opportunities in Materials Science & Engineering
University of Washington	REU in Inverse Problems
University of West Georgia	Summer 2016 REU in Combinatorics, Number Theory, and Graph Theory
University of Wisconsin - La Crosse	University of Wisconsin-La Crosse REU in Mathematical Ecology
University of Wisconsin – Stout	The LAKES (Linking Applied Knowledge in Environmental Sustainability) REU
University of Wyoming	Rocky Mountain Mathematical Career and Research Experiences
Valparaiso University	VERUM (Projects in Applied Math, Statistics, Combinatorics)
Vanderbilt Summer Science Academy	Summer Cancer Research Fellowship Program
Wake Forest University	Wake/Davidson Experience in Number Theory Research
Washington State University	ISP Summer Undergraduate Research Experience (SURE)
Washington University in St. Louis	CSE Research Experiences for Undergraduates
Wayne State University	Cancer Biology Program
Willamette University	Willamette Mathematics Consortium REU
Williams College	SMALL Undergraduate Research Project
Winthrop University	REU: Bridging Applied and Theoretical Mathematics

Appendix D
American Mathematical Society – Internships and Co-Op Opportunities for Undergraduates

From http://www.ams.org/programs/students/emp-internships).

- Abbott Laboratories
- Aerospace Corporation
- America Online
- Apple Computers Internships
- Applied Materials
- Arizona Space Grant
- AT&T
- Boeing Internships
- Dell Computer Corporation
- EMC Corporation (data storage)
- IBM, Co-Op/Intern Program Overview
- Intel Internship & Co-op Programs
- Lawrence Berkeley National Laboratory, Computing Sciences
- Media Bright
- Lawrence Livermore National Laboratory
- NASA Undergraduate Student Research Program
- National Institute for Standards and Technology (NIST) Summer Undergraduate Research Fellowships
- National Renewable Energy Laboratory's Education Partnerships
- Oak Ridge National Laboratory, US Department of Energy, Higher Education Research Undergraduate Laboratory Fellowships
- Texas Instruments
- US Department of Energy
- Pacific Northwest National Laboratory Internships
- Sandia National Laboratory also try Recruiting & University Partnerships
- SAP Labs
- Scripps Research Institute Undergraduate Summer Research Internship Program
- Stanford Linear Accelerator Center, Undergraduate Programs
- Wolfram Research (the makers of Mathematica), Summer Intern Program
- Xerox (PARC), Palo Alto

Appendix E
Courses offered by the Carnegie Mellon Open Learning Initiative

From http://oli.cmu.edu/learn-with-oli/see-our-free-open-courses

- AMERICAN ENGLISH SPEECH
- ARABIC FOR GLOBAL EXCHANGE
- ANATOMY & PHYSIOLOGY
- ARGUMENT DIAGRAMMING
- BIOCHEMISTRY
- ELEMENTARY FRENCH I
- ELEMENTARY FRENCH II
- ENGINEERING STATICS
- ELEMENTARY SPANISH I
- ELEMENTARY CHINESE 1
- EVIDENCE-BASED PRACTICE IN MANAGEMENT AND CONSULTING
- HEALTH INFORMATION TECHNOLOGY FOUNDATIONS
- INTRODUCTION TO BIOLOGY
- INTRODUCTION TO CHEMISTRY
- INTRODUCTION TO PSYCHOLOGY
- INTRODUCTION TO VISUAL DESIGN
- LOGIC & PROOFS
- MEDIA PROGRAMMING
- MODERN BIOLOGY
- NSC STEM PATHWAYS
- PRINCIPLES OF COMPUTING WITH PYTHON
- PROBABILITY & STATISTICS
- PUBLIC POLICY ANALYSIS FOR ENGINEERS
- RESPONSIBLE COMPUTING
- STATISTICAL REASONING
- STEM FOUNDATIONS
- STEM READINESS

Appendix F
MIT Open Courseware

From https://ocw.mit.edu/courses/audio-video-courses/#mathematics

Course #	Course Title	Level
18.01SC	Single Variable Calculus (Fall 2010)	Undergraduate
18.01	Single Variable Calculus (Fall 2006)	Undergraduate
18.02SC	Multivariable Calculus (Fall 2010)	Undergraduate
18.02	Multivariable Calculus (Fall 2007)	Undergraduate
18.03SC	Differential Equations (Fall 2011)	Undergraduate
18.03	Differential Equations (Spring 2010)	Undergraduate
18.05	Introduction to Probability and Statistics	Undergraduate
18.06SC	Linear Algebra (Fall 2011)	Undergraduate
18.06	Linear Algebra (Spring 2010)	Undergraduate
18.062J	Mathematics for Computer Science (Fall 2010)	Undergraduate
18.062J	Mathematics for Computer Science (Spring 2015)	Undergraduate
18.361J	Introduction to Modeling and Simulation	Undergraduate
18.410J	Design and Analysis of Algorithms	Undergraduate
18.410J	Introduction to Algorithms (SMA 5503)	Undergraduate
18.821	Project Laboratory in Mathematics	Undergraduate
18.S096	Topics in Mathematics with Applications in Finance	Undergraduate
18.S997	Introduction To MATLAB Programming	Undergraduate
Supplemental	Highlights of Calculus	Undergraduate
Supplemental	Calculus Revisited: Single Variable Calculus	Undergraduate
Supplemental	Calculus Revisited: Multivariable Calculus	Undergraduate
Supplemental	Calculus Revisited: Complex Variables, Differential Equations, and Linear Algebra	Undergraduate
Supplemental	Learn Differential Equations: Up Close with Gilbert Strang and Cleve Moler	Undergraduate
18.085	Computational Science and Engineering I	Graduate
18.086	Mathematical Methods for Engineers II	Graduate
18.094J	Teaching College-Level Science and Engineering	Graduate

Appendix G
Stanford University Open University

From http://online.stanford.edu/courses

Introduction to Mathematical Thinking from Keith Devlin
Cryptography I from Dan Boneh
How to Learn Math for Teachers from Jo Boaler
Introduction to Haptics (self-paced) by Allison Okamura
Computer Science 101 (self-paced) by Nick Parlante
Language, Proof and Logic (self-paced) by Dave Barker Plummer and John Etchemendy

Appendix H
Resources for Minority Faculty and Students

From http://www.maa.org/programs/underrepresented-groups/resources-minority-faculty-students

Resources for Minority Faculty and Students

The following list provides resources for minorities in mathematics - great for both the students and for the professors who advise them. This includes organizations, programs, events, and funding opportunities, which support the success of members of minority groups in the mathematical sciences. The word "minority" refers to members of those groups underrepresented in the mathematical sciences, including African-Americans, Hispanics, American Indians, Alaska Natives, and Pacific Islanders.

Organizations
- Enhancing Diversity in Graduate Education (EDGE)
- Hispanic Association of Colleges and Universities
- International Association of Black Actuaries (IABA)
- Math Alliance
- Mathematical Sciences Institutes Diversity Committee
- National Association of Mathematicians
- National Center for Faculty Development & Diversity
- Pacific Math Alliance
- Richard Tapia Center for Excellence & Equity
- SACNAS
- The Leadership Alliance
- American Indian Science and Engineering Society
- Center for Minorities and People with Disabilities in Information Technology
- The Benjamin Banneker Association, Inc
- CODE2040
- Institute for Broadening Participation (IBP)

Summer Programs
- The Biostatistics Enrichment Summer Training Diversity Program (BEST)
- EDGE summer session
- Mathematical and Theoretical Biology Institute (MTBI)
- Mathematics & Science for Minority Students (MS)2 program
- MIT Summer Research Program
- The MSRI Undergraduate Program (MSRI-UP)
- The Pacific Undergraduate Research Experience in Mathematics (PURE Math)
- The Research for Undergraduates Summer Institute of Statistics (RUSIS@UNR)
- Summer Undergraduate Mathematical Science Research Institute (SUMSRI)
- CSU Channel Islands REU (UAEH and AB540 friendly)
- The Summer Program to Increase Diversity in Undergraduate Research
- The Leadership Alliance (Several REU's for minorities, one application)
- Sampling Advanced Mathematics for Minority Students
- XSEDE Scholars Program

Conferences

- ACM Richard Tapia Celebration of Diversity in Computing
- Annual SACNAS National Conference
- Conference for African-American Researchers in the Mathematical Sciences (CAARMS)
- Center of Excellence in STEM Education, list of conferences
- Field of Dreams
- Gordon Research Conferences (Funding information
- Math Alliance events
- Underrepresented Students in Topology and Algebra Research Symposium (USTARS)
- Berkeley Edge Conference

Scholarships/Fellowships

- Alfred P. Sloan Foundation Graduate Scholarships Programs
- Developmental Fund for Black Students in Science and Technology Scholarship
- Ford Foundation Diversity Fellowships
- Hispanic College Fund
- McNair Scholars
- Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring (PAESMEM)
- The Sloan Foundation
- The Woodrow Wilson Rockefeller Brothers Fund Fellowships for Aspiring Teachers of Color
- President's Postdoctoral Fellowship Program
- The Marjorie Lee Browne Scholars Program
- ExxonMobil LOFT Fellowship

Mentoring

- e-Mentoring Network in the MathematicalSciences
- Math Alliance Mentors

- Programs and Others
- The Actuarial Science Academy Program of West Chester University
- Center of Excellence in STEM Education at the University of Texas-Pan American (UTPA)
- The Hispanic Outlook in Higher Education Magazine
- Increasing Diversity in the Mathematics Profession
- Minority Postdoc
- National Research Experience for Undergraduates Program (NREUP)
- Pathways - mathematics outreach program based in the Department of Mathematics at Harvey Mudd College
- PCMI Workshop for Mentors of Undergraduate Mathematics Research by Minority Student
- SFSU-Colombia combinatorics initiative
- Strengthening Underrepresented Minority Mathematics Achievement (SUMMA)
- SACNAS Leadership Institute
- Careers in Mathematical Sciences: Workshop for Underrepresented Groups
- Minorities in Energy

Helpful Literature

- *Calculus and Community: A History of the Emerging Scholars Program*
- Readings about Diversity and Inclusion
- Reducing Stereotype Threat
- Report Recommends Educational Policy Adjustments to Aid Minority Males
- *What We Have Learned from 30 years of the Emerging Scholars Program*
- *Whistling Vivaldi and Other Clues to How Stereotypes Affect Us*

This list was compiled and is periodically updated by Pamela E. Harris, Alicia Prieto Langarica and Marco V. Martinez. Any suggestions, additions or comments are welcome at minoritiesinmath@maa.org.