

Challenging Summer Mathematics Programs For High School Students

Summer, 2009

Teachers and Counselors: Please help with distribution of this document to talented mathematics students and their parents.

Quick links to all programs and future versions of this booklet can be found on the AMS web site at www.ams.org/employment/mathcamps.html

Please note: It is suggested that students submit their applications **well in advance of the application deadlines.**

All Girls/All Math

University of Nebraska, Lincoln, NE

Contact: *Professor Gwendolen Hines, Director*

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UNL Center for Science, Math and Computer Education
203 Avery Hall
Lincoln, NE 68588-0130*

e-mail: *agam@math.unl.edu*

web address: *<http://www.math.unl.edu/pi/outreach/agam>*

The main activity of the All Girls/All Math program at the University of Nebraska is a week long summer camp for talented high school girls from across the country. Campers will attend a class in Codes three hours every morning. In this class, students will learn basic number theory and applications to cryptography. In the afternoon, students will attend mini-courses in such areas as Bioinformatics, Knot Theory, Aerodynamics, and Fractal Geometry. The camp offers girls a unique opportunity to explore sophisticated mathematics in an all-girl environment and to meet other girls and women who have a love and talent for mathematics. With only 28 campers, we have a low camper-staff ratio and the staff is experienced and enthusiastic (and all-girl). This is the 13th year that we have offered the camp and previous campers have found their experience very rewarding. Said one, "It was the best week of my life!"

During the camp, there will also be some opportunity to explore other career possibilities. A scientist from the National Security Agency will give a presentation to the campers about life and work at the NSA. The camp also offers recreational evening activities and opportunities to build life-long friendships.

Girls who attend the camp will spend the week in a university dormitory with a counselor who is also a math graduate student, and they will have meals in the dormitory cafeteria. The cost for the camp is \$250 including room and board (\$125 for Nebraska students). Scholarships are available. For more information or an application form, contact agam@math.unl.edu or go to our website at: <http://www.math.unl.edu/pi/outreach/agam>. Application deadline is May 15, 2009.

This year we are also beginning a pilot program aimed at mathematically talented middle school girls with the goal of keeping those girls connected to mathematics through to their high school years, thus enlarging our base of candidates for the summer camp and addressing the problem outlined in a recent article in the *AMS Notices* about under-representation of women at the higher levels of mathematics.

AwesomeMath Summer Program

University of Texas at Dallas & University of California, Santa Cruz

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AwesomeMath

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AwesomeMath Summer Program is a three-week residential summer camp for mathematically gifted students from around the globe. It provides students the opportunity to hone their problem solving skills and further their mathematical education in general. Our students engage in meaningful problem solving activities and explore in detail areas in advanced mathematics. The high quality instruction is provided by renowned lecturers and Olympiad coaches, such as: Dr. Titu Andreescu - US IMO Team Leader (1995-2002), Director, MAA American Mathematics Competitions (AMC) at University of Nebraska-Lincoln (UNL) (1998-2003), Director, Mathematical Olympiad Summer Program (MOSP) (1995-2002), Coach of the US IMO Team (1993-present); and Dr. Zuming Feng - US IMO Team Leader (2003-present), US IMO Deputy Team Leader (2000-2002), Academic Director of MOSP (2003-present), Coach of the US IMO Team (1997-present).

Students also have the opportunity to learn from the best former IMO medalists and USAMO participants by interacting daily with our talented mentors, such as Zac Cox (USAMO qualifier 2001-2004), Oleg Golberg (IMO Gold medalist 2002-2004), Anders Kaseorg (IMO Gold medalist 2002, 2003), Thomas Mildorf (IMO Gold medalist 2005), Charles Chen (US IMO Team alternate 2005).

AMSP is not an "intense Olympiad training." Instead, we have strong problem-solving courses that fit the age and common interests of youngsters. We make what we feel is an important distinction: we do lots of math for the sake of math. Through this pursuit, we are confident that our students' performance on AMC and Olympiad-style contests will improve significantly. Students interested in applying for our program should visit our website at www.awesomemath.org

Canada/USA Mathcamp

University of Puget Sound, Tacoma, WA

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Fax: *617-812-6339*

Mailing address: *129 Hancock Street
Cambridge, MA 02139*

e-mail: *mc-info@mathcamp.org*

web address: *<http://www.mathcamp.org>*

Canada/ USA Mathcamp is a five-week-long summer program for 110 mathematically talented students. Mathcamp 2009 will take place from July 5 to August 9, at the University of Puget Sound in Tacoma, Washington. Students from Canada, USA and around the world, who are between 14 and 18 years old, are invited to apply; exceptional 13-year-olds will be considered as well.

Unlike most academic camps, Mathcamp does not have a set curriculum or even a list of required activities. In the words of one student, the camp's design "helps convey the idea that math can be almost anything that you want it to be". We encourage our faculty to teach what they are most passionate about, and then we let the students choose what they are most interested in learning. Class topics in the last two years have included topology, voting theory, theoretical computer science, number theory, fluid dynamics, information theory, probability, cryptography, complex analysis, mathematical logic, problem-solving ... the list goes on and on. Classes vary widely in duration, level, and format, but all are interactive, with the students actively engaged in the process of discovery. In addition to classes, students have the option of attending lectures by distinguished visiting researchers, doing a research project and participating in problem-solving competitions.

With five or more different mathematical activities offered in any given hour, choosing just one can be tough. With the guidance of an academic advisor, each student is challenged to design a program of study reflecting his or her personal interests and abilities. Some students decide to devote most of their time to a particular class or project, while others seek a broader perspective on the various branches of mathematics. Some are most interested in sharpening their problem solving skills and preparing for competitions, while still others want to learn about applications of mathematics to other fields. Almost all of these students, however, say that academic freedom and the chance to take charge of their own education are the aspects of Mathcamp that they value most.

In the evenings, the same wealth of opportunities continues into the non-academic sphere, with students and staff organizing numerous activities, from soccer games and bridge tournaments, to contra dancing classes, to live action role-playing games. On weekends, the camp offers numerous field trips such as hiking, white water rafting and visits to local museums and amusement parks.

Mathcamp is committed to enabling every qualified student to attend, regardless of financial circumstances. The full camp fee, including room, board, tuition and weekend activities is \$3,200. However, almost 50% of students qualify for an automatic reduction based on family income, and many students receive further financial assistance, including some full scholarships.

COSMOS - California State Summer School for Mathematics and Science

University of California (4 campuses: Davis, Irvine, Santa Cruz, San Diego)

Contact: *(see below for addresses of the four locations)*

Phone: *(530) 754-7325*

Fax:

Mailing
address:

e-mail: *see below*

web
address: <http://www.ucop.edu/cosmos/>

The California State Summer School for Mathematics and Science (COSMOS) is an academic four-week residential program for talented and motivated students who are completing grades 8 - 12. The COSMOS courses address topics not traditionally taught in high schools. These courses are in the areas of astronomy, computer science, wetlands ecology, ocean science, robotics, neuroscience, cognitive science, game theory, volcanology, and more.

The California State Legislature established COSMOS with a mission to motivate the most creative minds of the new generation of prospective scientists, engineers, and mathematicians who will become leaders for California, the nation and the world. The program is designed to create a community of students who participate in an intensive academic experience delivered by distinguished educators, scientists, and researchers. The program has three locations (see below).

Students currently enrolled in grades 8-12 are eligible to apply for admission to COSMOS. To be considered for admission, students must have achieved academic excellence in science and/or mathematics.

Tuition for the summer 2009 program will be \$2,425 for California students (\$6,500 for out of state students). Tuition covers the costs of housing and meals and some field trips and special events.

Students may apply for need-based financial aid through the application process. Full and partial scholarships are awarded to applicants from California to help with the cost of tuition.

Please contact one of the following locations for further information.

UC Davis COSMOS

E-mail: cosmos@ucdavis.edu

Web: <http://cosmos.ucdavis.edu>

Phone: 530-754-7326

Fax: 530-754-7327

UC Irvine COSMOS

E-mail: cosmos@uci.edu

Web: <http://www.cosmos.uci.edu/>

Phone: 949-824-6806

Fax: 949-824-3048

UC San Diego COSMOS

E-mail: cosmos@soe.ucsd.edu

Web: <http://www.jacobsschool.ucsd.edu/cosmos/>

Phone: 858-534-4317

Fax: 858-534-2095

UC Santa Cruz COSMOS

E-mail: cosmos@epc.ucsc.edu

Web: <http://www.epc.ucsc.edu/cosmos>

Phone: 831-459-1763

Fax: 831-459-3570

Hampshire College Summer Studies in Mathematics (HCSSiM)

Hampshire College, Amherst, MA

Contact: *David C. Kelly, Co-Director*

Phone: *413-559-5375*

Fax: *413-559-5448*

Mailing address: *Hampshire College Summer Studies in Mathematics
Hampshire College
893 West St.
Amherst, MA 01002-3359*

e-mail: *codirectors@hcssim.org*

web address: *<http://www.hcssim.org>*

The 37th and 38th Hampshire College Summer Studies in Mathematics will invite approximately 45 motivated and talented students to join college professors, math majors and graduate students on our rural campus to do, to share and to enjoy mathematics. The entire faculty live in the program dormitory and join students for meals and recreational activities as well as for more than 8 hours of mathematics each day.

In small and lively classes and 3 hour evening problem seminars, 15 students guided by a professor and two assistants, will collaboratively investigate challenging and rewarding problems from number theory, group theory, combinatorics, probability, the fourth dimension, graph theory, infinity, fractals, chaos and other active branches of mathematics. Emphasis will be placed on the processes of mathematical thought - discovering patterns, formulating questions and definitions, making conjectures, and creating proofs - rather than the simple accumulation of results. By doing mathematics and living with mathematicians, participants will experience what it is like to be a mathematician.

Activities include classes for four hours each morning (M-S), evening problem seminars (M-F), daily Prime Time Theorems, visits by pure and applied mathematicians, a weekly program journal, computers, math films and field trips. Regular contacts (including regional reunions, a web site, Yellow Pig's Day reunions during the program, mailings, e-mail, videotapes, pamphlets and software) will seek to engage alumni and their teachers with serious mathematics and to maintain the spirit of the Summer Studies intellectual community.

Institute of Technology Center for Educational Programs (ITCEP)

University of Minnesota

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University of Minnesota
4 Vincent Hall, 206 Church Street SE
Minneapolis MN 55455*

Fax: *(612) 626-1150*

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web address: *<http://www.itcep.umn.edu/sumenrich/index.php>*

The Institute of Technology Center for Educational Programs (ITCEP) offers summer mathematics enrichment programs for students entering grades 3 - 12. The common purpose of these programs is to keep young students interested in mathematics, science and engineering, and to give them a realistic picture of what these disciplines are all about. Institutes do this in three ways: first, by immersing students in mathematics coursework, establishing the foundation for related, interactive science and engineering activities; second, by introducing students to as many positive role models and opportunities as possible; and third, by fostering friendships. Students thrive intellectually when working with other local, national, and international students who, like themselves, enjoy being challenged in math and science. Recreational and social activities are critical contributors to forming lasting friendships.

Programs will be held on the Minneapolis campus of the University of Minnesota. Residential students live in Argyle House, a privately owned building designed especially for residential academic programs. All students attend classes in Argyle House and in various facilities on the Twin Cities campus.

Students are supervised at all times. The staff-to-student ratio of 1:5 ensures close interactions between students and instructors. The instructional team is comprised of University faculty, undergraduates, and graduate students. Residential mentors live with students in Argyle House.

Within thirty days of receipt of completed application materials, ITCEP mails acceptance packets, which include needs- and merit-based scholarship information, to eligible applicants. Applications are accepted until each session is filled. Sessions have a maximum enrollment of 15 students each.

MathPath

Colorado College, Colorado Springs, CO

Contact: *George R. Thomas, Executive Director*

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Port Huron, MI 48060*

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web address: *<http://www.mathpath.org>*

MathPath is a four-week residential summer program for students 11-14 years of age. Its goal is to inspire and advance the most mathematically gifted middle school age students in the USA, Canada and the world. This is achieved by showing students that math is even more exciting than they thought, that they can do it at an even more advanced level, and that they have many peers with whom to do it. We do all this by emphasizing 1) Enrichment over acceleration, 2) discovery over rote learning, 3) proof (rigorous mathematical thinking and communicating the rigor and thinking). 4) active participation, 5) immersion in mathematical culture, and 6) fun, both in and out of class. For more information, including application materials, visit <http://www.mathpath.org>.

There have long been excellent summer mathematics programs for high school students, and now there are several summer programs that take some middle school or middle school age students as well. MathPath remains the unique international summer camp exclusively for middle school age, exclusively about mathematics, and not primarily devoted to practice for competitions. As our slogan says, "Bright and Early". We admit students who are strictly in the age range of 11 to 14 years. Most of these students are enrolled in middle schools at the time of application. Many are home-schooled.

The MathPath day is a mix of plenary sessions (everyone together) and breakouts (small classes that students choose). Many plenary sessions are led by distinguished mathematicians, such as Princeton professor John Conway. In free time we organize many activities, from chess to ping pong to soccer to pickleball. On weekends there are special trips. MathPath is held in a different part of the country each year, so the trips depend on the locale. In Burlington, Vermont in 2008, a favorite trip was tubing on the Ausable River.

Michigan Math and Science Scholars Summer Program

University of Michigan, Ann Arbor, MI

Contact: *MMSS Program Coordinator*

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Each year, the MMSS program attracts a broad spectrum of students, from intensely dedicated young mathematicians to students who are open to learning more about mathematics in a congenial setting and in whom we might instill a deeper interest in our field. Our student body is diverse - all are equally welcome, and all can find appropriate challenges. Students can attend 2 two-week mini-courses on mathematics, statistics, or other sciences. During the summer of 2009, we will offer at least twenty-one such mini-courses, nine of which will be in mathematics and statistics. Courses for the summer of 2009 include: *Combinatorial Combat, Congruent Numbers: When can a Number be a Triangle?, End-of-the-World Mathematics, Images and Mathematics, Mathematics of Decisions, Elections and Games, Mathematical Modeling in Biology, Mathematics and the Internet, Sampling, Surveys, Monte Carlo and Inference, and Fibonacci Numbers.*

In a typical day at MMSS, students will attend morning lectures and other activities with University of Michigan faculty members; and spend afternoons in computer labs, solving problem sets, and doing research with advanced graduate students. Although there is always a group of students to be found doing yet more mathematics after the formal learning period has ended, the main focus of evenings and weekends is sports and social activities that are supervised by University of Michigan graduate and undergraduate counselors (including many former MMSS scholars). To encourage participants to continue developing mathematically, all students receive full computing privileges at the University of Michigan for the duration of the program.

Missouri Scholars Academy (MSA)

University of Missouri-Columbia, Columbia, MO

Contact: *Ted Tarkow*

Associate Dean

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University of Missouri-Columbia
317 Lowry hall
Columbia, MO 65211

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web
address: *<http://www.moscholars.org>*

The Missouri Scholars Academy (MSA), founded in 1985, offers academically talented "rising high school juniors" a state-funded opportunity for immersion into rigorous study of one or more core disciplines (mathematics, communication arts, science, humanities, etc.). Students are nominated from all Missouri public and private schools, and are selected by a state wide panel of teachers, counselors and school administrators. Those selected live in a university residence hall which is transformed for the three weeks into a hub of activities that enrich the academic program and the socialization that "dorm life" can create. Full information is at www.moscholars.org.

Prospective students should contact their high school counselors for information on the school's own selection process. To be eligible for consideration, applicants need, in general, to rank in the top 0.5% of all current Missouri sophomores. The selection process results in a "pool" of highly talented and highly energetic 15/16 year olds who are frequently not challenged in ordinary high school programs and curricula.

Courses are taught by master teachers from across the state. They, in turn, get to develop curricula that they can take back to their own schools and share with their home districts. Afternoon, evening and weekend activities promote healthy and rigorous intellectual inquiry, but also allow for much creative "fun." MSA becomes, for the vast majority of its participants, a crown jewel in their high school experiences.

PROMYS

Boston University,
Boston, MA

Contact: *Glenn Stevens, Director*

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Mailing
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Department of Mathematics
Boston University
111 Cummington Street
Boston MA 02215*

e-mail: *promys@math.bu.edu*

web
address: *http://www.promys.org*

PROMYS offers a lively mathematical environment in which ambitious high school students explore the creative world of mathematics. Through their intensive efforts to solve a large assortment of unusually challenging problems in number theory, the participants practice the art of mathematical discovery -- numerical exploration, formulation and critique of conjectures, and techniques of proof and generalization. More experienced participants may also study galois theory, geometry and symmetry, or combinatorics. Problem sets are accompanied by daily lectures given by research mathematicians with extensive experience in Professor Arnold Ross's long-standing Summer Mathematics Program at Ohio State University. In addition, a highly competent staff of 18 college-aged counselors live in the dormitories and are always available to discuss mathematics with students. Each participant will meet with professional mathematicians several times per week for problem-solving and open-ended explorations. Special lectures by outside speakers offer a broad view of mathematics and its role in the sciences.

PROMYS is a residential program designed for 75 ambitious high school students from grades 9 through 12. Admission decisions will be based on the following criteria: applicants' solutions to a set of challenging problems included with the application packet; teacher recommendations; high school transcripts; and student essays explaining their interest in the program.

Cost: The cost of room and board and instructional fees is \$2,600. Financial aid is available. **PROMYS** is dedicated to the principle that no student will be unable to attend because of financial need.

PROMYS is directed by Professor Glenn Stevens. Application materials can be obtained by writing to **PROMYS**, Department of Mathematics, Boston University, 111 Cummington Street, Boston, MA 02215, by e-mail at *promys@math.bu.edu*, by visiting our web site at <http://www.promys.org>, or by calling (617) 353-2563. Applications will be available in January and accepted from then until May 30, 2009.

PROTaSM (Puert Rico Opportunities for Talented Students in Mathematics)

University of Puerto Rico, Mayagüez Campus

Contact: *Dr. Luis F. Caceres*

Mathematics Department

PO Box 9018

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Mayaguez, PR 00681*

Phone: *787-832-4040 ext.2647/3848*

Fax: *787-265-5454*

e-mail: *lcaceres@math.uprm.edu*

web address: *http://ifem.math.uprm.edu/*

Very few appropriate efforts are made in Puerto Rico to tend to the needs of talented students in mathematics. **PROTaSM's** main objective is to provide for the highly able students in mathematics of Puerto Rico, extracurricular activities that allow them to develop academically, and to learn skills and concepts that are not usually taught in their schools, as a way to keep these students motivated and challenged. These experiences aid the academically talented students in developing their real potential to a maximum. In the long run, there is no doubt that these efforts will positively influence the whole student body, as well as the leverage of the mathematics courses in Puerto Rico. **PROTaSM's** efforts will be directed to Puerto Rico's public and private schools in three educational levels: Elementary (Fourth through Sixth grade), Intermediate (Seventh through Ninth grade), and High School (Tenth through Twelfth grade).

PROTaSM's activities may be divided into four categories: Math Olympiad, Sabbatical Academy, summer camps for mathematically talented students, and PROTaSM's web page. **Math Olympiad.** The main objective is to provide exposure to different activities, through the solution of problems that motivate students and deepen their knowledge in a variety of mathematical areas, such as geometry, combinatorics, algebra, number theory and math games and strategies. The problems that usually are involved in these activities allow students to face skills and concepts that they do not usually see in their regular curriculum. In this component of PROTaSM, we expect to impact more than 5,000 students, as we have done in previous years of the program. The program cycle will include several sessions, such as the Pre-Olympic Competition in two phases and a Puerto Rico Math Olympiad. PROTaSM coordinates two other Olympiads: May Olympiad and Kangaroo Olympiad. **Sabbatical Academy for Mathematically Talented Students.** The main objective of this activity is to provide courses in mathematical content and math problem-solving sessions to those students who have demonstrated academic talent in mathematics. The themes that are studied in these courses are not covered in the traditional schools' curriculum, and they are meant to take the student to higher levels of knowledge and abstraction, so as to exploit their abilities to a maximum. These courses take place at the facilities of the University of Puerto Rico, Mayagüez Campus (UPRM) during six different Saturdays. **Summer Camps for Mathematically Talented Students:** The objectives of these summer camps are to offer courses that encourage enthusiasm in learning math, introduce important concepts, practices and strategies for problem solving, and develop abilities to those who may become leaders in the next mathematical generation. **PROTaSM's web page:** PROTaSM's web-page can be accessed through IFEM's web page that was created in 2002 and has been updated frequently. The Internet address is <http://ifem.math.uprm.edu/>. Through this page all the students in Puerto Rico may access information about activities, find links to other web-sites on the Internet that provide information about mathematical Olympiads, as well as use the tests, exercises and activities developed in the Sabbatical Academy and summer camps. This is a tool that enhances the impact on many students to benefit from PROTaSM's efforts.

PROTaSM's activities are open to all students in Puerto Rico. PROTaSM's impact will be island-wide. This is in part the reason why the Puerto Rico Department of Education and the University of Puerto Rico have strongly supported PROTaSM's activities. The activities benefit not only the participants directly involved, but also their peers, as these students elevate the quality of math classes wherever they are enrolled. The web page and all materials available there are accessible at no cost to teachers and other students who might become interested. In order to apply, a student must participate in the first phase of the Pre-Olympic Competition, which can be accessed by the web site in November.

Research Science Institute (sponsored by the Center for Excellence in Education)

Massachusetts Institute of Technology

Contact: *Cliff Bowman, RSI Director*
Center for Excellence in Education
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Suite 215
McLean, VA 22102

Phone: *703-448-9062 ext.231*
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e-mail: *rsi@cee.org*
web address: *http://www.cee.org*

The Research Science Institute (RSI) hosts approximately 80 high school students at the Massachusetts Institute of Technology for six of the most stimulating weeks of their young lives. Selected from the United States and several nations, these students participate in a rigorous academic program which emphasizes advanced theory and research in mathematics, the sciences, technology and engineering. The students attend college-level classes taught by distinguished professors from leading universities. Nationally recognized high school teachers and doctoral level RSI alumni conduct classes designed to sharpen research skills. The students also complete hands-on research with selected mentors at universities, research organizations and corporations.

The uniqueness of CEE lies in its commitment to help RSI alumni throughout their academic careers - from college selection through graduate studies - to foster camaraderie and intellect. CEE's follow up program includes helping alumni with college and university selection, finding suitable summer employment, sponsoring trips to other nations for alumni as Junior Ambassadors of math and science, and keeping in touch with other alumni through activities.

The Research Science Institute is offered cost free to students competitively selected to attend. It is open to students who have completed their third year of high school or the equivalent, by summer of 2009, and plan to matriculate to a college or university in 2010. Please visit <http://www.cee.org> or contact RSI Director, Cliff Bowman, for more information, including an application for the 26th annual RSI, to be held in summer 2009.

Ross Mathematics Program

The Ohio State University, Columbus, OH

Contact: *Dr. Daniel Shapiro, Director*

Phone: *614-292-5101*

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Mailing address: *Ross Mathematics Program
Department of Mathematics
The Ohio State University
231 W. 18th Ave.
Columbus, OH 43210*

e-mail: *ross@math.ohio-state.edu*

web address: *<http://www.math.ohio-state.edu/ross>*

Participants in the Ross Mathematics Program are involved in an inquiry-based study of abstract mathematics. For those eight summer weeks, students are immersed in a world unlike anything they have seen before. This is the first time most of them will be asked to consider entirely new questions and to develop new approaches and methods. Instead of the standard classroom approach of presenting facts for memorization, we build a community of scholars who struggle with basic mathematical questions and discover many of the facts for themselves. By working through examples they come to recognize which of their discoveries will be the most useful.

Students who join this community and participate in this distinctive style of learning benefit in several ways. They acquire a deep appreciation of the ideas they have tackled and they gain some understanding of scientific thinking. During the course of the summer, most participants begin to relish their ability to discover things on their own and they acquire a taste for hard problems. They start searching for patterns and ideas in many different contexts. Once the spark of creative thought is lit, it burns bright in them during that summer and, we hope, for the rest of their lives.

Copies of application materials are available on the Ross Program web page: <http://www.math.ohio-state.edu/ross>. Information can also be obtained by e-mail (ross@math.ohio-state.edu), telephone (614-292-4101), or paper mail:

Ross Mathematics Program
Department of Mathematics
The Ohio State University
231 W. 18th Ave.
Columbus, OH 43210

Rutgers Young Scholars Program in Discrete Mathematics

Rutgers University, New Brunswick, NJ

Contact: *Debby Toti*

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Mailing address: *Rutgers University
Young Scholars Program
SERC Building, Room 225
Busch Campus
118 Frelinghuysen Rd.
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web address: *<http://dimacs.rutgers.edu/ysp/>*

The Rutgers Young Scholars Program in Discrete Mathematics is designed to encourage talented students to consider careers in the mathematical sciences. Selected students participate in an intensive four-week academic program that provides a challenging introduction to discrete mathematics - a new and growing area of the mathematical sciences with many applications on the cutting edge of modern research. During the program, you will develop and enhance your problem-solving abilities by applying mathematical concepts to a wide range of problems. You will also meet distinguished professionals in the field of discrete mathematics who will serve as role models and mentors and help you decide if mathematics is the right field for you. Teaching assistants who are embarking on their own careers in mathematics will provide additional academic support. You will also have an opportunity to participate in a year-long research project.

Approximately thirty high school students from across the United States will be selected for admission. Students will participate in instructional sessions, field trips, research projects, technology-based activities (including a Robotics Challenge) and workshops on careers in the mathematical sciences. Informal evening and recreational programs will also be provided.

The program is held on the Busch campus of Rutgers University. Students are housed in a modern, air-conditioned residence hall. The classroom building, computer laboratories, student center and recreation center are within walking distance of the residence hall. Residence life staff members coordinate the residence program and recreational activities.

The cost of the program is \$3,500, which includes tuition, materials, housing, and meals. A limited number of scholarships will be available for students in need.

SEARCH

Mount Holyoke College, South Hadley, MA

Contact: *Dr. James Morrow*

Search @ SummerMath

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50 College Street

South Hadley, MA 01075-1441

Phone: *413-538-2608*

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e-mail: *search@mtholyoke.edu*

web address: *<http://www.mtholyoke.edu/proj/search>*

If you want to explore ideas for your future, see another side of mathematics, work in a group, spend a month on a college campus - and you take yourself seriously - then SEARCH might be for you!

The SEARCH Program at Mt. Holyoke College is designed for young women who have done very well in high school mathematics, have a sense of adventure and would like to experience a research-like atmosphere in mathematics. Prospective students should have a good working knowledge of algebra and geometry, strong logical reasoning ability and a strong desire to explore open-ended problems in small groups guided by a teacher and an undergraduate teaching assistant.

During the day students will take classes, graph coloring, modular arithmetic, combinatorics and symmetry groups. There will also be instruction in the use of the mathematical software Maple and Excel spreadsheet software. There will be field trips, and - most of all - lots of interesting problems to work on! Students will have the unique opportunity to live on a college campus, meet a diverse group of students from across the country and find out some surprising things about mathematics. SEARCH is designed to give the feel of a research laboratory and of the world and work of mathematicians. Unique to this program is the chance to work on problems of your own design!

Many more details plus application materials can be found on our web pages at:
<http://www.mtholyoke.edu/proj/search/>

Stanford University Mathematics Camp (SUMaC)

Stanford University

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The Stanford University Mathematics Camp (SUMaC) is a four-week residential summer program designed for high school students who have exceptional interest and ability in mathematics, who enjoy being challenged with in-depth mathematical pursuits and who will be entering their junior or senior years in the Fall. SUMaC's goals are to provide an intensive exposure to advanced mathematics in a supportive atmosphere, to give students a chance to interact with like-minded peers as well as Stanford undergraduates, graduate students and faculty, to convey some of the excitement and beauty of mathematics, and to motivate further study in mathematics or related subjects.

While the development of problem-solving skills is an important aspect of the program, SUMaC's focus is not on math-contests training, nor is it intended to be equivalent to a college-level course; rather, it is directed at helping students attain a deep understanding of some general and important mathematical ideas.

SUMaC has maintained a relatively even balance of girls and boys, and has drawn students from over twenty states and a dozen foreign countries. Students come from many backgrounds and cultures. Admission is by a competitive process which involves an entrance examination. Scholarships are offered so as to allow all admitted students to attend.

SUMaC's academic component consists of two tracks: Program I centers on abstract algebra and number theory, and covers basic group theory with an emphasis on symmetry groups, unconstructibility in geometry, coding theory and cryptography; Program II is devoted to topics in low dimensional topology, leading to an exploration of the fundamental group and the classification of surfaces. Counselors and tutors are primarily Stanford graduate students and undergraduate math majors, and include SUMaC alumni. Courses are taught by instructors from the Stanford math department and Stanford's Education Program for Gifted Youth.

The daily schedule includes morning lectures and time devoted to working on problem sets and individual tutoring. Students are introduced to many other mathematical ideas and topics through colloquium-style lectures by mathematicians from the Stanford community and elsewhere. Students also work on research projects related to their core studies. The academic program is supplemented by many social and recreational activities including organized sports and several field trips in the greater San Francisco Bay Area.

Summer Math Institute (SMI)

The Texas Academy of Mathematics and Science (TAMS), University of North Texas, Denton Texas

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Summer Math Institute

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The Summer Math Institute (SMI) is an intensive residential program for middle and high school students. Admission to the program is selective and is based on a combination of factors, including test scores, grades, and a recommendation from the student's current math teacher. The program has grown from 28 students to 60 students, which is the maximum number of students the program can accommodate. Students are placed in one of the following courses: Algebra I, Geometry, Algebra II, or Precalculus. Each class is limited to between 15 and 20 students.

Students have the opportunity to master one year of high school mathematics during the three-week program. The program uses a diagnostic-prescriptive learning model. This model was developed specifically for mathematically talented students who have the motivation to learn at a faster and more advanced level. Since the academic program is essential to the structure of the program, students must have a strong interest in mathematics.

At SMI, students also learn responsibility, self-motivation, community participation and respect for others. Central to this residential program is the idea that living where they learn will encourage students to become a part of a community of like-minded young people who are committed to academic excellence and social and emotional growth.

Summer Mathematics Institute

Oakland University, Department of Mathematical Sciences

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The Summer Mathematics Institute is a free opportunity for bright and gifted pre-college students to interact with university faculty and each other, to take some challenging math classes that earn college credit and have fun in an academic atmosphere.

The Institute runs approximately from late June through the first week of August each summer. Students are encouraged to apply early (before the deadline of mid-May).

The Summer Mathematics Institute at Oakland University provides an exciting mathematics program to stimulate the mathematical development of bright students from Southeast Michigan. Students are selected based on both exceptional talent and interest in mathematics. Those selected will generally have completed the tenth or eleventh grade, but very bright students at the ninth grade level who have exceptional talent and have accelerated their mathematical studies should also apply.

A major component of The Summer Mathematics Institute at Oakland University is the teaching of advanced undergraduate mathematical concepts from probability theory, number theory, group theory, combinatorics, graph theory, statistics and linear algebra for college credit, in a creative environment with a high level of mathematical activity. These are interesting topics which can expand the horizons and confidence of bright students, and encourage them to work to their fullest potential. During the program the students also participate in supervised computer lab activity.

The Institute will have the use of a computer laboratory reserved for the participants. Students at the Institute will be given instruction on the use and ideas behind symbolic mathematical software (such as Maple or Mathematica), which enable computers to answer sophisticated mathematical questions. Students will also be encouraged to explore self-directed mathematical investigations independently.

Texas State University Honors Summer Math Camp

Texas State University, San Marcos, TX

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The Texas State University Honors Summer Math Camp is a 6-week residential program for academically talented students. The goal is to excite young students about doing mathematics, to teach the students to reason rigorously and precisely, and to develop questioning minds. Following in the tradition of the Ross Summer Program, we teach students to "think deeply of simple things" (Arnold Ross), while inspiring students to share in the joy and excitement of finding the simple mathematical ideas which underlie and explain seemingly complex problems. Perhaps the best description of the program is from our participants:

"Texas State HSMC is different from other academic camps in that it lets students explore the mathematical frontier by themselves."

"This camp brought together students of all races and social/economic classes."

"This camp has exposed me to more than any other single experience in the last 15 years of my life. Obviously I learned number theory, but that isn't even what I'm talking about. I learned how to turn a group of strangers into some of the closest friends I have ever had; I enhanced my self-confidence; I learned more patience, and the list goes on."

First year students take courses in Elementary Number Theory and Mathematica Computer Programming. Career opportunities, the dynamics of group work, and leadership development are discussed in an Honors Seminar course. Returning students study Combinatorics, Abstract Algebra, Analysis and Topology. Advanced students may work individually or in teams on a research project to submit to the Siemens-Westinghouse or Intel competitions, supervised by a faculty mentor. Extracurricular activities include weekly seminars by guest speakers, picnics, recreation each afternoon including aerobics, volleyball, basketball, or tennis, and weekend excursions that give the participants a chance to relax and enjoy the local surroundings. Students are provided with a copy of Mathematica to use in their schoolwork or research project, and also make presentations at their high school to math clubs or classes. In the past 6 years, 54 HSMC students have been semi-finalists in the Siemens-Westinghouse Math, Science and Technology Competition, with 26 regional finalists, and 6 national finalists (2 teams).

The application form consists of a personal essay, teacher recommendation form, and transcript including SAT or PSAT scores. Students should be rising 10th - 12th graders. Interested students should contact Professor Max Warshauer, Honors Summer Math Camp, Texas State University, San Marcos, TX 78666. Phone: (512) 245-3439, Fax: (512) 245-1469, e-mail: max@txstate.edu. For an on-line application, see www.txstate.edu/mathworks.