

# Synopsys Sac STEM Fair Judging Policy

## GENERAL POLICY

The judging goals of the Synopsys Sacramento Regional Science & Engineering Fair are to engage and inspire student participants to pursue STEM degrees and career pathways through recognition and exposure.

1. **Recognition:** To reward student scientific and engineering talent, primarily shown through original thought and skillful project execution
2. **Exposure:** To encourage broad interest and participation in all STEM subjects as applicable to their everyday lives through professional interaction, especially amongst students who may have no other outlet to do so.

To promote these goals, the Synopsys Sac STEM Fair's policy is to award first through third in the High School division and first through fifth in the Middle School Division. Both Divisions also receive at least one honorable mention project per category. That means that there are 70 possible category awards to be presented to Synopsys Sac STEM Fair participants.

We also award simply attending and participating in the STEM fair by acknowledging not only every project, but every *STUDENT* who participates with a certificate of participation and recognition, as well as an official Fair pin.

## JUDGING ORGANIZATION

The Synopsys Sacramento Regional Science and Engineering Fair uses three phases to complete judging for the STEM Fair event.

1. Project scoring
2. Database Collection & Scoring Deviation
3. Consistency Coordination & Follow up

The sections below explain a volunteer judge's role in each of these phases, along with the more specific Synopsys Sac STEM Fair policies and procedures that apply to each phase.

## PROJECT SCORING

### Scoring Policy

The Synopsys Sacramento Regional Science and Engineering Fair uses same 100-point scale developed and used by the Intel International Science and Engineering Fair (ISEF). See the "Judging Guidelines and Evaluation Criteria" for informal suggestions to judges to consider for criterion, not a formal scoring rubric.

### Three Topic Areas

Although the details may look complex, ISEF scoring is simple: roughly one third of available points are earned for each of these three areas:

1. Originality
2. Analysis – Scientific Thought or Engineering Design
3. Execution

Ten points are held back from the 100-point total for project "clarity," which basically rewards presentation, including both the poster and the interview with the student(s).

### Science vs. Engineering

The ISEF scoring criteria split into two alternatives for evaluating the second 30-point chunk of project features: "scientific thought" or "engineering design." Science projects earn points for features that promote empirical discovery, such as well-defined variables and thoughtful experimental controls. Engineering projects earn points for design-oriented features, such as practical tests, economic feasibility, and promising applications. The category structure of the fair generally means that science projects compete against other science projects while engineering projects compete against other engineering projects. But a few categories, such as "Energy and Transportation," could contain projects of both types.

### **Individual vs. Team**

Students may choose to work on a project alone or on a team of two or three classmates. Team projects earn points in the same ways as individual projects, except that a few points are withheld from each of the originality, analysis, and execution clusters (but *not* from presentation) and are awarded instead for teamwork. Student teams are expected to divide the work among their members yet also exhibit shared responsibility for overall success (one strong student should not "carry" the team).

## **PRACTICAL SCORING ISSUES**

### **Implementation Time**

The Synopsys Sacramento Regional Science and Engineering Fair schedules project interviews by project number and volunteer judge capacity. This means that judges must move thoughtfully but quickly through their examination of each project scheduled. There is seldom time to follow an overt, elaborate, multi-question evaluation process for each of the three 30-point scoring clusters. We recommend that you familiarize yourself with the criteria for each scored category *before* you go out on the exhibit floor, and then rely on your professional experience and judgment to thoughtfully but quickly assess the quality of each project on your judging schedule. We also provide two opportunities for judges to view project boards prior to the event. Furthermore, we post the abstracts online at least two weeks prior to the event for viewing alongside the rubrics and criteria.

### **Feedback to Students**

Judges should remember that the only audience for their project score sheets is *themselves*. The students whose projects you evaluate never see your score sheets or your clarifying comments for yourself. Hence, we urge a two-fold approach:

1. Use your *scores* to assess project features and record your evaluations
2. Use your *verbal comments* when you interview students to provide encouragement, technical suggestions, or *gentle* advice to improve future work (or future presentations of this work elsewhere). See also the "Interviews" section below.

### **Scoring Mechanics**

Some scoring mechanics unavoidably depend on details about projects submitted, availability of judges, and venue arrangements that will only settle close to the day of the STEM fair. This section summarizes the basic scoring-mechanics framework.

### **Judging Schedule**

On Fair day, judges should arrive at their designated conference room no later than 7AM to allow time for:

1. A very brief welcome (with food), rule reminders, meeting other judges within your assigned category, and assignment of projects to each judge
2. An opportunity to preview and compare your assigned projects *without* students present
3. For Grand Prize team only: selecting the ISEF and CSSF candidate projects from among those ranked as first-prize winners by all judges earlier.

Our goal is to complete the judging process no later than 1:30PM, a goal that obviously depends in part on the number of projects submitted and the number of judges available on fair day. We provide lunch and snacks on the day of judging.

### **Score Sheets**

All score sheets and cards are treated as "personally identified information," which judges should turn in to staff and which should *not* be shared or discussed outside of the judges' conference room.

### **What to Check**

Different categories of project on different fields of science or engineering may call for attention to different project aspects, but all judges must assign points for originality, analysis (or design), execution, and presentation within the ISEF scoring framework discussed above.

**\*\*Note: Judges often find attention to these key artifacts especially helpful when evaluating project quality**

1. Abstracts.

The relation between abstract quality and project quality (highly correlated in real-life science) tends to vary greatly by grade level. Middle-school abstracts are often not very revealing; high-school abstracts can be quite professional. All abstracts will be posted online in the student data base. The Middle and High School Divisions will be separate databases. If your category judging assignment has been received from the judging lead, please read the abstracts before arriving to judge projects on March 14, 2015.

2. Logbooks.

Again, these are often pro forma for younger students but should be thorough and reveal the personal sophistication of older students. While checking logbooks for IRB/SRC (safety, risk, and human-subject) compliance is *not* your primary role as a judge, finding obvious flaws (altered data, excessive death rates, undated pages) should certainly be pointed out to the lead judge.

3. Display Boards.

Science fairs are not beauty pageants, to be judged by display alone. Nevertheless, a project display should effectively use available space and explanatory graphics to clearly reveal the problems addressed, methods used, and results achieved. Good displays help their students talk cogently during a judge interview as well as deliver organized project details when students are absent.

### Interviews

For most students, judge interviews about their work are the most intellectually (and often, emotionally) challenging part of STEM fair day, please be aware of it!

1. Authority.

To most students, judges represent professional authority. Use your influence wisely by asking questions or offering constructive criticism from an encouraging stance. Although interviews are, of necessity, short, they should always have a positive tone.

2. Encouragement.

**Never** belittle projects nor display boredom with simple techniques. Projects often vary greatly in level of sophistication, but students with few facilities or little background should feel that while you recognize the basic character of their work, you value their effort, curiosity, and participation. A low score should *not* mean a negative interview experience.

3. Glibness.

Some students talk easily about their work, while others are nervous or scared. Good judges patiently distinguish between the knowledgeable but halting speaker and the student who really does not understand their own project.

4. Privacy.

Although a crowded exhibit floor makes complete privacy impossible, judges should try to avoid interfering with other, near-by interviews and should complete each project's score sheet in a way not visible to those being scored. Scores are *not* public information. Since their significance depends partly on other judges and other projects, sharing your scores with students is never appropriate.

### Ranking Aids

#### SCIENCE FAIR EXAMPLES

**STEP 1:** Go to the following link: <http://www.usc.edu/CSSF/History/2011/>

You should see the following:

2011 California State Science Fair

The 2011 California State Science Fair was held on May 2-3. This year the Fair took place entirely within the confines of the California Science Center located in Exposition Park, just south of downtown Los Angeles. This year we had 1000 participants from 403 schools throughout the State presenting projects in competition for over \$50,000 in total awards.

**Announcements:**

- [Changes since last year](#)
- April 27: Science Fair Teacher of the Year Finalists announced: Cassandra de Wood, Erin Schumacher, Maria Lyn Genota, Teri O'Donnell, and Diana Herrington.
- May 3: Awards Announced
- June 8: All award checks and medallions were mailed today. If you do not have yours in a few days, [contact us immediately](#).
- June 20: All participant portraits posted.
- June 27: Photos of all category awards and honorable mentions are now posted.
- June 30: Photos of all major fair awards are now posted.
- July 8: Photos of all awards presentations, both on stage and during the judging interview period, are now posted.

**Participants**  
[Alphabetical Listing](#)

**Projects**  
[Organized by Subject Category](#)

**Photographs**  
[Ordered Chronologically](#) (in progress)  
[Indexed by name](#) (in progress)  
[Portraits by Panel](#)  
[Portraits Alphabetically](#)  
[Category Awards](#)  
[Special and Recognition Awards](#)  
 More Coming Soon

**Awards**  
**Major Fair Awards –**

- [All five listed in PDF format](#) (more details below)
- [Science Fair Project of the Year – Senior Division](#)
- [Science Fair Project of the Year – Junior Division](#)
- [Science Fair Student of the Year](#)
- [Science Fair Teacher of the Year – Senior Division](#)
- [Science Fair Teacher of the Year – Junior Division](#)

**Category Awards**

- [Organized by subject and division](#)
- A single document of category awards in either [PDF](#) or [Excel](#) formats

**Special and Recognition Awards –** both in [HTML linked to photos](#) and in [PDF Format](#).  
**A single list of all awards in either [Excel](#) or [PDF](#) formats**

Last updated: Sun Jul 10 08:14:47 PDT 2011  
[California State Science Fair / 2011 / 26,327 / Calisf@usc.edu](#)

**STEP 2:** Click on [Organized by Subject Category](#) to see the various categories of projects.

**STEP 3:** Click on **PDF** to review all projects under a category.

**STEP 4:** Time yourself as you review and judge the first, second, and third place projects.

**STEP 5:** Click on the three digit codes "J##" or "S##" to see the entire panel's description, including schools, grades, advisors, and counties **OR** click on the adjacent word "PDF" to see just the Project Summaries for all projects in a panel.

**JUDGES SHOULD CLICK ON THE PDF LINK**

← → ↻ www.usc.edu/CSSF/History/2011/Panels/ 🔍 ☆ ☰

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## 2011 California State Science Fair Project Listings

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Click on the three digit codes "J##" or "S##" to see the entire panel's description, including schools, grades, advisors, and counties.  
Click on the adjacent word "PDF" to see just the Project Summaries, but for all projects in a panel.  
*Judges should click on the PDF link.*

Category	Juniors		Seniors	
Aerodynamics/ Hydrodynamics (Junior Division Only)	J01	PDF		
Alternative Energy (Junior Division Only)	J02	PDF		
Applied Mechanics & Structures	J03	PDF	S03	PDF
Behavioral & Social Sciences	J04	PDF	S04	PDF
Biochemistry/ Molecular Biology	J05	PDF	S05	PDF
Chemistry	J06	PDF	S06	PDF
Cognitive Science (Junior Division Only)	J07	PDF		
Earth & Planetary Sciences	J08	PDF	S08	PDF
Electronics & Electromagnetics	J09	PDF	S09	PDF
Environmental Engineering (Junior Division Only)	J10	PDF		
Environmental Science	J11	PDF	S11	PDF
Mammalian Biology	J12	PDF	S12	PDF
Materials Science (Junior Division Only)	J13	PDF		
Mathematics & Software	J14	PDF	S14	PDF
Microbiology (General)	J15	PDF	S15	PDF
Microbiology (Medical) (Junior Division Only)	J16	PDF		
Pharmacology/ Toxicology	J17	PDF	S17	PDF
Physics & Astronomy	J18	PDF	S18	PDF
Plant Biology	J19	PDF	S19	PDF
Product Science (Biological) (Junior Division Only)	J20	PDF		
Product Science (Physical) (Junior Division Only)	J21	PDF		
Zoology	J22	PDF	S22	PDF

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Last updated: Sun Apr 24 21:18:32 PDT 2011  
[California State Science Fair / 2011 Project Listings / CalifSF@usc.edu](#)

**STEP 6:** Now go back one layer to the first screen and click on: [Category Awards](#) and compare your selections to the ones that won awards.

**STEP 7:** Try different categories as you may have to judge more than one category at the Synopsys Sacramento Regional Science and Engineering Fair.

Also, go visit: <http://www.usc.edu/CSSF/History/> to see projects from other years. Practice judging (as above) using projects from other years listed.

**Important!** You will probably see similar projects at the SSRSEF as the ones listed on the web site; don't be biased by the projects that won awards in the past, judge each one as if you have never seen the project.

## CONSISTENCY COORDINATION

### Fairness Issues

Real and perceived fairness--in picking award winners and in distributing awards among project categories--both encourage participation and promote respect for judge decisions. Fairness also prevents students from manipulating the judging process to inappropriately gain awards.

Students largely self-select the category in which their project competes. Since science-fair categories are broad and nonexclusive, a project might easily qualify for several different categories. For example, work on the

environmental impact of a microscopic animal might fit into Biological Sciences (BIO) or Energy & Transportation (EAT) at the student's discretion. Empirical analysis of past regional-fair award distribution by category unfortunately shows that such content-overlapping categories have had very divergent rates of numbered awards. Students and teachers who became aware of these between-category differences were understandably concerned. Hence, we use several techniques to help judges avoid such real or perceived unfairness.

### **Consistency-Promoting Techniques**

To promote award consistency across categories, SSRSEF requires its judges to use:

1. Consistency compliance.

Achieving category consistency is the responsibility of *every* judge. No final decisions for numbered awards are recognized until all judges examine and resolve scoring discrepancies among categories by using some of these techniques:

- Chosen judges will be assigned Tie Breaker scoring sessions to **reassess tied scores or scores that do not fall within the normal standard deviation.**
- Projects judged with widely divergent scores will be re-assessed to ensure that all scores are consistent and the project was neither favored nor un-favored for any particular reason.

## **SELECTING ISEF/CSSF CANDIDATES**

### **The Goals**

The Synopsys Sacramento Regional Science and Engineering Fair is affiliated with Intel's International Science and Engineering Fair (ISEF), which entitles it to send three high-school projects to ISEF each year to compete for a second round of awards and recognition at the international level. SSRSEF pays the full or partial travel expenses for selected students to attend ISEF. The SSRSEF is also affiliated with the California State Science Fair (CSSF), which entitles it to send 14 mixed high school and middle school projects to CSSF to compete for statewide awards. All middle school projects awarded a first place are eligible to apply to the Broadcom Masters sponsored by Society for Science and the Public (SSP). Because of the filtering process involved, just participating in these second-level fairs is considered an honor.

Sending projects likely to win again at ISEF or CSSF benefits the prestige of ACSEF, but "likely to win again" is often not the same as being the most original or best executed science or engineering project. Along with intellectual content, factors that affect second-level success include:

- Topic (is it related to medicine or health which has been a very successful category at ISEF?),
- Presentation style (is it professional?),
- Student social maturity (do they interview smoothly?).

### **The Process**

To promote fairness among possible candidates for ISEF or CSSF SSRSEF's policy for this selection is as follows:

1. All projects awarded first place in their category, and only those, are considered when selecting each year's ISEF and CSSF candidates. All judges should keep this in mind when picking their first-prize award winners.
2. A Grand Prize judging team will work as a small committee to review (finalized, not preliminary) first-place award winners and from them select those that will represent SSRSEF at ISEF (high-school projects only).
3. This process may involve reexamining the technical strengths and weaknesses of the projects earning first-place awards and Category awards. It will also involve weighing the non-content competitiveness factors mentioned above. For this reason, it is SSRSEF policy to characterize the selected candidate projects as "most competitive" & superior in scientific or engineering quality as they go forward, when comparing first-place award winners.
4. The Grand Prize Team will choose candidate projects by consensus if possible, or by open majority vote (such as a show of hands) if necessary.
  - To help prepare the Team for their extra duties in selecting the ISEF and CSSF candidates, they will receive additional support material including: (1) more details on the non-content competitiveness factors mentioned above, and (2) annotated examples (summaries) of some previously successful ISEF.

## GENERAL RESPONSIBILITY ISSUES

### Conflict of Interest

To avoid conflicts of interest, ACSEF does not allow the following (perhaps otherwise well-qualified) people to serve as judges:

1. 6th-12th grade school teachers or site administrators of schools with participants, staff or board members
2. Parents of or professional mentors of any student participants
  - **EXCEPTION:** Parents of only high-school students can judge middle-school projects and vice versa, since these age levels are judged completely independently. SSRSEF lead judges review the volunteer judges registration prior to the event and ensure that the parent is assigned properly. (*Example:* you are a parent of a student in grades 6, 7 or 8 but not 9-12, so you could judge high school projects in your area of expertise.)
3. Anyone else whose relationship with any STEM fair participant could pose a conflict of interest such as: Family, neighborhood, and corporate relationships are often too complex for SSRSEF to enumerate all the cases where you as a judge may find yourself scheduled to evaluate a project whose student(s) you know personally or professionally. If you can anticipate such conflicts before fair day ("my company donated resources to four chemistry projects," for example), please contact the fair coordinator to see if you could serve as a volunteer in another capacity.

### Nondisclosure of Judging Results

Serving as an SSRSEF judge means that you agree to strictly follow our policy on the confidentiality of judging results:

1. Project scores are ***never*** disclosed to anyone outside of the judges' conference room. Students never see these scores; they only support the project ranking process and are ***never*** made public.
2. Ranking decisions (preliminary and those adjusted for cross-category consistency) are confidential until publicly announced at the awards ceremony. Do not discuss ranking decisions with anyone outside the judges' conference room (including in restrooms, lobbies, or parking lots).

## SPECIAL AWARDS

Category judges score and rank projects by category using the policies and procedures in this guide. Special awards judges represent SSRSEF sponsors who wish to recognize projects by using their own distinct criteria (usually quality combined with relevance to some specific product, problem, service, or agency mission). General and special-awards judging happen at the same time, but they are completely independent of each other (and special award choices have no impact on ranking decisions).