



THE GOVERNOR'S SCHOOL OF ENGINEERING AND TECHNOLOGY AT RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY

Summer, 2008

The Governor's School of Engineering and Technology is a unique summer program for gifted high school students who have completed their junior year. Students live on the campus of the School of Engineering at Rutgers, The State University of New Jersey. They enroll in a set of challenging courses and electives that cover material not normally seen in high schools or even at the undergraduate level. All students also undertake a small-group research project, which culminates in a conference-style research paper and presentation at our research symposium.

The Governor's School aims high. In a challenging and diverse environment, our students gain a thorough understanding of the field of engineering and current research trends, greatly improve their teamwork and leadership skills, and explore their educational and career options in the engineering and technology fields. The students also make connections with professors, professionals, and peers throughout the state of New Jersey, take personal responsibility for their intellectual advancement, and achieve a better understanding of engineers' impact on society.

THE LEARNING ENVIRONMENT

Courses:

All students will take five courses. Three of these courses will be considered part of our "core" and thus enroll all students. The core curriculum tentatively includes:

- A team competition-based *Robotics* course
- A class that examines *Modern Physics and the Engineering of Experiments*, covering topics such as relativity, quantum mechanics, string theory, and the design of experiments to test these theories.
- Research in New Technology*, which explores and examines the design of social networking websites, peer-to-peer paradigms, and computer architecture. Students critically examine and critique recent technology research papers in order to improve their own technical writing.

Students will also choose two elective courses from distinct categories. The Depth Exploration category includes intensive courses in specific engineering disciplines. Past courses in this category have focused on biomedical engineering innovations, designing earthquake-resistant civil engineering structures, and computer engineering. The Engineering Computation category encompasses courses in engineering mathematics and computing. Choices in this category include an introduction to computer programming, an advanced mathematics course, and an intensive computer security/cryptography course.

Although Governor's School courses are taught at a very fast pace and cover difficult material, most courses assume very little background knowledge, although a good preparation in typical high school mathematics and science is expected. Students who are just beginning to explore engineering will be able to grasp the material we cover. However, students with significant prior experience will be highly challenged.

Research Projects:

One of the cornerstones of the Governor's School experience is a small group research and design project, completed under the tutelage of an experienced research mentor from academia or industry. In groups of 5 or 6 students, the Governor's Scholars will investigate and attempt to solve an in-depth problem. Each group writes a conference-style research paper and presents their results at the GSET Research Symposium in front of an audience of professors, dignitaries, industry members, and invited guests. Students' research papers are published online in the Governor's School Research Journal. At the conclusion of the research experience, students should expect to have made significant connections with their research mentors and to have gained much greater scientific maturity.

Past projects have included topics such as designing and building a computer-controlled room, examining image processing techniques for detecting pancreatic cancer, creating renewable energy plans for New Jersey, and designing systems to detect E. coli in food processing plants. Please note that project topics vary from year to year. Research papers from our 2007 session are available in our research journal at <http://www.osd.rutgers.edu/gsjournal.htm>

Site Visits:

Governor's School students will have the opportunity to visit local engineering and technology corporations in order to learn about career opportunities and lifestyles in engineering. Site visit locations vary from year to year. For reference, students visited Sun Microsystems, Merck Pharmaceuticals, Lockheed Martin, and the Metropolitan Transit Authority during our 2007 program.

Guest Speakers:

A series of distinguished guest speakers will present the scholars with cutting edge research results, career opportunities, and advice that will prove relevant throughout their education and their career. Past guest speakers have included vice presidents at major corporations, audiologists specializing in hearing aid design, civil engineers redesigning local roadways, biomedical engineers who have gone on to become doctors, and professors leading infrastructural changes in Africa.

Enrichment Series:

A number of supplementary activities will reinforce opportunities, ideas, and ethics in engineering. A set of "Life Skills Days" will provide exposure to the many important skills an engineer needs to know, yet may not have seen before. Each "Life Skills Crash-Course" provides a 60-90 minute introduction to the topic without assuming any prior knowledge. Past topics have ranged widely, including electronics soldering, using power tools, repairing iPods, and even hip-hop dancing!

Scholars will also take part in a College Question and Answer session with current college students and recent graduates. Our students will get an inside look at college admissions and how to stand out in the process, learn what it's really like to major in different engineering and technology fields, and find out how to get involved in ground-breaking research as early as their freshman year.

Additional activities include everything from a half-day simulation of the Engineering Team Design Process to a student talent show!

To get a better sense of our program, we highly encourage interested students and parents to explore past research papers, photographs, and other materials on our website: www.osd.rutgers.edu/gs/

PROGRAM GOALS

Students should expect the following concrete outcomes from participation in Governor's School:

- A better sense of the myriad fascinating subfields within engineering and technology;
- Knowledge of educational and career opportunities in New Jersey;
- Seeing how engineering and technology benefit society;
- Exposure to cutting edge research and new trends;
- Meeting engineering and technology professionals and university faculty;
- Gaining experience in engineering research and design;
- Developing a strong academic relationship with their research mentors;
- Meeting peers throughout New Jersey who share their love of engineering and technology;
- Gaining hands-on experience creating and constructing their own engineering designs; and
- Working hard, but maturing significantly as a result.

We stress the following areas of the students' personal development:

- Personal responsibility for their education;
- Increased ambition and initiative; entrepreneurship;
- Teamwork and the ability to collaborate with fellow scholars and faculty;
- Communication skills, including technical writing and speaking;
- Intellectual stimulation;
- Making ethical decisions in their personal lives and careers;
- Achieving an enriched awareness of the diversity of ideas and people; and
- The ability to research and work in areas that are challenging and open-ended.

SELECTION PROCESS

Admission to the Governor's School of Engineering and Technology is very competitive. Students first express interest in attending the program to their high school counselors and teachers. A student can apply for only one Governor's School program. Each high school, at its own discretion, forms a Governor's School selection committee. While the makeup of the committee varies, many schools find it useful to include guidance counselors, math and science teachers, technology specialists, and perhaps even Governor's School alumni. Schools with fewer than 350 students in their junior class may nominate one student to the Governor's School of Engineering and Technology. Schools with more than 350 students in their junior class may nominate two candidates, and schools with over 700 students in their junior class may nominate three candidates. Students chosen by their high school's Governor's School selection committee are congratulated as Governor's School of Engineering and Technology Finalists, and their applications are forwarded to their county superintendent. County superintendents forward all finalists' applications to the selection board at Rutgers, the State University of New Jersey. Finalists' applications must be forwarded to County Superintendents by high schools no later than November 27th, 2007.

At the state level, a panel of professors, researchers, and educators in engineering and technology reviews the finalists' applications. Using the criteria below, this panel chooses students as Governor's Scholars and invites these students to attend the Governor's School. The committee's decisions are mailed to students' homes in the spring. Please visit www.nj.gov/govschool/ for an updated timeline.

SELECTION CRITERIA

The Governor's School of Engineering and Technology selection committee aims to create a student body made up of New Jersey's most talented and enthusiastic students. Our student body should be diverse in myriad ways and include representation from each of New Jersey's counties. Our students should also possess a great diversity of gifts in the arts, humanities, social sciences, and natural sciences. We aim to bring students of all talents into greater familiarity with the needs of their state and world as we face the future and the complex problems that it will bring.

The Governor's School encourages all qualified applicants regardless of sex, race, color, creed, national origin, physical handicap, political activity, or private conduct.

All applicants must meet the following criteria for their application to be considered:

- The student must be interested in the nature of the school. Specifically, we seek students who are passionate about the fields of engineering and technology and who are committed to the acquisition of knowledge and opportunities therein.
- The student must be a New Jersey resident who will have completed his or her junior year of high school in June, 2008.
- The student must be willing and able to attend the full program.
- The student must have academic course grades and achievement test scores that rank among the highest in his or her school.

Application decisions are based on the following quantitative and qualitative criteria:

Quantitative:

- The student's high school transcript and their class rank (if their school ranks).
- The student's standardized test scores (PSAT, SAT, HSPA, etc.)

Do the student's grades in high school and standardized test scores show him/her to be serious and dedicated to the acquisition of knowledge? While we of course expect our students to have demonstrated excellence in science, mathematics, and technology courses, we also look for students who will be able to critically evaluate situations and articulate their viewpoints, as evidenced by achievement in the arts and humanities. However, some creative students don't necessarily devote their gifts to getting perfect grades or test scores. These students seek to better themselves and their world in a multitude of ways. As such, students certainly do not have to be first in their class to apply. We are interested in highly capable and dedicated students with a rich variety of interests and skills who will benefit from and contribute to an environment in which the pursuit of engineering and technological knowledge is primary.

Qualitative:

- The student's personal essays
- Letters of recommendations from teachers, advisors, or mentors
- The student's extracurricular activities and community service pursuits
- The student's academic and extracurricular honors

While quantitative measures of academic achievement of course factor heavily into our decision, a student's personal and intangible qualities are, in fact, more important to us. We want to know what a student hopes to gain from the Governor's School experience, as well as what he or she hopes to contribute to the program. We expect Governor's Scholars to exhibit great creativity and a unique passion for the nature of our Governor's School. We expect each Governor's Scholar to believe in himself or herself, yet show humility and selflessness. We look for students who have shown a strong interest in engineering, technology, science, and mathematics, as well as an open mind and the ability to work on a team to explore these interests further. We expect students to show both depth and breadth in their interests, activities, leadership potential, and community involvement. Governor's Scholars should have not only great technical acumen, but also strong written and oral communication skills.

FREQUENTLY ASKED QUESTIONS

Question: What is a typical day like at the Governor's School of Engineering and Technology?

Answer: While some days are devoted entirely to corporate site visits, competitions, or other activities, the following describes a typical academic day. In the morning, students eat breakfast and attend two academic classes. All scholars have lunch together and attend a third class. Students then spend the rest of the afternoon working with their advisor on their research project. Research continues until dinner. After dinner, the schedule becomes much more variable. Some days, students will need to work on their research projects for most of the night, particularly if their advisor is a professional who often works during the day. Sometimes, there will be lectures or organized activities that take place after dinner. Other days, the time after dinner will be unstructured. For instance, you can choose to work on a vexing problem or project with your friends or residential teaching associates, play soccer, or enjoy some down time.

Question: How is work evaluated during Governor's School?

Answer: One of the core goals of the Governor's School program is to allow students to explore, create, and grow. As such, we do not assign grades to scholars in the program. However, students receive regular feedback and encouragement from their research advisors and course instructors.

Question: Will I receive college credit for participating in the program?

Answer: While you will not receive formal academic credit for participating in the program, you'll have the chance to learn innumerable skills that will help you be successful in college. You will also have the opportunity to develop a close relationship with your research mentor. Past students have submitted their projects to research competitions and continued their relationship with their mentors well into college. They have also used this research experience to their advantage in pursuing further educational opportunities.

Question: How competitive is admission to the Governor's School of Engineering and Technology?

Answer: Competition to become a finalist depends entirely on interest and enthusiasm within a student's high school. At the state level, the competition is more easily quantified. Annually around 20% of finalists are chosen to attend.

Question: How can I submit updated information about my application?

Answer: Over the course of your junior year, you'll likely receive additional accolades, outstanding test results, and other information to support your application. You are welcome to submit significant updates via email, fax, or postal mail. However, we discourage the submission of minor updates. We promise you that improving your SAT score by 80 points will not make any difference in the application process. As a note, very few students choose to send us updated information during the application process.

Question: Is Governor's School a lot of work?

Answer: Yes, but it's worth it. You will spend the vast majority of your day working on academic projects and challenges, but there is some (limited) time to play sports, practice music, or just hang out. You will learn a lot and be much better prepared for your future.

Question: Is Governor's School a lot of fun?

Answer: Yes. You'll meet students from around the state who share your interests. Many students develop life-long friendships during Governor's School.

Question: Whom should I contact if I have a question about the program?

Answer: Please feel free to contact us at any point using the addresses below. Questions about the program content, admissions, or the Governor's School experience are all valid!

CONTACTING US

Please feel free to contact us at any point. We're happy to tell you more about the program!

Dean Donald M. Brown, Director
Dr. Ilene Rosen, Assistant Director
Blase E. Ur, Program Coordinator

Email: blaseur@rci.rutgers.edu

Telephone: (732)445-5053, Extension 16

Fax: (732)445-5878

Mailing Address: Governor's School of Engineering and Technology
Rutgers School of Engineering
Office of Student Development
98 Brett Rd., Room B-110
Piscataway, NJ 08854

Website: <http://www.nj.gov/govschool/> (The state-wide New Jersey Governor's School program)
<http://osd.rutgers.edu/gs/> (The Governor's School of Engineering and Technology in particular)

APPLICATION INSTRUCTIONS

FOR THE GOVERNOR'S SCHOOL OF ENGINEERING AND TECHNOLOGY AT RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY Summer, 2008

Step 1: Complete the "Cover Sheet" page, which is the sixth page of this packet. This "Cover Sheet" should be the first page of your submitted application.

Step 2: As the second page of your application, include the "Check List," which is the seventh page of this packet.

Step 3: Attach a list of your extracurricular activities, in order of their importance to you. You are welcome to include clubs at school, community service activities, artistic or athletic programs, individual pursuits, and anything else that you do. Be sure to include leadership roles you hold in any of these activities.

Along with this list, please note any honors (academic or extracurricular) that you have received.

Step 4: Include answers to each of the following prompts. We recommend writing 1-2 pages, double spaced, for each of the two essay questions. The short responses should be answered in 1-2 paragraphs.

Essay 1) Create an autobiographical sketch of your background, history, and personality. Include your current and future goals and ambitions.

Essay 2) Why would you like to attend the Governor's School of Engineering and Technology? What do you hope to gain from and contribute to the program? Be sure to tell us about your interests in engineering and technology, how they've developed, and any steps you might have taken to explore these disciplines.

Short Response 1) Tell us about your most meaningful extracurricular activity or interest.

Short Response 2) Briefly tell us about something *academic* that you think is interesting. It can be as general as a whole discipline or as specific as a particular problem, challenge, invention, or scientist.

Short Response 3) What makes you unique? This can be a specific talent, interest, or a more general description. (*We certainly do not expect, nor want, applicants to discuss academics in answering this question. Living in a dorm with your peers is a very important component of the Governor's School, so we are interested in learning about you as a person, team member, artist, collector, creator, or friend.*)

Step 5: Include recommendation letters from two people not related to you. At least one of these letters must be from a high school teacher. The second letter may come from another teacher, a club advisor, coach, or mentor.

Step 6: Include a statement from your high school nominating committee explaining why they selected you, stressing why they think you would make an excellent Governor's Scholar.

GOVERNOR'S SCHOOL OF ENGINEERING AND TECHNOLOGY 2008 APPLICATION COVER SHEET

Student's Name: (first) _____ (last) _____

Street Address _____

City/Town _____ Zip _____

State Legislative District _____ County _____ Birth Date _____

Student's Email Address _____

Home Phone # _____ Cellular Phone # (Optional) _____

Gender: Male ___ Female ___ Race/National Origin (Optional) _____

Mother's/Guardian's Name: (first) _____ (last) _____

Father's/Guardian's Name: (first) _____ (last) _____

Parents' Email Address(es) _____

School Name: _____

School Address _____ Town _____ Zip _____

School Telephone _____ School District _____ County _____

Please choose the three disciplines of engineering or technology that you would most like to study during Governor's School

1. _____

2. _____

3. _____

SELECTION PROCESS

First, notify your high school of your interest in the program. Then, submit your complete application to your school as per your counselor's instructions.

November 27, 2007
Schools submit finalists' application materials to county superintendents. From there, applications are forwarded to Rutgers.

December 14, 2007
Applications of finalists selected by counties are submitted to the Governor's School of Engineering and Technology at Rutgers.

April 2008
The Governor's School of Engineering and Technology at Rutgers mails decisions to all finalists.

All dates for the 2008 summer programs will be announced January 15, 2008 at www.nj.gov/govschool.

STUDENTS AND PARENTS, Please check and sign

I am a resident of New Jersey.

I expect to be a senior in the 2008-2009 school year.

I am not irrevocably committed to another summer program.

I am willing and able to attend the entire 2008 Governor's School session.

Signature of Student *Date*

This is to certify that I give my permission for the student named above to participate in the Governor's School of Engineering and Technology at Rutgers University in full-time residence.

Signature of Parent/Guardian *Date*

**GOVERNOR'S SCHOOL OF ENGINEERING AND TECHNOLOGY 2008
APPLICATION CHECK LIST
(Please include as "Page 2" of your application)**

Student's Checklist:

- I've included the "Cover Sheet" (previous page) as Page 1 of my application.
- I've included this check list as Page 2 of my application.
- I've attached a list of my extracurricular activities and both extracurricular and academic honors.
- I've included responses to all five essay and short response prompts.
- I've attached two letters of recommendation.
- My school has included a statement from the nomination committee, my high school transcript, and copies of my standardized test scores.
- I am a resident of the State of New Jersey, will complete my junior year of high school in the spring of 2008, and am currently able to attend the entire Governor's School of Engineering and Technology.
- I have kept a copy of my application for my own records.

I have reviewed the checklist above, and have included all necessary and appropriate application materials. All of the information submitted as part of my application is factual and truthful to the best of my knowledge.

Name of Student (please print)

Student's Signature

Principal's Checklist:

- The student has included their application "Cover Sheet," this page, a list of activities and honors, five essay responses, and two letters of recommendation.
- I have included a statement from the nomination committee expressing why this candidate would make an excellent Governor's Scholar.
- I have included the candidate's high school transcript and copies of relevant standardized test scores (i.e. PSAT, SAT, AP, HSPA). Transcripts should include current eleventh year grades.
- The candidate is a conscientious and eager student with at least a B average in academic courses.

Fill in candidate's high school GPA _____ Class Rank _____

- The candidate ranks among the highest in our school in their academic achievement, indicated by their grades and standardized test scores.

PSAT/SAT (circle): _____ date _____ Percentile: _____

Additional Test Results (optional): _____ Date: _____

- This student has not been nominated to more than one Governor's School.
- The nominating high school has kept a copy of this application on file.

I have reviewed the checklist above, and have included all necessary and appropriate application materials. All of the information submitted as part of my application is factual and truthful to the best of my knowledge.

Name of Principal (please print)

Principal's Signature

School District Name