



## **The Governor's School of New Jersey**

### **GOVERNOR'S SCHOOL OF ENGINEERING AND TECHNOLOGY at Rutgers University**

**Application for Summer 2009**

## **PROGRAM OVERVIEW**

The Governor's School of Engineering and Technology is a unique and intensive residential summer program that brings together some of New Jersey's most talented and motivated high school students. At no cost to their families, students spend part of the summer following their junior year studying on the campus of the Rutgers University School of Engineering. Through team-based courses in areas such as "Robot Soccer" and research projects ranging from creating biodiesel fuel to enhancing privacy on Facebook, students collaborate on interesting and cutting-edge topics. The scholars work with peers and professors who are not just very smart, but also very enthusiastic about engineering and technology.

During the program, scholars collaborate with 2-4 other students on a novel research project, and also enroll in five challenging engineering courses that cover material not normally seen in high schools, or even at the undergraduate level. Students' research projects culminate in a conference-style final paper and presentation in front of hundreds of invited guests at our research symposium. Research projects and classes are augmented by site visits to local corporations, a series of distinguished guest speakers, life-skills workshops, and numerous activities that allow New Jersey's brightest and most enthusiastic young scholars to connect with professors, professionals, and peers from throughout the state.

The Governor's School aims high. Scholars gain hands-on experience in research and work on challenging and open-ended problems with others who share their love for engineering and technology. Free of grades and official credit, Governor's School emphasizes current research trends and teamwork. The hands-on learning environment is unique, non-traditional, and inspirational for everyone involved. For many of our scholars, this is their first opportunity to collaborate with other students with the same academic talent and motivation. It's no surprise, then, that our alumni consider Governor's School to be not just an important educational foundation, but also one of the best experiences of their lives.

Throughout Governor's School, students are encouraged to take personal responsibility for their education and to develop their ideas; entrepreneurship is highly encouraged. Governor's Scholars can expect to be highly challenged and to work very hard. In return, they will reap the benefits of an environment in which discovery and the pursuit of knowledge are primary, but in which everyone has a lot of fun. All students can also expect to develop strong academic relationships with their research mentors at Rutgers, engineering professionals, and each other.

## **ELIGIBILITY**

In order to be considered for the Governor's School of Engineering and Technology, potential scholars must meet the following criteria:

- The student must be a New Jersey resident and be a high school junior during the 2008-2009 school year.
- The student must have a very strong interest in engineering and technology and be committed to the acquisition of knowledge and the pursuit of opportunities in those fields.
- The student must be willing to live in residence on Rutgers' Busch Campus during the program, which runs 7 days a week.
- The applicant must be one of the top students in his or her school. The student should have primarily "A" grades in honors math and science classes. Most scholars have outstanding scores (95<sup>th</sup>+ percentile) on standardized achievement tests, although this is not a strict requirement; a student with very strong extracurricular experience and interest in engineering, coupled with outstanding personal essays and teacher recommendations, can be a very strong candidate in spite of weaker standardized test scores.

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

## THE LEARNING ENVIRONMENT

### Courses:

All students take five academic courses at the Governor's School of Engineering and Technology. Two of these courses will be considered part of our "core" and thus enroll all students in the program. *Robotics*, the first core course, is structured around team-based competitions that lead up to "Robot Soccer" as the final challenge. The second core class is *Modern Physics and Experimental Engineering*, which covers topics such as particle physics, relativity, string theory, and how machines like the Large Hadron Collider are engineered to test those theories.

Students will also choose three separate elective courses from distinct categories- "Design Experience," "Laboratory Experience," and "Technical Analysis." Whereas the two core courses focus on topics that pervade engineering, the elective courses are designed to provide hands-on experiences in a particular field of engineering or technology. The "Design" series of electives allows students to choose a course in which they design and build a computer controlled room or solar cells, or use rapid prototyping to create their own remote control car. The "Laboratory" series gives students the chance to do hands-on analysis and testing. For instance, classes in evaluating earthquake-resistant building designs, processing biomedical signals, and constructing electrical circuits are typical "Laboratory" classes. The final category, "Technical Analysis," encompasses courses in applied mathematics and computer science/engineering. "Analysis" courses range in difficulty from an introductory computer programming course to an industrial engineering course based on statistical methods to an intensive look at the mathematics behind computer security, including cryptography and pseudorandomness. Please note that the elective classes vary from year to year, and thus are subject to change.

### Research Projects:

The cornerstone of the Governor's School of Engineering and Technology 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 3 - 5 students, the Governor's Scholars will investigate and attempt to solve a complex and novel problem. Each group writes a conference-style research paper and presents its results at the Governor's School Research Symposium in front of an audience of professors, dignitaries, industry members, and invited guests. At the conclusion of the research experience, students should expect to have made significant connections with their research mentors and to have gained scientific maturity.

The project topics vary from year to year. Past projects have included creating a biomedical anthropometrics database, field-testing modern bridge inspection techniques, embedding fiber optics in the tendons of offshore oil drilling structures, analyzing computer worms and viruses, and designing water purification systems for developing nations.

We highly recommend that you look through past students' research papers to get a sense of the Research Project experience. Research papers from our 2006-2008 sessions are available in our electronic research journal at <http://www.osd.rutgers.edu/gsjournal.htm>

### Site Visits:

Each Governor's School student will have the opportunity to visit three local corporations to learn about future career opportunities. Among the dozen locations we visited in 2008 were PSE&G Nuclear, Sun Microsystems, Chanel, Colgate-Palmolive, Lockheed Martin, and the IBM Wafer Fab. Note that site visit locations vary from year to year.

### Enrichment Series:

A number of supplementary activities will reinforce ideas in engineering. "Life Skills Days" will provide exposure to many important skills an engineer needs to know, yet may not have seen before. Each Life Skills Crash-Course provides a 60 minute introduction to a topic without assuming any prior knowledge. Past topics have ranged from using power tools, repairing iPods, soldering, and speed-solving the Rubik's Cube, all the way to salsa dancing!

A series of distinguished guest speakers will discuss cutting edge research results and career opportunities, and give advice that will prove relevant throughout scholars' careers. Past guest speakers have included vice presidents at major corporations, founders of startup companies, quantum computer experts, civil engineers redesigning local roadways, biomedical engineers who are now doctors, science fair champions, and professors leading infrastructural changes in Africa.

Our Governor's School students will also work together to design and run technology outreach programs for disadvantaged local communities. In 2008, we partnered with community organizations in Paterson and Newark and ran a very successful series of computer literacy events for middle school students and senior citizens.

Additional activities at Governor's School include a College Question and Answer session with current students at elite universities, a half-day simulation of the team design process, recreational athletics activities, and a student talent show! We also schedule additional activities based on admitted students' expressed interests, so each year's Governor's School is customized.

## ONLINE RESOURCES / WEBSITE

To get a better sense of our program, we highly encourage interested students and parents to look at past research papers, photographs, and other materials on our website: [www.osd.rutgers.edu/gs/](http://www.osd.rutgers.edu/gs/) Please also feel free to contact us at any time during the application process. Our contact information is on the following page.

## THE SELECTION PROCESS

Students chosen by their high school's nominating committee are termed “**nominees**,” and their applications must be forwarded to their county superintendent by **November 21<sup>st</sup>, 2008**. County superintendents forward all complete applications to the selection committee at Rutgers, the State University of New Jersey. Thus, every nominee who includes all of the requested documents in his or her application will be evaluated at the state level. The dates and length of this year's residential program will be announced on **January 15, 2009** at [www.nj.gov/govschool](http://www.nj.gov/govschool).

At Rutgers, a panel of professors, researchers, and educators in engineering and technology reviews finalists' applications. Using the criteria below, this panel selects students as “Governor's Scholars” and invites those students to attend the Governor's School. The committee's decision is both emailed to the student and postal mailed to the student's home address during the **first week of April, 2009**. Admissions decisions at the state level are quite competitive; in recent years, approximately 25% of nominees have been offered admission.

Once a student's application is submitted to the county superintendent (and thus forwarded to Rutgers University), the next correspondence the nominee should expect to receive from the Governor's School is the decision letter in April. If the nominee wishes to update his or her application with new PSAT scores, an updated transcript, or evidence of significant new accomplishments, he or she should send this information directly to Rutgers at the address listed on the next page. Please note that we discourage minor updates.

## SELECTION CRITERIA

The selection committee for the Governor's School of Engineering and Technology aims to craft a student body made up of New Jersey's most talented and enthusiastic students, with representation from each of New Jersey's counties. Our student body should be diverse in myriad ways. Our students should possess a great range of gifts in technology, the arts, humanities, and the natural sciences. Overall, the committee chooses the students who will best take advantage of an opportunity to gain greater familiarity with the technological needs of society as engineers solve the complex problems of the present and future.

Decisions are based on the following qualitative and quantitative criteria, in order of decreasing importance:

- The student's high school transcript and class rank
- The student's personal essays and reasons for wanting to attend Governor's School
- Letters of recommendation from teachers, advisers, and mentors
- The student's extracurricular activities and community service pursuits
- The student's academic and extracurricular honors
- The student's standardized test scores (PSAT preferred)

We expect Governor's Scholars to exhibit great creativity and a unique passion for the nature of our Governor's School. 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 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. In general, students with a demonstrated fervent interest in engineering and technology (both inside and outside of the classroom) are more successful in the admissions process than students with perfect standardized test scores but only superficial interest in engineering. Of course, most of our scholars are not only devoted to engineering and technology, but *also* have astronomical test scores and rank at the absolute top of their class. We are privileged to choose the best of the best.

## APPLICATION INSTRUCTIONS

**Step 1:** Review the program information and descriptions in this packet. We also highly recommend that you and your family visit our web site at [www.osd.rutgers.edu/gs/](http://www.osd.rutgers.edu/gs/) in order to see pictures and videos from past years, along with our past students' research papers.

**Step 2:** Complete the "Cover Sheet" page, which is the fifth page of this packet. This "Cover Sheet" should be the first page of your submitted application.

**Step 3:** As the second page of your application, include the "Check List," which is the sixth page of this packet.

**Step 4:** 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, jobs you've held, 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 5:** 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 can 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 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 an academic idea that you find very interesting. It can be as general as a whole discipline or as specific as a particular problem, challenge, or inventor.

Short Response 3) What makes you unique? This can be a specific talent, a special interest, or a more general description.

**Step 6:** Include recommendation letters from two people not related to you. At least one of these letters must come from a high school teacher. The second letter may come from another teacher, a club advisor, or a mentor.

**Step 7:** Verify that your high school will include your transcript (including junior year grades) and PSAT scores from 2008.

**Step 8:** If your junior year grades or junior year PSAT scores are not available at the time you submit your application, please forward them to the selection committee at Rutgers (using the address below).

## CONTACT INFORMATION

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

**Email:** [blaseur@rci.rutgers.edu](mailto:blaseur@rci.rutgers.edu)

**Website:** <http://osd.rutgers.edu/gs/> (*Engineering only*)  
<http://www.nj.gov/govschool/> (*all programs*)

**Telephone:** (732)445-5053, Extension 16

**Fax:** (732)445-5878

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

# GOVERNOR'S SCHOOL OF ENGINEERING AND TECHNOLOGY 2009 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 # \_\_\_\_\_

Gender: Male \_\_\_ Female \_\_\_ Race/National Origin (Optional) \_\_\_\_\_

Mother's/Guardian's Name: (first) \_\_\_\_\_ (last) \_\_\_\_\_

Father's/Guardian's Name: (first) \_\_\_\_\_ (last) \_\_\_\_\_

Mother's Email Address \_\_\_\_\_

Father's Email Address \_\_\_\_\_

School Name: \_\_\_\_\_

School Address \_\_\_\_\_ Town \_\_\_\_\_ Zip \_\_\_\_\_

School Telephone \_\_\_\_\_ School District \_\_\_\_\_ County \_\_\_\_\_

Please choose three disciplines of engineering or technology that you would most like to study during Governor's School. (i.e. [http://en.wikipedia.org/wiki/Fields\\_of\\_engineering](http://en.wikipedia.org/wiki/Fields_of_engineering))

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

## IMPORTANT DATES

### **November 21<sup>st</sup>, 2008**

You and your school must submit your application to your county superintendent

### **December 12, 2008**

Applications of nominees submitted to the Governor's School of Engineering and Technology at Rutgers U.

### **January 15, 2009**

The dates and length of this summer's residential program will be posted on [www.nj.gov/govschool](http://www.nj.gov/govschool)

### **April 3, 2009**

The Governor's School of Engineering and Technology at Rutgers announces admissions decisions by email and postal mail.

## STUDENTS AND PARENTS, Please check and sign

- I am a resident of New Jersey.
- I expect to be a high school senior in the 2009-2010 school year.
- I am not irrevocably committed to another summer program.

\_\_\_\_\_  
*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*

# APPLICATION CHECK LIST

(Please include as "Page 2" of your application)

**Nominee's Checklist:**

- I've included the "Cover Sheet" as Page 1 of my application.
- I've included this checklist as Page 2 of my application.
- I've attached a list of my extracurricular activities and my extracurricular and academic honors.
- I've included responses to all five essay and short response prompts.
- I've attached two letters of recommendation, at least one of which was written by a teacher.
- My school has included my high school transcript and copies of my PSAT (or other standardized test) scores.
- I am a resident of the state of New Jersey and will complete my junior year of high school in the spring of 2009.
- I have kept a copy of my application for my own records. If my current PSAT scores were not included, I will forward them to Rutgers once they become available.

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 Nominee (please print)

\_\_\_\_\_

Student's Signature

**Principal's Checklist:**

- The nominee has included his or her application "Cover Sheet," this checklist, a list of activities and honors, five essay responses, and two letters of recommendation.
- I have included the nominee's high school transcript and copies of his or her PSAT (or other standardized test) scores.
  - The transcript includes grades from junior year, and the PSAT scores are from 2008.
  - I have included an older transcript or PSAT scores. The nominee will mail an updated transcript with junior year grades along with his/her 2008 PSAT scores when they become available.
- The nominee is a conscientious and eager student, and ranks near the top of his/her class.

**Fill in candidate's high school GPA \_\_\_\_\_ Class Rank \_\_\_\_\_ Class Size \_\_\_\_\_**

- The nominee's standardized test scores are among the best in our school.

**PSAT Scores: M \_\_\_\_\_ V \_\_\_\_\_ W \_\_\_\_\_ Test Date: 2007 / 2008 (circle)**  
**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 included contact information for the nominee's guidance counselor: **Name:** \_\_\_\_\_ **Email:** \_\_\_\_\_

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