



Rensselaer



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30th Annual Greater Capital Region
Science and Engineering Fair (GCRSEF)
Saturday, March 21, 2020

For detailed rules and registration forms, download the
ISEF Rules and Guidelines Booklet

See the top of the next page of this Brochure for details

REGISTRATION DEADLINE: Postmarked by January 25, 2020

GCRSEF Board

Len Behr, University at Albany, **Consultant**

Nate Covert, Shaker HS, **Awards**

Donna Crone, Rensselaer Polytechnic Institute, **Liaison, Meeting Rooms**

Ulysses deArmas, Rensselaer Polytechnic Institute **Liaison for Food, Rooms and RPI
Scholarship**

Robert Keefe, NYS Department of Health, **SRC/IRB Chair**

Fran Lohnes, Saratoga Springs High School, **Senior Division Registrar**

Donna Mooney, **Secretary, Junior Division Registrar**

Matthew Nielsen, GE Global Research, **Head Judge, Senior Division**

Dan Norton, Regeneron Pharmaceuticals, **Head Judge, Junior Division**

Regina Reals, Burnt Hills-Ballston Lake CSD: **Treasurer, Awards, P.R.**

Peter Robinson, Saratoga Springs High School, **Webmaster**

Amanda Troutman, Regeneron Pharmaceuticals, **Regeneron Liaison**

Joan Wagner, Eastern Section of STANYS, **Director/President**

Goals

Science fairs provide a vehicle by which talented science, mathematics and engineering students can be recognized for their achievements just as athletes are recognized in sporting events. When students do original research, they better understand the nature of science. They get to network with other students who share their interests. As a result of this experience, many of these students go on to pursue STEM careers.

This is the 30th year that Rensselaer is hosting and sponsoring the *Greater Capital Region Science and Engineering Fair*, an affiliate of the *International Science and Engineering Fair (ISEF)* and the *STANYS Science Congress*. *STANYS State Science Congress* is sponsored by the **Science Teachers Association of New York State (STANYS)**. Top projects from the Senior Division (grades 9–12) will be chosen to compete in the *ISEF* and the *STANYS State Science Congress*. Top projects from the Junior Division (grades 6-8) will be chosen to compete in the *STANYS State Science Congress* and the *Broadcom Masters National Competition*.

REQUIRED FORMS: PRINT OUT A COPY OF THIS BROCHURE FOR YOUR REFERENCE

The following Regional forms and other pertinent regional information can be downloaded directly or completed on the Regional Fair website: <www.gcrsef.org>

- ✓ **Online Student Registration Form**
- ✓ **Online Teacher Registration Form**
- ✓ **Regional Registration Form B (SRC/IRB Form)**
- ✓ **Copy of this brochure**
- ✓ **Official 22 category ISEF abstract form (add link). Bring 10 copies with one displayed by hard copy of storyboard (no electronic storyboards) in a frame (NOT ON THE STORYBOARD), one submitted at registration, and remaining 8 copies placed by storyboard for judges.**

Please go to the following website for all International rules, guidelines and forms: <<https://student.societyscience.org/international-rules-pre-college-science-research>>

ATTENTION ALL PARTICIPANTS ON DAY OF SCIENCE FAIR, MARCH 21, 2020:

1. **TIME OF EXHIBIT SET-UP** 7:45-8:20 AM. Any student remaining in exhibit area after 8:20 AM may face disqualification. Only judges are allowed in the exhibit area after 8:20 AM.
2. **INSTALLATION:** Exhibits must be set up in final working order by the exhibitor at the assigned space. Participants will receive a letter with more specific directions two weeks before the fair. **WARNING: You cannot move your exhibit from the assigned location.** Senior Division exhibits are in the Walker Labs while Junior Division Exhibits are in the Sage Labs.
3. **REGISTRATION: 8:15-8:55 AM:** Sage Labs
4. **PARTICIPATION REQUIREMENT:** Students must be physically present the entire day, including the awards ceremony. Students must be present in the awards auditorium to receive an award. There will be no electronic interviews.
5. **WELCOME:** 9:00-9:30 AM: All students must be in the Sage Auditorium during this time.

REGISTRATION FORMS: All forms and links to forms are online at <<http://www.gcrsef.org>>.

Attention Senior Division: To Insure You Submit All Required Forms, PLEASE USE THE RULES WIZARD AT <<https://ruleswizard.societyforscience.org>>.

Attention Sponsoring Teachers:

Junior Division: Send all student forms with \$35.00 registration fee per student in one mailing, postmarked by January 25, 2020 to the Mrs. Donna Mooney, Junior Division Registrar, 228 Spring Avenue, Troy, NY 12180.

Senior Division: Send all senior division student forms with \$35.00 registration fee per student in one mailing to, Ms. Fran Lohnes, Senior Division Registrar, Saratoga Springs Senior High School, 1 Blue Streak Blvd, Saratoga Springs, NY 12866

Senior division sponsoring teachers must also include the SRC/IRB Regional Form B.

All projects must submit the forms noted for each division, completed exactly as requested. Incomplete forms will not be processed. All downloaded forms are in an interactive PDF format. NO HAND-WRITTEN FORMS will be accepted! Please make sure to read all rules posted on the ISEF Fair website. See:

<<https://student.societyforscience.org/isef-forms>> Please make sure to check both the Fair's regional website and the ISEF website for any new rules. **The forms for the senior and junior division differ as noted below.**

Junior Division Forms and Required Papers

- **Online Student Registration Form** (On Regional website): This form is completed online.
- **Online Teacher Registration Form** (completed online by sponsoring teacher).
- **Checklist for Adult Sponsor (Form 1)** (From International Science Fair website).
- **Student Checklist 1A** (From International Science Fair website).
- **Press Release** (On Regional website).
- **Additional Form when using human subjects: Junior Division Human Subject Form** (on Regional website).
- **Additional Form when using vertebrate animals: Junior Division Vertebrate Animal Form** (on regional website)
- **Official Abstract form** (on Regional website): Bring 10 copies. One is submitted at registration and one placed in a picture frame by your storyboard. The remaining 8 copies, leave by your project.
- **One copy of all submitted forms must be placed in front of poster. Students are to retain all original copies of their forms.**
- **One copy of research paper placed by poster and an additional copy submitted at Registration.**
- **Lab notebook placed by poster.**

Senior Division Forms and Required Papers

- **Online Student Registration Form** (on Regional website): This form is completed online.
- **Online Teacher Registration Form** (completed online by sponsoring teacher).
- **Regional SRC/IRB Registration Form B** (on Regional website): Completed by School.
- **Press Release Form** (on Regional website):
- **Checklist for Adult Sponsor (Form 1)** (From International Science Fair website).
- **Student Checklist (1A)** (From International Science Fair website).
- **Approval Form (1B)** (From International Science Fair website).

- A number of other ISEF forms may be required of your project. See rules wizard: <https://apps2.societyforscience.org/wizard/index.asp>
- **Official Abstract form** (on Regional website): Bring 10 copies. One is submitted at registration and one placed in a picture frame by your storyboard. **Your abstract cannot be on your poster.** The remaining 8 copies, leave by your project.
- **One copy of all submitted forms must be placed in front of poster. Students are to retain all original copies of their forms.**
- **One copy of research paper placed by poster and an additional copy submitted at Registration.**
- **Lab notebook placed by poster.**

SRC/IRB APPROVAL

To provide for prior approval, each school district is responsible for forming a local review panel (See page 8).

The following projects require SRC/IRB approval BEFORE research begins. Please review the ISEF rules book, which can be downloaded from the ISEF:

<<https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/2020/Rules/Book.pdf>>. **The ISEF Rules book for 2020 with forms can also be downloaded directly from the GCRSEF website. Every student participating should download and read a copy of this Fair brochure.**

- *Human subjects* including surveys (these require IRB approval, but it is recommended that schools combine the SRC and IRB into one committee called the SRC/IRB Committee). See pp 7-8 of this brochure for more information.
- *Potentially hazardous biological agents* (rDNA technologies, human or animal fresh tissues, blood or body fluids).
- *Vertebrate animals*
- *Controlled substances, devices, equipment:*
 - **Chemicals** (*i.e.*, hazardous, flammable, explosive or highly toxic; carcinogens; mutagens and all pesticides).
 - **Equipment** (*i.e.*, welders; lasers; voltage greater than 220 volts).
 - **Firearms**
 - **Radioactive substances**
 - **Radiation** (*i.e.*, x-ray or nuclear; unshielded ionizing radiation of 100- 400 nm wavelength).

FAIR FINALISTS

Grand prize finalists in the Junior and Senior Division may be eligible to compete (with all expenses paid) in the *STANYS State Science Congress* hosted in Milton J. Rubenstein Museum of Science & Technology (MOST) in Syracuse, NY, June 13, 2020, 8:00 AM-5:00 PM. The top three senior division projects will be invited to compete at the 70th *International Science and Engineering Fair* in **Anaheim, CA, (May 10-15, 2020)**. The top four junior division projects will be invited to compete in the **Broadcom Masters Competition**. The top 300 Masters will be announced on September 4, 2020 and then 30 finalists will be awarded an all-expense paid trip to Washington, DC to compete in the finalist week from October 25-30, 2020.

A large number of prizes and special awards will be presented to winners in both divisions, including many cash awards, as well as a Rensselaer \$40,000 Scholarship.

RULES FOR THE FAIR

- 1. WHO MAY ENTER: Students in grades 6 – 12 may enter if attending a school in one of the 15 counties listed below. This includes all schools, public and private, and any home-schooled students in the**

counties of Albany, Columbia, Fulton, Greene, Hamilton, Montgomery, Orange, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Ulster, Warren, and Washington. In special situations, the fair may accept students from other areas by contacting the Fair Director, Joan Wagner at: gcrsef@gmail.com

2. **JUDGING:** Students will be judged only on laboratory experiment/data collection performed over the past 12 continuous months. See ISEF rules for longitudinal studies and continuation studies.
<<https://student.societyforscience.org/rules-all-projects>>. **A copy of the Judging criteria is available on the GCRSEF website.**
3. **TEACHER AND ADULT SPONSORS:** Every student must have a *teacher sponsor* in the school where he/she is enrolled. Parents/guardians, friends, or any other adult mentor cannot be a teacher sponsor unless the student is home-schooled. **HOWEVER**, any qualified adult may act as a research mentor for the student. The *adult sponsor* is the person who is directly involved with the student and his/her research and may be a parent. The adult sponsor is responsible for the safety of the student at all times.
4. **PRIOR APPROVAL:** Participants working on projects dealing with human subjects (including surveys), vertebrates, potentially hazardous biological agents and controlled substances must have prior approval.
5. **STUDENTS MUST DO ALL WORK:** Sponsors may help in planning and advising, but parents, teachers, or friends may not actually design, conduct or build the project. Abuses of this rule will result in disqualification. All students are expected to be able to answer questions regarding the design and development of every phase of their project.
 - (a) A student may not display a group project from a previous competition as an individual project.
 - (b) A research project that is a new phase of a previously entered project must include a copy of Continuation Form 7, of ISEF rules for 2020.
 - (c) Borrowed or purchased displays or collections are not permitted. All collections must bear a label describing how, where, and when they were assembled and must be protected by safety glass or screen.
6. **INSTALLATION:** Exhibits must be set up in final working order by the exhibitor at the assigned space on March 21st, 2020 between 7:45 and 8:20 AM. Participants will receive more specific directions two weeks before the fair. **WARNING: MOVING YOUR ASSIGNED STATION WILL RESULT IN DISQUALIFICATION!**
7. **CONTENTS OF EXHIBITS**
 - Posters displaying research results must be anchored on a **self-contained, free-standing storyboard (supplied by the student)** that can be placed at your assigned station. **Electronic storyboards are not permitted. Please note, tripods are not provided.**
 - Student name **MUST** be on the **top right corner** of the poster board. Do not place your project number on the poster.
 - **ACCOMPLISHMENTS, ACKNOWLEDGEMENTS, AFFILIATIONS, i.e. school, college, university or research center name, ADDRESSES, PHONE OR FAX NUMBERS, ARE NOT PERMITTED ON THE STORYBOARD!**
 - **A Project Card Number and holder** will be provided at each station to be clipped to the top center of the poster so the project number is clearly in view. The holders with numbers must be returned to the box outside the Sage Auditorium before going to the awards ceremony.
 - **SIZE:** No exhibit may exceed 48 in (121.9 cm) from side to side, 30 in (76.2 cm) from back to front, and 108 in (274 cm) in height (from floor including height of table). All exhibits will be placed on laboratory tables provided in the exhibit room. **For this regional ISEF fair, no poster board can be greater than 72 inches in height since it must be placed on a lab table. Projects with posters larger than this size will be disqualified from the competition.**

- **PHOTOGRAPHS:** Photographs pertaining to the project are encouraged! Only the student researcher may appear in those photographs unless legal permission is provided. **Provide the name of person or organization responsible for each picture.** (See Page 26 of 2020 ISEF Rule book. This can be downloaded from the regional website). If the student researcher generated all of the photos, then only one credit line on the poster board or by the poster is needed to acknowledge this.
- A copy of the abstract must be placed in a non-glass picture frame by the storyboard. It cannot be on the storyboard. Place remaining 8 copies of your abstract and one copy of your research paper by the storyboard. As a reminder one of the ten copies of your abstract is submitted at registration.
- Place Your Lab Notebook by your exhibit poster. **This is very important to the judges.**
- A copy of all submitted forms must be placed in front of poster. Students are to retain all original copies of their forms.
- One copy of research paper placed by poster. One copy is submitted at registration.

8. SAFETY: Any visitor must easily and safely operate animated or push buttons exhibits. Use shields (wire, plastic, or safety glass) around any hot substances. Any exhibit using harmful, poisonous, or explosive materials, or electrical apparatus under potentially dangerous conditions will not be accepted under any circumstances. **The following is not allowed in the exhibits:**

- Aquariums, live plants, or live animals are not acceptable.
- Telescopes mounted on tripods must be securely anchored to a wooden or plywood base not larger than 48 in (121.9 cm) by 30 in (76.2 cm) and must not protrude beyond the mounting base.
- No glass
- Soil, sand, rock, cement and/or waste samples, even if permanently encased in a slab of acrylic
- Taxidermy specimens or parts
- Preserved vertebrate or invertebrate animals
- Human or animal food
- Human/animal parts or body fluids (for example, blood, urine)
- Plant materials (living, dead, or preserved) that are in their raw, unprocessed, or non-manufactured state
- All chemicals including water. Absolutely no liquids can be utilized in the Project Display
- All hazardous substances or devices (Example: poisons, drugs, firearms, weapons, ammunition, reloading devices, grease/oil and sublimating solids such as dry ice)
- Items that may have contained or been in contact with hazardous chemicals (Exception: Item may be permitted if professionally cleaned and documentation for such cleaning is available). Filters including microbial) may not be displayed unless the Display & Safety Committee can reasonably determine that the device was cleaned or was never used (please include receipts in your notebooks and/or logbooks)
- Sharp items (for example, syringes, needles, pipettes, knives)
- Flames and highly flammable materials
- Batteries with open-top cells or wet cells
- Drones or any flight-capable apparatus unless the propulsion power source removed.
- 3D Printers unless the power source is removed.
- Inadequately insulated apparatus capable of producing dangerous temperatures are not permitted
- Any apparatus with belts, pulleys, chains, or moving parts with tension or pinch points that are not appropriately shielded
- Any display items that are deemed distracting (i.e. sounds, lights, odors, etc.)

9. ELECTRIC POWER: Alternating current (120V 60 Hz) will be provided. As battery-powered exhibits are sometimes unsatisfactory, direct current may be supplied from an approved AC or DC converter. Exhibits using electricity must have spring-return switches, operating only when the button is held down. Wiring must conform to the highest standards. Soldered and taped electrical joints properly guard against short

circuits. Take no chances for fire or injury. Have your adult sponsor check all wiring! **BRING YOUR OWN UL listed 3-WIRE EXTENSION CORD(S) IF NEEDED.**

10. **THE RESEARCH PAPER AND ABSTRACT:** Should be word-processed on 8.5 by 11.0 in. paper. The recommended length for the senior division is 5 to 10 pages, and 3 to 5 pages for the junior division. Graphs, pictures and diagrams do not count as written pages. **YOU MUST HAVE TWO COPIES OF YOUR PAPER!** Give one copy of the paper to registration and place one copy by your storyboard. The cover page should contain the title of your project as well as your name and assigned project number. The abstract should follow the cover page and should be no more than 250 words and written on the Official Abstract Form, which can be downloaded from the Society for Science and the Public website or the Regional website. For detailed information on how to begin your research and write a paper and abstract see: "Handbook download" from regional website: <www.gcrsef.org>.
11. **ORAL PRESENTATION:** You will be required to present a short summary (Up to 5 minutes for an overview of project, i.e., research goals, procedure and conclusions) to the judges, which will be followed by questions from the judges.
12. **JUDGING:** Judges will walk through the exhibit areas starting at 8:25 AM. **ONLY JUDGES CAN BE PRESENT IN EXHIBIT AREAS BETWEEN 8:20-9:30 AM!!** No students, parents or teachers are allowed during this time. The main part of the judging process will begin 9:30 AM. All participants must stay at their stations during this time so that they can fulfill the oral part of the presentation. After lunch, the participants must return to their exhibits for additional interviews with the judges. **THE DECISIONS OF THE JUDGES ARE FINAL AND NONREVIEWABLE.**
13. **STANDARDS:** The Planning Committee of the Greater Capital Region Science and Engineering Fair reserves the right to disqualify any exhibit on the day of the Fair for work that is unsuitable in subject matter or treatment that is potentially dangerous or that violates any rules of the fair. Exhibits that lack any of the necessary paper work or required signatures will be disqualified!
14. **RESPONSIBILITY:** Rensselaer Polytechnic Institute, though taking reasonable precautions in protecting exhibits, will not be responsible for broken or missing exhibits or parts. Protect any valuable items with some type of shield. Loose items and any collections must be secured to the exhibit and protected under some type of shield. Students are required to keep their exhibits in proper working order at all times.
15. **REMOVAL OF EXHIBITS:** All projects are to be removed at the close of public viewing and before the awards ceremony. They can be left in the hallway, if desired, but the rooms will be locked. Please make sure to clean-up around your exhibit.
16. **HELPFUL HINTS:** Have your teacher sponsor provide you a copy of this Regional Student Brochure or download it from website <www.gcrsef.org>. Make sure to download a copy of the ISEF 2019 Rules for the ISEF website: <<https://student.societyforscience.org/international-rules-pre-college-science-research>>. A PDF of the 2020 SEF rules can also be downloaded from our regional website: <www.gcrsef.org>.
17. **CHAPERONES:** All students in the junior division must have a chaperone. A chaperone can supervise up to 10 students. No chaperone can supervise more than 10 students. Groups larger than 10 must have more than one chaperone. The chaperone(s) must be present during setup and from lunch to closing.
18. **REGISTRATION FEE:** \$35.00 for students living in the counties of Albany, Columbia, Fulton, Greene, Hamilton, Montgomery, Orange, Rockland, Rensselaer, Saratoga, Schenectady, Schoharie, Ulster, Warren, and Washington. \$50.00 for students outside of these counties.

19. INSPECTION OF EXHIBITS: After projects are set-up, they will be inspected for safety and any rule infringement. Place your name on the inspection form at your exhibit. If approved, a sticker will be placed on the form.

20. STUDENTS SEEKING PATENTS: If you plan to obtain a patent on your research, make sure the rights to your ownership is protected. Patent information can be found here:

United States Patent and Trade Office
Customer Service: 1-800-786-9199 (toll-free);
571-272-1000 (local); 571-272-9950 (TTY)
www.uspto.gov/
www.uspto.gov/patents/process/index.jsp

FORMING A LOCAL SRC/IRB Committee (Form B)

Q. WHEN MUST STUDENT RESEARCH BE LOCALLY REVIEWED?

A. **ALWAYS!** However, many research projects can be reviewed by the adult sponsor or classroom teacher without the need for a local review panel. This MUST be done prior to the commencement of research.

Q. WHAT STUDENT RESEARCH PROJECTS MUST BE REVIEWED BY A SRC/IRB COMMITTEE?

A. Any research projects involving human subjects (including surveys), vertebrate animals, potentially hazardous biological agents, and controlled substances must be reviewed. **Research conducted by a pre-college student at a Regulated Research Institution** (e.g., university, college, medical center, government lab, correctional institution) must be reviewed and approved by that institution's IRB. A copy of the IRB approval for the entire project (which must include the research procedures/measures the student is using) and/or an official letter from the IRB attesting to approval is required. A letter from the mentor is not sufficient documentation of IRB review and approval. This is in addition to **Form C: Regulated Research Institutional/Industrial Setting Form**.

Q. WHEN SHOULD A LOCAL SCHOOL DISTRICT BEGIN TO ORGANIZE A REVIEW COMMITTEE?

A. **IMMEDIATELY!** Each September or October, local school districts should officially appoint a panel to review and approve student research projects that require prior approval.

Q. WHAT IS THIS REVIEW PANEL CALLED?

A. Actually, there are two types of review panels.

- 1) A general review panel, the **Scientific Review Committee (SRC)**, examines projects for the following:
 - a. Evidence of literature search
 - b. Evidence of proper supervision
 - c. Use of accepted and appropriate research techniques
 - d. Completed forms, signatures and dates showing maximum of one year duration of research and appropriate pre-approval dates (when needed)
 - e. Evidence of search for alternatives to animal use
 - f. Humane treatment of animals
 - g. Compliance with rules and laws governing human and animal research
 - h. Compliance with rules regarding potentially hazardous biological agents, controlled substances and hazardous substances and devices
 - i. Documentation of substantial expansion for continuation projects
 - j. Compliance with the ISEF ethics statement

The Fair's Regional Science Review Committee will eventually review all projects entered in the Greater Capital Region Science and Engineering Fair, **however, all projects requiring approval MUST be reviewed.**

- 2) A second review panel, the **Institutional Review Board (IRB)**, is a committee that according to federal law must evaluate the potential physical or psychological risk of research involving human subjects. All proposed human research must be reviewed and approved prior to experimentation! This includes the research plan as well as any questionnaires or surveys used in the project.

A local school or school district can combine both the SRC and IRB into ONE review panel as long as all prerequisites for both panels are met.

Q. WHO SHOULD SERVE ON A LOCAL SRC/IRB COMMITTEE?

A. In order to combine both review panels there must be a minimum of four persons who serve on the local SRC/IRB Committee.

- a) A biomedical scientist (Ph.D., M.D., D.V.M., D.D.S., or D.O.)
- b) A science teacher (the teacher supervising the student may NOT serve on the panel)
- c) A school administrator
- d) And **one** of the following: a medical doctor, physician's assistant, registered nurse, psychiatrist, psychologist, or licensed social worker, Pharm D.

If the project involves human behavior, a psychologist, psychiatrist, or individual with human behavioral training **must** serve on the panel. If students are using non-human vertebrate animals, a veterinarian or an individual with training in animal care should serve on the panel. SEE ISEF RULES, Pp 10-12.

Q. WHAT IS REGISTRATION FORM B?

A. This form is required for all projects that require prior approval. Form B can be downloaded from the regional website: <www.gcrsef.org>.

Q. WHERE CAN I GET HELP? WHERE DO I START? HOW DO I GET MORE INFORMATION?

A. If a sponsor teacher needs help forming a local SRC/IRB, you can call Joan Wagner at (518) 505-7507, email at gcrsef@gmail.com or see the information table at the Eastern Section of STANYS annual Siena Conference on October 11, 2020.