



# 43<sup>rd</sup> Georgia Junior Science & Humanities Symposium

The University of Georgia  
February 25-27, 2018

---

## RULES & GUIDELINES

---

Office of Academic Special Programs  
Tel. (706) 542-6473 / Email: [oasp@georgiacenter.uga.edu](mailto:oasp@georgiacenter.uga.edu)  
Applications available online - [www.georgiacenter.uga.edu/gjshs](http://www.georgiacenter.uga.edu/gjshs)

## Table of Contents

|   |           |
|---|-----------|
| <b>Important Dates.....</b>                                     | <b>3</b>  |
| <b>About the Junior Science &amp; Humanities Symposia.....</b>  | <b>3</b>  |
| Sponsorship .....   | 3         |
| Objectives.....   | 4         |
| Why Participate?.....   | 4         |
| Awards.....   | 5         |
| <b>The Georgia Regional Symposium (GJSHS).....</b>              | <b>6</b>  |
| Presenters & Observers .....                                    | 6         |
| Application and Selection Processes .....                       | 6         |
| Teachers.....   | 7         |
| Expenses/Housing Arrangements .....                             | 7         |
| Materials Required for Entry: ABSTRACT .....                    | 7         |
| Materials Required for Entry: RESEARCH PAPER.....               | 8         |
| Project Categories .....  | 10        |
| Team Projects .....   | 11        |
| Research Involving Non-Human Vertebrates or Human Subjects..... | 11        |
| The Oral Presentation .....                                     | 11        |
| Poster Presentations.....                                       | 13        |
| <b>Regional and National Judging .....</b>                      | <b>13</b> |
| Judging Criteria .....  | 14        |
| The GJSHS Judging Team and Process .....                        | 15        |
| <b>Regional and National Scholarships .....</b>                 | <b>15</b> |
| Scholarship Eligibility .....                                   | 15        |
| Scholarship Conditions .....                                    | 16        |

*The information contained in this rulebook is adapted from the 'National JSHS - Program Fact Sheet and Guidelines for Students' at [www.jshs.org](http://www.jshs.org). Please visit [www.jshs.org](http://www.jshs.org) for the most updated information about the National Junior Science & Humanities Symposium.*

---

## Important Dates

---

|                      |  |
|----------------------|--|
| January 10, 2018     | Deadline for submission of the online GJSHS application and research paper (to be uploaded to the online application)  |
| February 5, 2018     | Approximate date the list of selected students (presenters and observers) will be posted on the GJSHS website at <a href="http://www.georgiacenter.uga.edu/gjshs">http://www.georgiacenter.uga.edu/gjshs</a> |
| February 25-27, 2018 | Georgia Junior Science & Humanities Symposium<br>University of Georgia Center for Continuing Education<br>Athens, GA   |
| April 2018           | 56 <sup>th</sup> National Junior Science & Humanities Symposium<br>Dates and locations TBA   |

---

## About the Junior Science & Humanities Symposia

---

Each year over 12,000 talented high school students and their teachers participate in JSHS at each of forty-eight regional symposia held on university campuses nationwide by presenting the results of their scientific, engineering, or mathematics research. Progressing from the regional symposia, 240 student delegates advance to the National JSHS and may compete for significant military-sponsored scholarships and other awards.

The primary aims of JSHS are to promote original research and experimentation in the sciences, engineering, and mathematics at the high school level, and to publicly recognize students for outstanding achievement. By involving talented students and their teachers in affiliated symposia, and by recognizing students' research endeavors through scholarships and other awards, JSHS aims to encourage continued interest and participation in the sciences and ultimately to widen the pool of trained scientific and engineering talent prepared to conduct research and development vital to our nation.

### Sponsorship

The Junior Science and Humanities Symposia (JSHS) program has been sponsored by the United States Department of the Army since its inception in 1958, and additionally joined by the Departments of the Navy and Air Force after 1995. Resulting from this sponsorship and the cooperative efforts of universities throughout the nation, JSHS encompasses forty-eight regional symposia reaching high schools throughout the United States, Puerto Rico, and in cooperation with the Department of Defense Schools of Europe and the Pacific, and the annual National JSHS.

The Academy of Applied Science, a non-profit educational organization in Concord, New Hampshire, administers the National JSHS Program in cooperation with universities or other educational institutions.

The Georgia Junior Science and Humanities Symposium (GJSHS) is administered by the University of Georgia's Office of Academic Special Programs. It is a program in which high school students present and defend original scientific research. Eighth grade students are invited to submit their work for selection in the poster presentation category.

## Objectives

- |                   |   |
|-------------------|---|
| <i>Promote</i>    | research and experimentation in the sciences, mathematics, and engineering at the high school level.  |
| <i>Recognize</i>  | the significance of research in human affairs, and the importance of humane and ethical principles in the application of research results.  |
| <i>Search out</i> | talented youth and their teachers, recognize their accomplishments at symposia, and encourage their continued interest and participation in the sciences, mathematics, and engineering. |
| <i>Expand</i>     | the horizons of research oriented students by exposing them to opportunities in the academic, industrial, and governmental communities.   |
| <i>Increase</i>   | the number of adults capable of conducting research and development.  |

## Why Participate?

At regional and national symposia, students and their teachers may...

- Gain self-confidence not only through the experience of the research investigation but also through networking among participants with similar interests
- Participate in a forum honoring exceptional work and encouraging personal and academic growth.
- Participate in a student science poster session (selected observers and 8<sup>th</sup> graders)
- Participate in a scientific conference, take field trips, and have their work published.
- Opportunity for laboratory and/or campus visits
- Interact with practicing researchers who offer a look beyond high school to opportunities in post-secondary education and to academic and career development in the sciences, engineering, and mathematics, and presentations by guest speakers
- Develop higher-order thinking skills and integrated learning across disciplines through the process of scientific inquiry, writing a scientific paper, and delivering a presentation - all skills that will benefit future post-secondary and graduate pursuits.

## Awards

Significant awards are available to JSHS regional and national student finalists. University-contributed scholarships or other awards are sponsored by many regional symposia. The availability of these additional awards, type of award, and value vary by region. The Departments of the Army, Navy, and Air Force jointly sponsor the following awards (subject to the availability and release of government funding):

### ***For students who participate in regional and national symposia...***

- Public recognition and certificates, honoring achievement and interest in research pursuits
- Attain a sense of achievement and self-confidence resulting from interaction with students from other schools and regions and with professional researchers and educators. To quote a former JSHS alumnus, [At JSHS] "I learned a tremendous amount of science, got to meet other high school students who shared my interests in science, and learned that I could succeed at any program that I chose to pursue."

### ***For 48 teachers...***

- ***A \$500 award*** to one teacher at each of the 48 regionals, honoring the individual teacher and his or her school's contributions to advancing student participation in research

### ***For the regional finalists...***

- ***An expense-paid trip to the National JSHS***, awarded to five finalists at each regional symposium. The National brings together over 360 participants in a program of educational and scientific exchange.
- ***An invitation to present their original research investigation at the National JSHS***, awarded to two finalists at each regional symposium.
- ***A total \$4,500 undergraduate, tuition scholarships***, awarded at \$2000, \$1500, and \$1000 to each of three regional symposium finalists. (scholarship payable upon matriculation and upon meeting the JSHS scholarship conditions)

### ***For the national finalists...***

- ***Seven \$12,000 undergraduate, tuition scholarships***, awarded to each of the 1st place finalists in the National research paper competition.
- ***Seven \$8,000 undergraduate, tuition scholarships***, awarded to each of the 2nd place finalists in the National research paper competition.
- ***Seven \$4,000 undergraduate, tuition scholarships***, awarded to each of the 3rd place finalists in the National research paper competition.
- ***An expense-paid trip to the London International Youth Science Forum***, an exchange program bringing together over 400 participants from 60 nations. The London trip is awarded to each of the 1st place finalists; the runner-ups are alternate winners.

---

## The Georgia Regional Symposium (GJSHS)

---

Georgia JSHS invites the participation of all high school students who have completed an original research investigation in the sciences, engineering, or mathematics. All students in grades 8 -12, enrolled in a public, private, or home school within the area served by the Georgia JSHS regional symposium are eligible. Experimental research, field research, observational research, and applied research are eligible. While review or library research is a part of the research process, these investigations alone are not appropriate. (See [www.jshs.org](http://www.jshs.org), Guidelines section, for additional descriptive reviews of the types of research.)

### Presenters & Observers

Students are selected to attend Georgia JSHS after a preliminary judging process of their research papers. Based on the results of this preliminary review, students will be selected to attend Georgia JSHS as either a *presenter* or an *observer*:

- **PRESENTERS** Fifty (50) Georgia students in grades 9 - 12 will be selected to participate in the oral presentation competition at the Georgia regional symposium in Athens. GJSHS culminates with the selection of five (5) of these presenters to win an expense-paid trip to National JSHS. Two (2) of these five finalists will have the opportunity to present their research and in the oral presentation competition at NJSHS, and one (1) will be invited to enter the NJSHS poster competition.
- **OBSERVERS** Approximately twenty (20) additional students will be invited to participate as symposium observers and to present their science research in a poster presentation. Students in the 8<sup>th</sup> grade may be selected as observers only, not presenters.

### Application and Selection Processes

- (1) Students will complete online registration and application materials for GJSHS. **A link to the online application system will be available in October 2017.**
- (2) As part of the online application, students will upload a written **Abstract** and **Research Paper** prepared in accordance with GJSHS guidelines (see pages 7-10).
- (3) Preliminary judges will read and score papers.
- (4) 50 presenters and 20 observers will be selected; selections will be posted on the GJSHS website.
- (5) At GJSHS February 25-27, 2018, presenters will deliver a concise oral presentation to the symposium, and observers will participate in the poster competition.
- (6) Based on the GJSHS presentations, presenters may be selected for awards or to attend the National JSHS competition.

The submitted written reports and oral presentations should present the results of original research carried out by the student. Students are encouraged to obtain assistance from teachers, mentors, parents, or other students. How can students best demonstrate original work? Through oral and written

research presentations made at JSHS, students report on their unique, innovative, and creative contributions to the research problem and their approach to undertaking the investigation. Students must also demonstrate their understanding of the scientific principles underlying the research problem.

**All applicants must comply with regional and national rules and policies that apply to the preparation of the written reports and the oral presentations.**

## Teachers

Approximately 10 teachers from Georgia are also selected to attend GJSHS as chaperones based on their submitted applications. An application must be received by GJSHS for teachers to be considered. A link to the online application system will be available in October 2017.

## Expenses / Housing Arrangements

**All expenses for the hotel and meals** (except Monday dinner) are covered for all participants (students and teachers/chaperone) selected to attend, as they are funded by the GJSHS grant provided by the sponsors. Travel and Monday dinner expenses are the responsibility of the participant.

Student participants are typically housed four to a room in hotel rooms containing two queen-sized beds; requests for alternate housing arrangements for an additional fee *may* be considered depending on space availability.

## Materials Required for Entry: ABSTRACT

The Abstract and Research Paper should be uploaded to the student's online application **as a single PDF document** (see guidelines below). Deadline for submission of all materials is January 10, 2018.

Abstracts should be prepared to serve the following purposes:

- (a) To enable the reader to decide whether the topic is of sufficient interest to warrant taking the time to read the entire paper or going to hear the presentation; and
- (b) To acquaint the reader with recent research results in a concise manner.

## ABSTRACT REQUIREMENTS

*Please read carefully before preparing your abstract.*

1. An abstract is a **summary** of the research written in narrative (story) form. It is not merely a general description about the research.
2. Maximum 400 words, typed in 12-point font, single-spaced.
3. Must be the *FIRST PAGE* of the Research Paper PDF document, although no page number should be assigned.
4. Should include the following elements, written in narrative form without subtitles:
  - a) The **title** should be brief and descriptive.

- b) The **statement of the problem** tells the reader what specific questions are addressed in the study. The variables and limitations are identified. The intent and objectives of the research effort are made explicit in this statement.
- c) The **purpose** states the usefulness of the study. It answers the question as to why the project was undertaken.
- d) The **hypothesis** is an educated guess that shows the relationship between a set of observed facts and a theory. The hypothesis limits the scope of the investigation and unifies the research design. **Please note that engineering, math, computer science, and sometimes physics projects do not have a hypothesis.**
- e) The **procedure** provides a brief summary of what was done.
- f) The **conclusions** provide a concise statement of the outcomes of the investigation. They should be written in non-technical language and be related directly to the hypothesis. The conclusions should identify unsolved aspects of the original problem or any new problems identified.

There is no "standard" or required arrangement for the parts of an abstract (although format listed above is recommended). Its statements may be in any sequence that enables the most information to be conveyed in the fewest words. Its sequence can be, and frequently is, totally different from that of the paper. A good abstract is usually drafted and re-drafted, eliminating, adding, or rearranging words. Financial sponsorship mentioned in the paper must be concisely credited in the abstract: "Research supported by ..." *\*Note: This is different from science fair rules.*

## Materials Required for Entry: RESEARCH PAPER

The Abstract and Research Paper should be uploaded to the student's online application **as a single PDF document** (see guidelines below). Deadline for submission of all materials is January 10, 2018.

The Research Paper details the original scientific research and should generally follow "best practices" in the field. Work must be that of the student, not the mentor.

## RESEARCH PAPER REQUIREMENTS

*Please read carefully before preparing your research paper.*

1. Must be typed in **standard 12-point font**.
2. Must be **double-spaced**.
3. Must use **1-inch margins**.
4. Must be minimum of 6 pages and **maximum of 20 pages** (excludes the Abstract but includes all other paper components, including title page, table of contents, works cited, etc.).
5. Must be submitted as **PDF**. Please double-check formatting of images, tables, page numbering, etc. before submission to ensure distortion did not occur during PDF conversion.
6. **The following elements and format are recommended:**



- a) TITLE PAGE - The cover page must contain the title of the research, category, student's name, school, and school address. Make sure your title is concise but also descriptive.
- b) TABLE OF CONTENTS - List the topics and sub-topics in order and the page numbers on which they start. Include a list of all graphs, tables, and other representative figures. Each figure should have a title and page number.
- c) INTRODUCTION - Write the introduction to provide background details or the setting of your specific research problem. Assume that the reader will be scientifically literate, but he or she may not be familiar with the details. State the purpose of the research study early in the introduction, and then state the hypotheses that you are testing. Describe what is already known about the research.
- d) MATERIALS, METHODS, AND PROCEDURES - State the materials, methods, or procedures used to conduct the research in a step-by-step manner. This section should be written specifically enough so that the research could be replicated.
- e) RESULTS (DATA OR FINDINGS) - Present the results of your research finding in logical order. Use graphs, tables, and/or other representations. Tables and graphs should be numbered separately and should include captions. Numbering will enable you to refer to them in the body of your paper quite easily. Explain in your paper the important features of each table, graph, etc. Report the results of statistical analyses of your data and the type of statistical tests used.
- f) DISCUSSION AND CONCLUSIONS - In this section, interpret your results. First, restate the hypotheses and explain how the data either supported or rejected the initial hypotheses. Discuss your research findings in relationship to what is already known about the research problem (reported in the introduction section). Draw conclusions based upon your research findings. The conclusions can include relevant, subjective observations or comments, but do state that these are speculation.  
  
Acknowledge any limitations which affect the research results. For example, what further experiments need to be performed? Statistical techniques used to manipulate the data may have limitations. Some of the treatment effect might have been caused by a random, uncontrolled, intervening variable. Again, acknowledge these limitations and other factors over which the researcher had no control, and state how these might have influenced the study outcomes.
- g) LITERATURE CITED - This is a list of citations for every article cited in your text. Endnotes are needed for all direct quotations and for all important statements of fact or opinion that are taken from written sources. Figures, dates, descriptions of situations, scientific data, opinion, representations and the like which are presented to advance the subject of the paper must have a stated source. Check with your teacher or other advisors if you need further assistance in the format for endnotes.
- h) APPENDICES - In some cases, you may wish to include large tables of raw data in your report. You should include such items in an appendix at the very end of your research report. Label and paginate your appendices.
- i) ACKNOWLEDGMENT OF MAJOR ASSISTANCE - Include a statement on where and when the research was done and acknowledge those who assisted you with the study.

## ADDITIONAL TIPS FOR ABSTRACTS AND RESEARCH PAPERS

1. Use past tense and third person in describing completed research and present tense when stating existing facts and what is in the paper.
2. Incorrect spelling and sentence structure will discourage interest in your project.
3. Assume that the reader has a good general technical vocabulary, but try to avoid use of highly-specialized words or abbreviations.
4. In an abstract, if reference to procedure is essential, try to restrict it to identification of method or type of process employed. In the research paper, discuss the details of procedures and equipment.
5. State results, conclusions, or findings in a clear, concise fashion.
6. Have your teachers read your abstract and paper to make sure they communicate clearly.
7. Helpful references:
  - a) Kathryn, Geese & Rezba, *Students and Research* (ISBN 0-8403-7766-5)
  - b) Matthews, Bowen & Matthews, *Successful Scientific Writing* (ISBN 0-521-55948-0)
  - c) Rezba, Sprague, Fiel, Funk, *Learning and Assessing Science Process Skills* (ISBN 0-8403-8430-0)

## Project Categories

The organization of the presentation sessions is based on a review of all abstracts and the area (category) of research suggested by the student. Each session will have professionals who represent that particular category. Student presenters must state in the abstract and in the application which of the following categories best fits their project:

- **BEHAVIORAL & SOCIAL SCIENCE**
- **CHEMISTRY** (*including chemistry-physical, organic, inorganic; earth science-geochemistry; materials science, alternative fuels*)
- **ENGINEERING; TECHNOLOGY** (*including renewable energies, robotics*)
- **ENVIRONMENTAL SCIENCE** (*pollution and impact upon ecosystems, environmental management, bioremediation, climatology, weather*)
- **LIFE SCIENCES** (*general biology—animal sciences, plant sciences, ecology; cellular and molecular biology, population genetics, general biochemistry*)
- **MATHEMATICS & COMPUTER SCIENCE** (*computer engineering; applied mathematics-theoretical computer science*)
- **MEDICINE & HEALTH** (*biochemistry, bioengineering, disease diagnosis and treatment, epidemiology, immunology, neuroscience, physiology, pathology*)
- **PHYSICAL SCIENCES** (*physics; computational astronomy; theoretical mathematics*)

## Team Projects

Students may present a report on work done as part of a class project, or as a science fair project or summer research project. However, students should report on their individual contributions to research. If students are part of a larger group, the presentation should focus on the individual contributions in the larger research project and properly acknowledge the contributions of other students, mentors, and/or teachers. For team research that cannot be divided into individual presentations, a team leader should be selected to present the results of the group work. In this case, all JSHS directives applying to individual research investigations will apply to group research investigations. In the event the group presenter of the winning regional group is unable to present at the National level, this opportunity will be passed on to the next ranking project. This decision is made because the judges' evaluations and scores pertain to the individual presenter.

For team projects, **all team members** must meet JSHS eligibility (grade 8 -12, enrolled in a public, private, or home school in Georgia). Exceptions *may* be considered on a case-by-case basis; contact GJSHS staff.

## Research Involving Non-Human Vertebrates or Human Subjects

Research involving non-human vertebrates or human subjects must be conducted under the supervision of an experienced teacher or researcher and follow state and federal regulatory guidance applicable to the humane and ethical conduct of such research. This must be acknowledged in the students' **electronically submitted written report.**

## The Oral Presentation

If you are selected as a presenter for the Georgia Junior Science & Humanities Symposium, you will prepare an oral presentation of your scientific research. For this presentation, you may use a computer-projected presentation developed with *PowerPoint* or other presentation software.

The Georgia Junior Science and Humanities Symposium (GJSHS) is modeled after the National Junior Science and Humanities Symposium (NJSHS). The purpose of the research presentations at the GJSHS is to afford selected students the opportunity and experience of reporting their research and experimentation to an assemblage of their peers, teachers, and other symposium attendees, and to allow judges to select those presentations that merit special recognition.

## SESSION TIMING

The research presentation may not exceed 12 minutes, followed by a maximum 6-minute question period. A session moderator will aid the student speaker in maintaining this schedule and in fielding questions from the audience. The procedure for maintaining the time includes a 10-minute signal for the student. At the 12-minute point, the student speaker must stop the presentation even if he or she has not finished. Following the presentation, the session moderator will ask for judges' questions. The speaker should repeat a question before answering so the audience may understand the entire dialogue. The speaker may entertain questions from the audience if time permits and while the exchange appears interesting and relevant. Questions intended to harass the student speakers will not be allowed by the session moderator.

## AVAILABLE EQUIPMENT

Available audio-visual equipment in each session at GJSHS includes: (1) LCD projector; (2) projection screen; (3) laptop computer. Students may bring their own laptop computer for use during their presentation. Equipment operators will not be available in each session. Students may enlist the help of a teacher or fellow student when experiencing difficulty with the audiovisual equipment. Students should be prepared to re-show visuals during the questioning period.

## COMPUTER USAGE

An LCD projector, projection screen, and laptop will be in each room. If using computers, students should adhere to the following guidelines:

- a. Incorporate any illustrations or other graphical representations into a PowerPoint (or other slide show presentation program) for presentation during the symposium.
- b. Save the PowerPoint presentation to a USB flash drive or CD.
- c. Prepare for any equipment problems by bringing back-up presentation materials.
- d. Start computer equipment that may be brought to the symposium prior to the designated presentation time. No additional presentation time will be allowed to cue up a presentation.

## VIDEO USAGE

If using videos, students must comply with the following ground rules:

- a. The video component cannot make up more than two (2) minutes of the presentation.
- b. No audio or background music is permitted other than sounds that are an integral part of the research.
- c. Recorded or mechanically produced narration is not permitted. Narration must come from the speaker.
- d. Videos (and audio, if any) may be used only for those aspects of the presentation that cannot adequately be presented by illustrations or graphs. Video material presented must be an integral part of the research and should not be a substitute for presentation of data. Videos must not be used for presentation of common procedures, illustrating equipment, or showing laboratory facilities. Videos should illustrate work that was done and should not be used for stimulation or aesthetic value.

## OTHER PRESENTATION AIDS

No written handouts are permitted. Research apparatus may be used if it is integral to the presentation and **only if the apparatus is hand-held**. Software such as PowerPoint may be used to prepare or drive presentation.

## SUGGESTIONS

**Remember, you are the expert.** No one in the audience knows as much about your research investigation as you. Therefore, remember to explain your research in enough detail so the audience will understand what you did, how you did it, and what you learned. Whenever possible, avoid jargon or

unnecessary terminology. If it is essential to use specialized terms, remember to explain the specialized term briefly. Give your audience enough time to understand what you are trying to convey.

**Graphs, tables and other representation help explain your results.** Keep them simple and uncluttered. Focus on important information; for example, remember to name the variables on both axes of a graph, and state the significance of the position and shape of the graph line. Deliver your presentation at a comfortable pace. It helps to practice your presentation before a non-specialized audience.

**Practice will help perfect the presentation and the timing.** Do listen to the advice of your non-specialized audience but also get help from a teacher or other advisors as needed.

## Poster Presentations

If you are selected as an observer for the Georgia Junior Science & Humanities Symposium, you will be **required to prepare a poster** of your scientific research for competition.

1. The poster must be limited in size to 24 inches by 36 inches and must be light enough to hang on a wall using poster adhesive.
2. Each poster presentation should show the complete scientific process of your work along with final results presented by use of graphs, charts, and/or illustrations.
3. Observers are required to attend all symposium presentations and all other scheduled events.
4. If the research was a **team project** and one team member has been selected as a presenter, the other member(s) may or may not be selected to attend the symposium. If selected they are not allowed to participate in the poster contest. They will be required to attend the activities that their team member attends.

**NOTE: Your team member may or may not be invited to GJSHS based on space availability.**

---

## Regional and National Judging

---

At the Georgia Junior Science & Humanities Symposium (GJSHS), the first round of judging occurs when the students' research papers are reviewed by a team of scientists in the field. Selected students are invited to deliver oral presentations of their research at GJSHS February 25 - 27, 2018. These presentations will represent the finest efforts of high school students in the state or region toward either original laboratory research, field research, or applied research. Following judging of the oral presentations on Monday, Feb. 26, the judging team will deliberate to select approximately 12 students for the finalist presentations on Tuesday, Feb. 27. The selection of the student delegates who will advance to the National JSHS will be chosen from the 12 finalists.

During oral presentations, judges are permitted a questioning period during which the judging team may ask questions about the students' paper, research process, or presentation. These questions are

intended to aid judges by clarifying the student's depth of understanding, the amount of work and level of effort the student put in to the project, and the individual contributions to the research problem.

At the National Junior Science & Humanities Symposium, student research presentations will be organized in concurrent sessions by discipline. Military-sponsored scholarships and other awards will be made to 1st place finalists and runner-up finalists from each of the final sessions.

In the evaluation of the presentations, judges are reminded that a key element of JSHS is the intellectual development of the individual student as an experimenter and researcher. The student presentation should clearly demonstrate in its quality and content that it is an appropriate example for the major objectives of the U.S. Army, Navy, and Air Force Research Offices' National Junior Science and Humanities Symposium.

## **Judging Criteria**

Regional and national judges evaluate the research papers and presentations using the criteria below, which are used as the basis for discussion among judging team members for the selection of students to advance to subsequent rounds of competition:

### **1. RESEARCH PROBLEM**

- Problem is clearly defined.
- Research is based on clear rationale, model, theory, or philosophy.
- Clearly and accurately provides background information.
- Shows thorough understanding of existing knowledge about research problem and its inherent complexities.

### **2. SCIENTIFIC THOUGHT, CREATIVITY/ORIGINALITY**

- Shows understanding and application of appropriate scientific method and processes for the research problem.
- Demonstrates significant individual contributions to and understanding of the research problem.
- Research demonstrates high level of effort.

### **3. RESEARCH DESIGN, PROCEDURE, RESULTS\***

- Procedures are detailed, clearly defined, and appropriate for the problem.
- Identification and control of variables are clearly explained and appropriate.
- Procedures are replicable.

#### **\* FOR PROJECTS IN THE ENGINEERING, TECHNOLOGY, & COMPUTER SCIENCE FIELDS:**

- Presents a workable solution that is acceptable to a potential user.
- Recognizes economic feasibility of solution.
- Recognizes relationship between design and end product.
- Tested for performance under conditions of use.
- Results offer improvement over previous alternatives.

### **4. DISCUSSION/CONCLUSIONS**

- Results are clearly stated and thorough.
- Conclusions are logical and relevant to the research problem and results.
- Recognizes limits and significance of results.
- Shows a clear understanding of scientific or technological principles.

- Theoretical or practical implications are explained.
- 5. SKILL IN COMMUNICATING RESULTS**
- Demonstrates clarity in communicating results to non-specialized audience.
  - Terms are appropriately and helpfully defined.
  - Writing is clear, articulate, and grammatically correct.
  - Charts, graphs, and tables are used appropriately and contribute to reader’s understanding of the research.
- 6. SOURCES/ACKNOWLEDGEMENTS**
- Student acknowledges sources and major assistance received.

### **The GJSHS Judging Team and Process**

The GJSHS judging team includes individuals who have significant graduate-level education and experience in the general fields of research that are represented by the GJSHS student presenters. Although specialized experience in each student’s field of research at the GJSHS is typically represented among the judges, it is not guaranteed given the submitted paper topics and available judges in any given year. Therefore, student presenters are reminded of their responsibility to communicate their results so that they may be understood by both the non-specialized audience and by the judges. Judges are also selected for their interest in encouraging the students and in the future development in the science, engineering, or mathematics fields.

The GJSHS Office, Academy of Applied Science, and the Judging Panel recognize the enormous effort that students undertake in conducting their research. Therefore, our objective is to ensure an equitable competition by selecting qualified judges and by communicating the rules of competition to both students and judges. We realize that in any competition of this nature, differences of opinion about the judges interpretations may occur. **It is the policy of the sponsors of the Georgia JSHS (e.g. the University of Georgia as well as the Army, Navy, and Air Force) to support the interpretations and final decisions of the judges panel.**

---

## **Regional and National Scholarships**

---

### **Scholarship Eligibility**

- A student must be a citizen or permanent resident of the United States or U.S. territory to be eligible for the government-sponsored scholarship awards.
- Regional symposia directors are responsible for monitoring citizenship status of student applicants. Foreign nationals may present their research at the regional symposium level for recognition of excellence and may be eligible to attend the National symposium. However, students not meeting the above citizenship requirement may not be eligible for further competition at the National symposium and for the government-sponsored scholarship awards.

- The total scholarship awards available through JSBS are capped at a maximum total of \$30,000 per individual student winner.
- Scholarships are awarded to only one student. Student presenters who are part of a team must notify JSBS of which student finalist will receive scholarship funding should the team presentation earn regional or national awards.

## **Scholarship Conditions**

Student scholarship recipients must meet the following:

- Demonstrate full-time enrollment as an undergraduate student at an accredited institution
- Pursue an undergraduate degree in a science, technology, engineering, or mathematics discipline, as defined by the National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council in their combined directory titled [Organization and Members](#)
- Maintain at least a B (3.0) equivalent grade average

**This document is adapted from the *National JSBS - Program Fact Sheet and Guidelines for Students* at [www.jsbs.org](http://www.jsbs.org).**

**Visit the National JSBS website for more information: <http://www.jsbs.org>**

**Helpful documents, such as oral presentation tips and sample papers, may be found at <http://www.jsbs.org/guidelines.html>**