

***REGENERON***

**SCIENCE**  
**TALENT SEARCH**

A program of  
SOCIETY FOR SCIENCE  
& THE PUBLIC



Since 1942

# REGENERON SCIENCE TALENT SEARCH

**2018 RULES AND ENTRY INSTRUCTIONS**



2017 Regeneron Science Talent Search finalists on the Capitol steps in Washington, DC.

The [Regeneron Science Talent Search \(Regeneron STS\)](#) is the nation's most prestigious pre-college science competition, providing an important forum for original research that is recognized and reviewed by a national jury of professional scientists. Alumni have made extraordinary contributions to science and have earned many of the world's most distinguished science and math honors, including twelve Nobel Prizes, eleven National Medals of Science and two Fields Medals. Annually, over 1,800 high school seniors from around the country accept the challenge of conducting independent science, math or engineering research and completing an entry for the Regeneron Science Talent Search. The Regeneron Science Talent Search recognizes 300 students as scholars and awards their schools each year and invites 40 student finalists to Washington, D.C. to participate in final judging, display their work to the public, and meet with notable scientists and government leaders. Each year, Regeneron STS scholars and finalists compete for \$3.1 million in awards.



# REGENERON SCIENCE TALENT SEARCH PROCESS & PREPARATION

## STUDENT ENTRY

Entries in the Regeneron Science Talent Search are submitted online. All components of the application must be included in the online submission, including school transcripts and test scores. Components of the application are managed as follows:

1. Responses to short answer and essay questions are entered directly into the online application web pages.
2. The Research Report (maximum 20 page research paper), Institutional Review Board approval (for human participants), and International Animal Care and Use Committee approval (for non-human vertebrate animals) are uploaded by entrants as are uploaded by entrants as Adobe Acrobat files (PDFs).
3. Requests for educator recommendations, project recommendations, and high school reports are sent via e-mail by the online recommendation system at the request of the entrant. Recommenders receive an email invitation and are prompted to create a password to complete and submit forms online. Counselors must upload transcripts on the high school report as PDFs. Mailed, hard copies are not accepted. Students are responsible for the timely receipt of transcripts and recommendations.

## IMPORTANT DATES

**Application Opening:** AUGUST 1, 2017  
<https://sciencetalentsearch.fluidreview.com>

**Recommendation Due Date:**  
NOVEMBER 8, 2017 AT 8:00 P.M. EASTERN TIME

Recommendations should be received by the Society (not just requested) by this date and time.

**Technical Support Deadline:**  
NOVEMBER 14, 2017 AT 8:00 P.M. EASTERN TIME

Students submitting a technical support request by this date and time are guaranteed that the specific problem reported will be resolved before the Application

Deadline. The Society cannot guarantee that requests for technical assistance will be resolved if submitted after this date and time. Entrants should submit early on November 14 in case they experience difficulties and it becomes necessary to submit a technical support request.

**Application Deadline:**  
NOVEMBER 15, 2017 AT 8:00 P.M. EASTERN TIME

All parts of the application must be received by the Society by this date and time, including recommendations.

Recommendations must be submitted by the recommendation provider by this date and time. No portions of the application will be accepted after the deadline for any reason.

## SELECTION PROCESS

After reviewing entries for completeness, accuracy, eligibility and rules adherence, all portions of every eligible submission are evaluated by three or more doctoral scientists, mathematicians, and/or engineers in the appropriate scientific discipline. Three hundred scholars are selected. These top entries are further reviewed by an additional judging panel of doctoral scientists, who select 40 finalists.

## ANNOUNCEMENTS

Entrants are encouraged to check the Regeneron STS website, [student.societyforscience.org/regeneron-sts](http://student.societyforscience.org/regeneron-sts), frequently for announcements during the summer and fall. Scholars will be announced on this website on January 9, 2018. Finalists will be announced on January 23, 2018.

## REGENERON SCIENCE TALENT INSTITUTE

The 40 Regeneron Science Talent Search finalists will receive an all-expense paid trip to Washington, DC, to attend the Regeneron Science Talent Institute from March 8–14, 2018. The visit will include final in-depth judging, visits to historic sites and cultural institutions, and meetings with national leaders and prominent scientists and engineers.

Regeneron STS finalists will exhibit their research to the public and will have the opportunity to exchange ideas and insights with each other, as well as with illustrious members of the scientific research community. Full participation in the Regeneron Science Talent Institute is a requirement of maintaining finalist status and receiving finalist award monies.

The Regeneron Science Talent Institute culminates in a black-tie gala honoring the forty finalists, to be held March 13, 2018. The evening will conclude with the announcement of the top ten award winners.

## ELIGIBILITY REQUIREMENTS

1. a. Any student who is enrolled in and attending his or her last year of secondary school (public, private, parochial, or home school) on the application deadline date in the United States, Puerto Rico, Guam, the U.S. Virgin Islands, American Samoa, Wake and Midway Islands, or the Marianas; or
- b. Any United States citizen enrolled in his or her senior or 12th grade year of secondary school on the application deadline date attending a:
  - i. Department of Defense Dependents School or an accredited overseas American or International School; or
  - ii. foreign school as an exchange student; or
  - iii. foreign school because his/her parent(s) are temporarily working and living abroad.

Proof of citizenship is required for 1b (above).

2. Entrants must be completing high school courses required for college applications and must not have entered any previous STS.
3. Sons and daughters of Society for Science & the Public employees, Trustees, Regeneron Science Talent Search evaluators or judges are not eligible to enter the Regeneron Science Talent Search.
4. Only one entry per student.
5. Applicants must:
  - a. be over 13 years of age and have legal parental or guardian consent to submit the application and participate, or
  - b. be 18 years of age or older, or
  - c. be an emancipated minor.
  - d. not have already earned a high school diploma.

## ENTRY RULES

1. Research conducted as part of a pre-collegiate student team project is not eligible for Regeneron STS. This includes any research or portion of research regardless of whether it has or will be submitted to any competition. Even if the student was a primary member of a team or conducted one portion of the research, it must still be considered a part of that team project, and is not eligible for Regeneron STS. Students may not “split” a team project and enter it in Regeneron STS as individuals. Research conducted alongside adult researchers in a research institution is allowed, but adequate acknowledgement of ownership throughout the application is vital. Consideration should be given to the extent to which the research qualifies as independent research, given the student and adult responsibilities.

2. Each student must attest to the following statement before submitting an application:

I certify that I am at least 18 years of age, or that I am an emancipated minor, or that I possess legal parental or guardian consent to submit the Application and participate in the Regeneron STS, and that I am fully able and competent to submit the Application and to abide by and comply with the Regeneron STS Rules & Entry Instructions. In any case, I certify that I am over the age of 13. I certify that all the information provided is correct and complete without omission to the best of my knowledge and I certify that the Research Report I am submitting is my own individual work, not that of a student team, nor does it represent the work of others. I understand that I am responsible for all aspects of my work’s authenticity: the research, the Application, and all other documentation in the application process, as well as the display board and oral presentation if I am selected as a finalist. I attest that all these submissions are exclusively my work in substance and in presentation. I further understand that scientific fraud, misconduct, misrepresentation of work or attribution thereof, or violation of the rules and/or eligibility requirements may result in disqualification and forfeiture of any monetary awards and that the Society reserves the right in such cases to bar future participation in Society programs. I agree to accept the decision of the judges as final and understand that my application and Research Report will not be returned to me but shall become the sole property of Regeneron STS/the Society. I also agree to permit Regeneron STS/the Society to use all information contained in my application in any way it deems appropriate for publicity purposes. I certify that I have read and fully understood all rules and eligibility requirements found in the Regeneron STS Rules & Entry Instructions and that I have complied with all rules and meet the eligibility for submitting this Regeneron STS entry.

3. The Society uses plagiarism detecting software to authenticate the Regeneron Science Talent Search entries including essays, research reports and recommendation letters. Every report is individually reviewed by the software and any questionable cases receive a second review by an Regeneron Science Talent Search Rules Advisor to determine whether the entry is in violation of Regeneron STS rules and guidelines. Submissions found to be in violation of the originality rules will be notified and will not be awarded entrant status, nor will they receive the benefits associated with being an entrant.
4. The practice of mentor/adult compensation based on a student’s results (placement) in the Regeneron STS is prohibited. Any such compensation will render the student entry ineligible for consideration and will be grounds for the revocation of any award already made.

# REGENERON SCIENCE TALENT SEARCH | PROCESS & PREPARATION

## 5. APPLICATION CONTENTS: Each entry must include the following (a and b) :

- a. Completed Application tasks 1-10 (required sections of the application):
  - i. Basic Information
  - ii. High School Information
  - iii. Activities, Interests and Awards
  - iv. Test Score
  - v. Essay Questions
  - vi. Previous Research
  - vii. Science Research Description
  - viii. Upload Research Report
    - Research Report: including text, and all appendices, tables/charts, etc., may not exceed 20 pages total. Title page, abstract, and bibliography pages do not count in the 20 page limit. Any pages provided that exceed 20 will not be read or considered. Students should select a report format/style that is appropriate for their discipline.
  - ix. Rules Wizard
    - Rules Wizard will determine if projects require a complete IRB/IACUC approval, and will then require upload of relevant documents in this section.
  - x. Beyond Judging
- b. **“Submitted”** status—applications that are not fully submitted will not be accepted. Entrants must hit a submit button and will know their applications have been accepted when they receive a confirmation email.

Applicants must request the following items (c- e) through the online system, but applications for which the Society does not receive these items will still be judged:

- c. Educator Recommendation(s): completed online by the person with the most knowledge of the student in an academic setting and of his or her scientific potential.
  - d. Project Recommendation(s): completed online by the person closest to the student’s research. The head of a lab should only complete this if he or she worked with the student closely.
  - e. High School Report: completed online by a counselor or administrator. Official high school transcripts must be uploaded in this section.
6. Projects involving experimentation with live, non-human vertebrate animals are permitted under restricted/limited conditions.

Live, non-human vertebrate animals are defined as any live mammalian embryo or fetus, bird or reptile eggs within three days (72 hours) of hatching, and all other vertebrates at hatching or birth. Exception: Because of their delayed cognitive neural development, zebrafish embryos are not considered vertebrate animals until 7 days (168 hours) post-fertilization.

All studies involving vertebrate animals must be conducted at a Regulated Research Institution and be reviewed and approved before experimentation begins by an Institutional Animal Care and Use Committee, known as an IACUC.

All projects involving live, non-human vertebrate animals must adhere to the following rules.

- a. Projects involving experimental procedures conducted on live animals must be conducted in a Regulated Research Institution with documentation of IACUC approval and must be restricted to the following:
  - i. the student’s only physical contact with the animal(s) is restricted to supervised handling and husbandry procedures that meet IACUC standards at Registered Research Institutions, which conform to federal regulations protecting animal well-being and researcher safety; AND
  - ii. the student works with non-living material (e.g. tissue, blood) that has been supplied to them by the supervising scientist; AND
  - iii. the animal(s) is/are not sacrificed solely for the student’s project; AND
  - iv. the project the student designs and implements begins with non-living material. (No procedures, invasive or otherwise, were conducted on live vertebrate animals for the student-designed project); AND
  - v. the student was not involved in the collection of data, directly or indirectly (through media or video) where the research involved invasive or intrusive experimentation that causes more than momentary pain or distress to the vertebrate animal(s).
- b. Projects involving animals in their natural environment may be conducted in the field or other site with documentation of IACUC approval, proper permissions or licenses and must be restricted to the following:
  - i. the study is observational or behavioral AND
  - ii. the study is non-invasive and non-intrusive AND
  - iii. the study does not affect an animal’s health or well-being by causing stress, discomfort or pain AND
  - iv. the student has no direct contact with the animal
- c. Projects that only involve the observation of animals in their natural environments, where no experimental or behavioral procedures are conducted AND in which the study does not affect the animal’s health or well-being by causing stress or discomfort do not require prior review and approval.

In both cases (a) and (b) described above, documentation of IACUC approval, proper permissions, and licenses must be provided with the application.

# REGENERON SCIENCE TALENT SEARCH | PROCESS & PREPARATION

7. Projects involving HUMAN PARTICIPANTS, including surveys (written, in-person, or online), product testing, or human tissue samples, must adhere to the following rules even for anonymous studies:

Based upon the Code of Federal Regulations (45 CFR 46), the definition of a human participant is a living individual about whom an investigator conducting research obtains (1) data or samples through intervention or interaction with individual(s), or (2) identifiable private information.

- a. Student researchers must write a research plan that should include a description of research participants, recruitment procedures, research methodology, assessment of risks and benefits of the research, procedures for minimizing physical, psychological and privacy risks to participants and procedures for obtaining informed consent.
- b. The research plan must be reviewed and approved by a properly constituted Institutional Review Board (IRB) before the student may begin recruiting and/or interacting with human participants. After initial IRB approval, a student with any proposed changes to the research plan must repeat the approval process before experimentation/data collection resumes.
  - i. If research is conducted in a high school, it is the responsibility of the student researcher to receive properly documented IRB approval before beginning the study (see IRB guidelines below).
  - ii. If research is conducted at a federally regulated research institution (e.g., university, medical center, NIH, correctional institution, etc.), the research plan must be reviewed and approved by that institution's IRB and proper documentation must be provided.
- c. The research study must be in compliance with all privacy and HIPAA laws when they apply to the project. Students are prohibited from administering medications and performing invasive medical procedures on human participants. The IRB must confirm that the student is not violating the Medical Practice Act of the particular state or territory in which he/she is conducting the research.
- d. Research participants must voluntarily give informed consent/assent, and in cases where the research participant is a minor, parental permission may be required. The IRB determines whether written documentation of consent/assent/permission is necessary.
- e. Student researchers may NOT publish or display information in a report that identifies the human participants directly or through identifiers linked to the participants (including photographs), without written consent (Public Health Service Act, 42, USC 241 (d)).

- f. All standardized tests that are not in the public domain must be administered, scored and interpreted by a qualified professional as required by the instrument publisher. Any and all use and distribution of the test must be in accordance with the publisher's requirements including procurement of legal copies of the instrument.
- g. Some studies involving human data or human tissue samples are not considered human participants projects and are exempt from IRB review and approval. These include:
  - i. Studies in which the data or tissue samples are preexisting and publicly available.
  - ii. Behavioral observations of unrestricted, public settings in which a) the researcher has no interaction with the individuals being observed and b) the researcher does not manipulate the environment and c) the researcher does not record any personally identifiable data.
  - iii. Research in which the student receives pre-existing or retrospective data or tissue samples in a de-identified/ anonymous format. The professional providing the data or tissue samples must certify, in writing, that the data or tissue samples were not collected for the purpose of the student's project and have been appropriately de-identified in compliance with all privacy and HIPAA laws.
- h. If a student-designed invention, program, concept, etc. is product tested by human participants, other than the student researcher, the project must be reviewed and approved by an IRB as described above before the product testing takes place.

## INSTITUTIONAL REVIEW BOARD

An Institutional Review Board (IRB) is an independent committee that, according to federal regulations (45-CFR-46), evaluates the potential physical and/or psychological risk of research involving human participants. All proposed human research must be reviewed and approved by an IRB before experimentation begins. This includes any surveys or questionnaires to be used.

School-level IRBs must consist of a minimum of three members. A school-level IRB must include: (1) a science teacher not involved with project(s) being reviewed, (2) a school administrator (preferably a principal or vice principal) and (3) one of the following who is knowledgeable and capable of evaluating the physical and/or psychological risk involved in a given study: a physician, psychiatrist, physician's assistant, registered nurse, psychologist, or licensed social worker who is not involved with the project being reviewed. No member of an IRB may be personally related to the student researcher. Teachers and advisors who oversee a specific project must



not serve on the IRB reviewing that project. An improperly-constituted IRB invalidates the approval of a project. IRBs must secure additional alternate members to ensure the eligibility of the projects being reviewed.

IRBs exist at federally registered institutions (e.g., universities, medical centers, NIH, correctional facilities). The IRB must initially review and approve all proposed research conducted at, or sponsored by, that institution.

## RISK ASSESSMENT

Once a study population is chosen, the student researcher must assess any potential physical and/or psychological risks. In evaluating risk, students and IRBs must follow the federal definition of minimal risk:

No more than minimal risk exists when the probability and magnitude of harm or discomfort anticipated in the research are not greater (in and of themselves) than those ordinarily encountered in DAILY LIFE or during performance of routine physical or psychological examinations or tests.

The following risk groups require additional safeguards because they may be vulnerable to coercion or undue influence:

1. Any member of a group that is naturally at-risk (e.g., pregnant women, individuals with diseases such as cancer, asthma, diabetes, cardiac disorders, psychiatric disorders, dyslexia, AIDS, etc.).
2. Special vulnerable groups that are covered by federal regulations (e.g. children/minors, prisoners, pregnant women, mentally disabled persons, or economically or educationally disadvantaged persons).

The following are examples of activities that contain more than minimal risk:

1. PHYSICAL
  - a. Exercise other than ordinarily encountered in daily life by that participant.
  - b. Ingestion of any substance or exposure to any potentially hazardous materials.
2. PSYCHOLOGICAL
  - a. Any activity (e.g. survey, questionnaire, viewing of stimuli) or experimental condition that could potentially result in emotional stress. For example, answering questions related to personal experiences such as sexual, physical or child abuse, divorce and/or psychological well-being (e.g. depression, anxiety, suicide) is considered more than minimal risk.

Additionally, research activities that involve exposing participants to stimuli or experimental conditions that could potentially result in emotional stress must also be considered more than minimal risk. Examples include violent or distressing video images, distressing written materials or activities that could potentially result in feelings of depression, anxiety, or low self-esteem in participants.

- b. Any activity that could potentially result in negative consequences for the participant due to invasion of privacy or breach of confidentiality. When research activities involve collection of personal information (e.g. history of abuse, drug use, opinions, fingerprints) or health-related data (genetic material, blood, tissue) the researcher must consider risks related to invasion of privacy and possible breach of confidentiality. Ways to reduce these risks include collecting data anonymously or developing data collection procedures that make it impossible to link any identifying information (e.g. participant's name) with his/her responses or data.

## INFORMED CONSENT

Informed consent provides information to the potential participant about the risks and benefits associated with participation in the research study and allows the person to make an independent, educated decision about whether or not to participate. Informed consent is an ongoing process, not a single event that ends with a signature on a page. It must not involve coercion or deception.

Documentation of informed consent is required:

1. When the IRB determines that a research study involves physical or psychological activities with more than minimal risk;
2. When the IRB determines that the project could potentially result in emotional stress to a research participant;
3. When the IRB determines that the research participants belong to a risk group.

## ADDITIONAL RESOURCES

Additional resources are available regarding human participants research guidelines.

On this website, the Office for Human Research Protections details national guidelines from which Regeneron STS rules are derived and provides the recommended online training prior to planning any human participant study, for students, new high school IRBs, and new IRB members: <http://ohsr.od.nih.gov>

Bioethics resources are at: <http://bioethics.od.nih.gov>

## ACADEMIC INTEGRITY

The Regeneron Science Talent Search, like colleges and universities across the nation, expects that students hold themselves to rigorous ethical standards, both academic and personal. Responsibility for integrity in scholarship is inherently the scholar's, including the student scholar. Students must be responsible for all aspects of their work's authenticity: the research, the application, and all other documentation. The required signature box asks the entrant to attest to every statement, and by their signature, claim each one to be true or understood. It also attests that material

submitted is exclusively the work of the applicant in substance and in presentation. Note that it additionally attests that no mentor of an Regeneron STS applicant may be compensated based on an applicant's performance in the Regeneron STS. The responsibility and privilege to present independent work in conformity with Regeneron STS rules rests with the student, with the guidance of faculty and adult advisors.

If a determination is made at any point that an entrant has violated rules and/or misrepresented work or attribution thereof, the Society reserves the right to disqualify the entry, withhold and/or withdraw monetary awards and/or exclude the entrant from participating in Society programs.

## INTELLECTUAL PROPERTY

Independent research for the Regeneron STS may produce findings that are the Intellectual Property (IP) of the entrant. Participation in the Regeneron STS requires disclosure of methods and results; they will be made available to the public. If entrants are concerned about the protection of IP, they are urged to consider these issues with their supervising scientist and qualified adult advisors to make an informed decision before entering the Regeneron STS. The exhibition, posting, and judging process will not be modified in deference to journal embargoes or other considerations.

## CONDITIONS OF AWARDS

All awards will be paid in the year they are awarded, if the student has provided the necessary documentation to process payment. Awards not disbursed within two years of the award date will be subject to forfeiture.

For individual awards greater than or equal to \$20,000, annual payments will be made. The awardee must be an undergraduate or graduate student in good standing to receive payment. Payments must begin no later than six years after the award is made and must conclude within eight years of matriculation from high school. Initial payments will commence once the student has provided the necessary documentation to provide payment. Awards not disbursed within the dates noted above will be subject to forfeiture.

The Society may approve, at its discretion, the extension of the payment schedules noted above if the student provides a request in writing detailing his or her individual circumstances. The Society reserves the right to deny any such request.

Internal Revenue Service (IRS) regulations require that the Society file IRS Form 1099 for Miscellaneous Income for recipients of award monies which total \$600 or more during a calendar year. Award recipients will receive their copy of Form 1099 from the Society in January of the year following the year award payments are made. ♦



# REGENERON SCIENCE TALENT SEARCH | CATEGORIES

Entrants must select one category from the list below; this will determine the expertise of the initial review only. Scholars and finalists are selected without regard to the category, and winners may not be selected proportionally across categories. Consultation with teachers or mentors is encouraged to determine the best category for each entry.

**ANIMAL SCIENCES (AS):** Study of animals – ornithology, ichthyology, herpetology, entomology, animal ecology, paleontology, cellular physiology, circadian rhythms, animal husbandry, cytology, histology, animal physiology, invertebrate neurophysiology, studies of invertebrates, etc.

**BEHAVIORAL AND SOCIAL SCIENCES (BE):** Human and animal behavior, social and community relationships – psychology, sociology, anthropology, archaeology, ethology, ethnology, linguistics, learning, perception, urban problems, public opinion surveys, educational testing, etc.

**BIOCHEMISTRY (BI):** Chemistry of life processes – mechanisms of molecular biology and genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, hormones, etc. Studies involve understanding life and cellular processes specifically at the molecular level.

**BIOENGINEERING (BN):** Engineering principles applied to biology or medicine, such as bodily aids or replacements, medical/diagnostic devices, and drugs or other therapies using engineering to address a biological problem.

**CELLULAR AND MOLECULAR BIOLOGY (CM):** Wide ranging field that studies cellular structure, function, biomolecule trafficking, signal transduction, genetic information flow, and cellular replication.

**CHEMISTRY (CH):** Study of nature and composition of matter and laws governing it – physical chemistry, organic chemistry (other than biochemistry), inorganic chemistry, plastics, fuels, pesticides, metallurgy, soil chemistry, etc.

**COMPUTER SCIENCE (CS):** Study and development of computer hardware, software engineering, internet networking and communications, graphics (including human interface), simulations/virtual reality or computational science (including data structures, encryption, coding and information theory), etc.

**COMPUTATIONAL BIOLOGY AND BIOINFORMATICS (CB):** Studies that primarily focus on the discipline and techniques of computer science and mathematics as they relate to biological systems. This includes the development and application of data-analytical and theoretical methods, mathematical modeling and computational simulation techniques to the study of biological, behavioral, and social systems.

**EARTH AND PLANETARY SCIENCE (EP):** Geology, mineralogy, physiography, cryosphere, ocean sciences, geomagnetism, hydrology, meteorology, climatology, speleology, seismology, tectonics, volcanology, and planetary science, etc.

**ENGINEERING (EN):** Technology; projects that directly apply scientific principles to manufacturing and practical uses – civil, mechanical, aeronautical, chemical, and electrical engineering; electronic, sound, automotive, marine, heating and refrigeration, transportation, environmental engineering, etc.

**ENVIRONMENTAL SCIENCE (EV):** Study of ecology, sustainability, climate, and human impacts, including pollution from air, water or land sources and their control or remediation, etc.

**GENOMICS (GE):** DNA microarray and deep sequencing studies; phylogenetic analysis of DNA or other biomol-

ecules; analysis of human or other genomes, molecular evolution, etc.

**MATHEMATICS (MA):** Development of formal logical systems or various numerical and algebraic computations, and the application of these principles – calculus, geometry, abstract algebra, number theory, statistics, complex analysis, probability, etc.

**MEDICINE AND HEALTH (ME):** Study of diseases and health of humans and animals – pharmacology, physiology, pathology, ophthalmology, oncology, cardiology, nephrology, endocrinology, pediatrics, dermatology, allergies, speech and hearing, nutrition, dentistry, etc.

**MATERIALS SCIENCE (MS):** The structure, engineering properties, processing, and innovative uses of metals/alloys, polymers, ceramics, glasses, electronic materials, biomedical materials, composites, and other innovative materials at scales ranging from the atomic to the macroscopic, etc.

**PHYSICS (PH):** Theories, principles, and laws governing energy and the effect of energy on matter – solid state, optics, acoustics, particle, nuclear, atomic, plasma, superconductivity, fluid and gas dynamics, thermodynamics, magnetism, quantum mechanics, biophysics, etc.

**PLANT SCIENCES (PS):** Study of plant life – agriculture, agronomy, horticulture, forestry, plant taxonomy, plant physiology, plant pathology, plant genetics, hydroponics, algae, etc.

**SPACE SCIENCE (SS):** Study of celestial bodies, their positions, motions, nature and evolution – astronomy, astrometry, celestial mechanics, etc.

# REGENERON SCIENCE TALENT SEARCH | THE RESEARCH REPORT

The research report is evidence of research ability, scientific originality, and creative thinking. It is an opportunity to demonstrate competence in planning and completing a project in science, mathematics, or engineering. Students must have completed an independent scientific investigation and have results to report. Investigations not yet completed, literature reviews, and essays are not eligible for this competition.

There is no time limit on the period over which research is performed. Some entrants spend years developing the work that is eventually submitted; others will have spent a few intensive weeks. Each entrant may submit only one entry and Research Report on one topic.

The research report must be in at least the size of Times New Roman 11pt. font, but entrants may choose their own clearly legible font, with 1.5 line spacing, and 1" margins on all sides.

The research report, limited to 20 pages, must include:

- Title Page (1st page, not in 20-page limit) containing no phone numbers or email addresses
- Abstract (2nd page, not in 20-page limit)
- Short introduction describing the background and purpose of the work
- Experimental section including methods and results
- Concluding discussion of results and implications
- Bibliographic references for all sources consulted with internal citations (not in 20-page limit)

*Note: The file size upload limit for the research report, including all illustrations, photos, tables, diagrams, charts, drawings, and/or maps embedded in the report, is 2MB.*

Please do not include the following in the research report:

- Library research or a history of literature beyond the short introduction
- Detailed explanations of experiments and procedures of other researchers that preceded the project.
- Lengthy autobiographical information or personal history
- Photographs of yourself
- Photographs of people that are not part of a data set

**ENTRANTS ARE ENCOURAGED TO SEEK EVERY POSSIBLE RESOURCE:**

Books, journals, experts in the field, adult advisors. Refer to research journals in your subject area for examples of report formats to guide your own format. Any pages submitted beyond the 20-page limit will not be read or considered. Regeneron STS recognizes the independent research of student investigators. Work submitted by the student scientist should be of her or his own design and execution, and presented in her or his own words. Frequently Regeneron

STS applicants do research within the context of the laboratory and/or in collaboration with others outside of a laboratory in which they work or that is related to that of those with whom they are working. This is expected, since science is a cumulative process, each finding built on previous ones. However, full disclosure of any research or person that has influenced the applicant's work is required. Furthermore, the research report must accurately reflect the work of only the student researcher. While students may seek review of their content and presentation of the research report, both the content and writing should be the work of the applicant. Adults reviewing research reports should suggest areas for improvement, but not provide the student with replacement text or rewrite any portion of the entry. Note that no mentor of an Regeneron STS applicant may be compensated based on an applicant's performance in the Regeneron STS. It is acceptable for students to pay or be paid for research experiences.

The research report must be uploaded online as a pdf. This upload is limited to 2MB. ♦

## TRANSCRIPTS

As of August 1, 2017, high school transcripts will only be accepted via the online application through the High School Report Recommendation. Transcripts will not be accepted via regular mail, fax or e-mail. Entrants are encouraged to request their High School Report Recommendation as early as possible, and to check in with their recommender (often a guidance counselor or registrar) to check on the status of the transcript submission; they should not wait until they are ready to submit the online portion as the Society will not accept any individual piece of the application after the deadline. The timely receipt of the transcript is the responsibility of the student. All transcripts should be received by the Recommendation Due Date.

High school recommenders experiencing difficulties with the updated transcript requirements should email [sts@societyforscience.org](mailto:sts@societyforscience.org).

## PREVIEW OF EDUCATOR RECOMMENDATION

Applicants must submit at least one educator recommendation. Questions #1–#3 will be answered in an uploaded letter of recommendation.

1. How long have you known this student and in what capacity? How does this student compare to students you currently teach and also to those you have known during your teaching career? (uploaded in letter)
2. Please address, with specific examples if possible, the student's character and integrity.
3. Please describe your personal observation (if any) of the extracurricular involvement and/or leadership this student has demonstrated among his/her peers. Do not include activities you have not witnessed. Entrants are able to provide a full extracurricular list in their portion of the application.
4. Please summarize your observations and experience with this student and the qualities (s)he possesses that you believe would contribute to his/her future promise as a scientist, mathematician or engineer. Relevant topics include (but are not limited to) scientific attitude, curiosity, initiative, problem-solving, originality of thought, collegiality, and work ethic (*1,000 character count maximum*).
5. Please explain your level of knowledge (if any) regarding the submitted research project and/or any other research projects conducted by this student during his/her high school career. If you are or were involved, can you attest that the application and research project submitted in this application properly reflect his/her own work? If you were not involved and have no knowledge of the work, please state so here (*1,000 character count maximum*).

## PREVIEW OF PROJECT RECOMMENDATION

The person who is most familiar with the research will complete this form online. Questions #1–#9 can be answered in text boxes or a letter or recommendation can be uploaded. Questions #10–#13 must be answered in response boxes on the website.

1. Briefly explain how the student first became known to you. (e.g. personal relationship, summer program, high school partnership, direct communication from student, required or elective high school course).  
  
Is the student related to you or your colleagues? (son, niece, cousin, etc.) If so, please explain the relationship.
2. Please describe the nature of your involvement with the student's research. What role did you serve for the student? What type of guidance did you provide?
3. How did the student get the idea for his/her project? Was the project assigned; picked from a list of possible research topics; result from discussion with a scientist; arise from work in which the student was engaged; suggested by the student?
4. What was the duration and intensity of the student's research experience? Number of weeks, months or years; full-time vs. part-time; resident vs. non-resident, etc.
5. Provide a brief description of your laboratory/research environment and what the student's role was within this group. (Size, number of scientists or students, research levels (post-doc, doctoral, undergraduate, high school))
6. If there were other high school students in your research group, please explain the interaction of this student with others.  
  
Name any students who performed research that was similar to this student and explain how this student's work was different and independent from others.
7. For what aspects of the research can you give credit to the student as being his or her own unique contribution?
  - a. Purpose of the Experiment
  - b. Procedural Design
  - c. Data Collection
  - d. Processing/Analysis of Data
  - e. Drawing Conclusions
8. What did the student do that showed creativity and ingenuity? Based on your knowledge of the student, please provide examples of how this student demonstrates future promise as a scientist. Was he/she creative in his/her science, or creative for a high school student? What is your impression of his/her knowledge of experimental design, construction or use of equipment, evaluation of data, etc.?



9. Please provide any additional information that will help to articulate the work of this student. *(1,000 characters)*
10. Did the student's project involve non-intrusive, non-invasive research on live non-human vertebrate animals? If yes, please describe the student's training to work with animals, the supervision under which the work took place, and the student's overall interaction with the animals. *(800 characters)*
11. Was the student provided with tissue from a non-human vertebrate animal study? If yes, please provide the title of the IACUC-approved study, the IACUC approval number and date of approval (where required/and or applicable). Please describe the interaction the student had with live animals. *(800 characters)*
12. Did the student's research involve a human participants study being conducted at your institution, either behavioral or tissue? If yes, please provide the IRB approval number and date of approval. Please describe the student's interaction with the human participants and/or the student's specific role in the larger study. *(800 characters)*
13. Did you provide the student with de-identified human data? (If yes, please describe the data source.)

## PREVIEW OF SECONDARY SCHOOL REPORT

Do not complete these questions by hand. The entrant will request that his or her school counselor or an administrator complete this form in the online recommendation system. Please note that entrants are now responsible for the upload of their standardized test scores, and this information is no longer required in the High School Report. Transcripts now must be uploaded in the High School Report."

1. What is the approximate average graduation rate of your school over the past 2–3 years? (Compare the number of first year students entering your school to the number who graduate.) \_\_\_\_\_
  
2. Approximately what percentage of your graduates attend four-year colleges? \_\_\_\_\_
  
3. Please check all that apply to your school:  
\_\_\_\_\_ Magnet Program offered: \_\_\_\_\_  
  
Is the student in this magnet program? \_\_\_\_\_  
\_\_\_\_\_ International Baccalaureate offered  
\_\_\_\_\_ Advanced Placement courses offered
  
4. \_\_\_\_\_ AP courses offered in math & sciences

# REGENERON STS INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL FORM

Required for all research involving human participants. (Institutional Form or Intel ISEF form may be substituted.)

Student's Name: \_\_\_\_\_ Title of Project: \_\_\_\_\_

Adult Sponsor: \_\_\_\_\_ Contact Phone/Email: \_\_\_\_\_

To be completed by Student Researcher in collaboration with the Adult Sponsor/Designated Supervisor/Qualified Scientist:

1. ☐ I have submitted my Research Plan which addresses research methodology, participant recruitment, confidentiality and privacy issues, informed consent procedures and a risk and benefit analysis for the human participants.
2. ☐ I have attached any surveys or questionnaires I will be using in my project.
3. ☐ I have attached an informed consent that I would use if required by the IRB.
4. ☐ Yes ☐ No Are you working with a Qualified Scientist?

Name: \_\_\_\_\_ Degree: \_\_\_\_\_

Email Address/Phone Number: \_\_\_\_\_

Experience/Training as it relates to this project: \_\_\_\_\_

## MUST BE COMPLETED TO BE VALID

To be completed by Institutional Review Board (IRB) after review of the research plan. The submitted Research Plan must address all areas indicated on the Human Participants section of the Research Plan Instructions.

### Check one of the following:

- ☐ Research project requires revisions and is NOT approved at this time. IRB will attach document indicating concerns and/or requested revisions.
- ☐ Research project is Approved with the following conditions below: (All 5 must be answered)
1. Risk Level (check one) : ☐ Minimal Risk ☐ More than Minimal Risk
  2. Qualified Scientist (QS) Required: ☐ Yes ☐ No
  3. Written Minor Assent required for minor participants:  
☐ Yes ☐ No ☐ Not applicable (No minors in this study)
  4. Written Parental Permission required for minor subjects:  
☐ Yes ☐ No ☐ Not applicable (No minors in this study)
  5. Written Informed Consent required for subjects 18 years or older:  
☐ Yes ☐ No ☐ Not applicable (No subjects 18 yrs or older in this study)

IRB SIGNATURES (All 3 signatures required) None of these individuals may be the adult sponsor, designated supervisor, qualified scientist or related to (e.g., mother, father of) the student (conflict of interest).

I attest that I have reviewed the student's project and agree with the above IRB determinations.

**Medical or Mental Health Professional** (a psychologist, psychiatrist, medical doctor, licensed social worker, licensed clinical professional counselor, physician's assistant, or registered nurse)

Printed Name

Degree/Professional License

Signature

Date of Approval

## School Administrator

Printed Name

Degree

Signature

Date of Approval

## Educator (not involved with the project)

Printed Name

Degree

Signature

Date of Approval



# REGENERON SCIENCE TALENT SEARCH | JUDGING & AWARDS

All completed entries received by the deadline are first reviewed for eligibility, including student age, citizenship and residence. The originality of each entry is checked using plagiarism monitoring software. Those entries showing high similarity scores are reviewed by the rules committee and entries not passing this test are notified and fail to qualify for entrant status. A rules committee reviews each project for compliance with the vertebrate animal and human participant rules.

All eligible and valid entrants will receive a t-shirt, laptop stickers, a free one-year student membership to Society for Science & the Public which includes a free one-year subscription to *Science News*.

Entries are evaluated in four areas:

- Research Report and Scientific Merit
- Student Contribution to the Research
- Academic Aptitude and Achievement
- Overall Potential as a Future Leader of the Scientific Community

Every eligible entry, in its entirety, is reviewed by minimally three Ph.D. level scientists in the subject area of the research. Evaluators may request additional reviews for entries that are multi-disciplinary and for which they are requesting additional expertise.

## DIGITAL BADGES

Evaluators may award digital badges for special achievement in two areas – Student Initiative and the Research Report. Students must obtain a Society membership number in order to claim these badges.

## SCHOLAR AWARDS

Each of the 300 students named a scholar in the Regeneron Science Talent Search will receive a \$2,000 award for their outstanding science research. These awards will be mailed to Regeneron STS scholars in late Spring, upon completion and return of a W9 Request for Taxpayer Identification Number to the Society.

## SCHOOL AWARDS

The Regeneron Science Talent Search School Award recognizes excellence in teaching and school support of individual student research. Each school will receive an award of \$2,000 for each Scholar named in the Regeneron Science Talent Search. The award is to contribute to excellence in science, math and/or engineering education at the recipient school. In the case of home schooling, the award will be given to an affiliated school or school district of the home school or a qualified designee, after consultation with the Regeneron STS Director. The award will be mailed to the school in the Spring after submission of the School Award Program application and a W9 Request for Taxpayer Identification Number to the Society.

## FINALIST AWARDS

A panel of judges representing expertise across the disciplines of entry convenes and selects forty finalists from among the scholars. These students are awarded an all-expenses-paid trip to Washington, DC, where they will participate in individual interviews and display their work for the judges. Ten finalists are selected for top awards.

Award amounts are as follows:

<b>FIRST PLACE AWARD</b> \$250,000	<b>FIFTH PLACE AWARD</b> \$90,000	<b>NINTH PLACE AWARD</b> \$50,000
<b>SECOND PLACE AWARD</b> \$175,000	<b>SIXTH PLACE AWARD</b> \$80,000	<b>TENTH PLACE AWARD</b> \$40,000
<b>THIRD PLACE AWARD</b> \$150,000	<b>SEVENTH PLACE AWARD</b> \$70,000	<b>REMAINING THIRTY FINALISTS</b> \$25,000
<b>FOURTH PLACE AWARD</b> \$100,000	<b>EIGHTH PLACE AWARD</b> \$60,000	

# SAMPLE INFORMED CONSENT FORM

## INSTRUCTIONS TO THE STUDENT RESEARCHER:

An informed consent/assent/permission form should be developed in consultation with the Adult Sponsor, Designated Supervisor or Qualified Scientist.

This form is used to provide information to the research participant (or parent/guardian) and to document written informed consent, minor assent, and/or parental permission.

When written documentation is required, the researcher keeps the original, signed form.

Students may use this sample form or may copy ALL elements of it into a new document.

If the form is serving to document parental permission, a copy of any survey or questionnaire must be attached.

STUDENT RESEARCHER:

TITLE OF PROJECT:

I am asking for your voluntary participation in my science fair project. Please read the following information about the project. If you would like to participate, please sign in the appropriate box below.

PURPOSE OF THE PROJECT:

IF YOU PARTICIPATE, YOU WILL BE ASKED TO:

TIME REQUIRED FOR PARTICIPATION:

RISKS:

BENEFITS:

HOW CONFIDENTIALITY WILL BE MAINTAINED:

If you have any questions about this study, feel free to contact:

Adult Sponsor: \_\_\_\_\_

Phone/email: \_\_\_\_\_

## VOLUNTARY PARTICIPATION:

Participation in this study is completely voluntary. If you decide not to participate there will not be any negative consequences. Please be aware that if you decide to participate, you may stop participating at any time and you may decide not to answer any specific question.

By signing this form I am attesting that I have read and understand the information above and I freely give my consent/assent to participate or permission for my child to participate.

ADULT INFORMED CONSENT OR MINOR ASSENT

Date Reviewed & Signed: \_\_\_\_\_

Printed Name of Research Subject: \_\_\_\_\_

Signature: \_\_\_\_\_

Parental/Guardian Permission (if applicable)

Date Reviewed & Signed: \_\_\_\_\_

Parent/Guardian Printed Name: \_\_\_\_\_

Signature: \_\_\_\_\_

# REGENERON SCIENCE TALENT SEARCH | ALUMNI

## NOBEL PRIZE

STS YEAR	NAME	HONOR, YEAR
1944	Ben R. Mottelson	Physics, 1975
1946	Gerald Edelman	Physiology or Medicine, 1972
1947	Leon Cooper	Physics, 1972
1947	Martin Karplus	Chemistry, 2013
1949	Walter Gilbert	Chemistry, 1980
1950	Sheldon Glashow	Physics, 1979
1952	John Hall	Physics, 2005
1955	Roald Hoffman	Chemistry, 1981
1964	Paul Modrich	Chemistry, 2015
1967	Frank Wilczek	Physics, 2004
1968	Roger Tsien	Chemistry, 2008
1968	Alvin Roth	Economics, 2012

## FIELDS MEDAL

1950	Paul J. Cohen	Mathematics, 1966
1953	David B. Mumford	Mathematics, 1974

## NATIONAL MEDAL OF SCIENCE

1948	Ronald Breslow	1991
1950	Paul Cohen	1967
1950	Daniel Kleppner	2006
1953	Leo Kadanoff	1999
1953	David Mumford	2009
1954	Lubert Stryer	2006
1955	Roald Hoffmann	1983
1956	Leroy Hood	2011
1956	Donald Knuth	1979
1957	Richard Zare	1983
1961	Robert Axelrod	2012

## NATIONAL MEDAL OF TECHNOLOGY

1954	Marcian E. "Ted" Hoff	2010
1965	Raymond C. Kurzweil	1999

## MACARTHUR FELLOWSHIP

1948	Richard S. Berry	1983
1967	Frank Wilczek	1982
1962	Michael Silverstein	1982
1960	Arthur Winfree	1984
1953	Alar Toomre	1984
1958	Jane Richardson	1985
1958	John Schwarz	1987
1972	Robert Coleman	1987
1961	Robert Axelrod	1987
1974	Eric Lander	1987
1953	David Mumford	1987
1964	Amory Lovins	1993
1982	Peter Miller	1998
1984	Daniel Schrag	2000
1978	David Spergel	2001
1989	Jon Kleinberg	2005
1999	Maneesh Agrawala	2009
1996	Jacob Lurie	2014

## ALBERT LASKER BASIC MEDICAL RESEARCH AWARD

1949	Walter Gilbert	1979
1956	Leroy Hood	1987
1976	Ron Vale	2012

## NATIONAL ACADEMY OF ENGINEERING

1943	Eberhardt Rechtin	Aerospace Corporation
1949	Alan J. Goldman	Johns Hopkins University
1952	John A. Armstrong	IBM Corporation
1956	Leroy Hood	Institute for Systems Biology
1961	Michael E. Lesk	Rutgers, State University of New Jersey
1964	Robert Sproull	Sun Microsystems
1965	Raymond Kurzeil	Kurzweil Technologies
1974	Ilan Kroo	Stanford University
1974	Tom Leighton	Massachusetts Institute of Technology
1978	Mark Drela	Massachusetts Institute of Technology
1989	Andrew Jackson	University of Pennsylvania

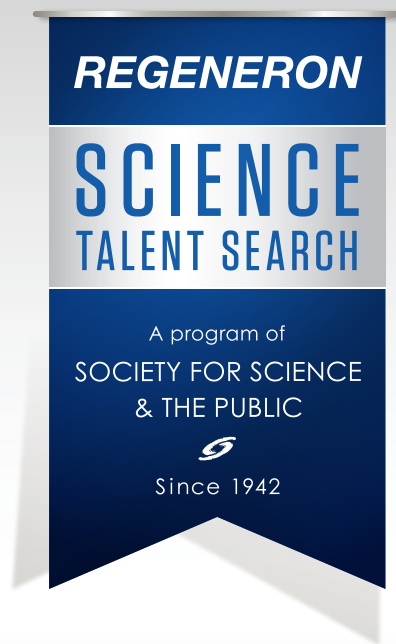
## NATIONAL ACADEMY OF SCIENCES

1943	Murray Rosenblatt	1984
1944	Roald Hoffmann	1972
1944	Robert H. Kraichnan	2000
1945	George Clark	1980
1945	Andrew Sessler	1990
1945	Andrew Streitwieser	1969
1945	Michael Tinkham	1970
1947	Leon N. Cooper	1975
1947	Gary Felsenfeld	1976
1947	Martin Karplus	1967
1948	Ronald Breslow	1966
1948	Stephen Berry	1980
1948	Paul Martin	1979
1949	Walter Gilbert	1976
1950	Paul J. Cohen	1967
1950	Sheldon Glashow	1977
1950	Saul Sternberg	1982
1952	Paul Richards	1985
1953	David Mumford	1975
1954	Donald Crothers	1987
1954	Eric Davidson	1985
1956	Mary-Dell Chilton	1985
1956	Leroy Hood	1982
1956	Robert Solovay	1986
1957	Stephen L. Adler	1975
1958	Bertrand Halperin	1982
1958	Jane Richardson	1991
1960	Melvin Hochster	1992
1960	John Mather	1988
1961	Robert Axelrod	1986
1961	Wayne Hubbard	2005
1963	James Vaupel	2004
1964	Edward I. Solomon	2005
1967	Frank Wilczek	1990
1969	Robert Cava	2001
1970	Douglas Rees	2000
1967	Clark Lagarias	2001
1976	Ronald Vale	2001
1976	George Yancopoulos	2004
1974	Eric Lander	1997
1974	Tom Leighton	2008
1980	Lisa Randall	2008

## SEARCHING FOR ALUMNI

Do you know a former Science Talent Search (STS) finalist or scholar from either the Regeneron, Intel or Westinghouse years? If so, please contact Society for Science & the Public at [alumni@societyforscience.org](mailto:alumni@societyforscience.org). The Society is developing an alumni program to create a national network of past participants of STS.





**The Regeneron Science Talent Search encourages students to tackle challenging scientific questions and develop the skills needed to solve the problems of tomorrow.**

#### **SOCIETY FOR SCIENCE & THE PUBLIC**

Society for Science & the Public (the Society) is one of the oldest nonprofit organizations in the U.S. dedicated to public engagement in science and science education. Established in 1921, the Society is a membership society and a leading advocate for the understanding and appreciation of science and the vital role it plays in human advancement.

Through its acclaimed education competitions and its award-winning *Science News* and *Science News for Students*, The Society is committed to inform, educate, and inspire.

[societyforscience.org](http://societyforscience.org)

To learn more about the Regeneron Science Talent Search, visit:

[student.societyforscience.org/regeneron-sts](http://student.societyforscience.org/regeneron-sts)

#### **REGENERON CORPORATION**

Science, Technology, Engineering and Math (STEM) education is at the heart of Regeneron's corporate citizenship efforts, representing more than 90 percent of our citizenship investments. We are deeply committed to supporting the development of highly engaged, well-trained, and innovative young thinkers.

We focus on programs that support, challenge and reward the best and brightest minds in science research, increase the effectiveness of teachers in STEM and bridge STEM skills gaps and career awareness among students historically underrepresented in the sciences.

Learn more: [regeneronsts.com](http://regeneronsts.com)

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