Singapore Science and Engineering Fair (SSEF) 2020

Teacher Coordinators' Briefing

04 Jul 2019 (Thu)
Science Centre Singapore

Jointly organised by:

Agenda

- Introduction to SSEF / ISEF

- Registration for SSEF 2020
    - Registration Processes
    - Completion of Forms & Common Issues
    - Updates from Intel ISEF 2019
    - Matters Relating to H3 Science Research

- Networking and Sharing of Practices

The Singapore Science and Engineering Fair

Introduction
to SSEF / ISEF

Singapore Science and Engineering Fair (SSEF) 2020

↗ Organised by MOE, A*STAR and Science Centre Singapore

↗ SSEF 2020 is the 20th Anniversary

↗ Some numbers for SSEF 2019:

  ↗ **553** projects submitted

  ↗ **609** participants at the Fair

  ↗ **396** judges at the Fair

  ↗ **154** Gold / Silver / Bronze / Merit / Special* awards

The Singapore Science and Engineering Fair

Singapore Science and Engineering Fair (SSEF) 2020

↗ **Main Category** is open to all students studying in MOE schools, who are between 15 - 20 years old as of **1 May 2020**

↗ Eligibility:

  ↗ Each student can only submit **one** project

  ↗ Include no more than 12 months of continuous research and may not include research performed before Jan 2019

  ↗ Individual or Team (no more than 3 members) projects

↗ Key dates*****:

  ↗ 11 Mar 2020 (Wed) – Final Judging Day

  ↗ 12 Mar 2020 (Thu) – Public Day

*confirmed after School Terms and Holidays for 2020 released in Aug 2019

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Project Categories

Animal Sciences	Earth and Environmental Sciences	Mathematics
Biochemistry	Embedded Systems	Microbiology
Biomedical and Health Sciences	Energy: Chemical	Physics and Astronomy
Biomedical Engineering	Energy: Physical	Plant Sciences
Cellular and Molecular Biology	Engineering Mechanics	Robotics and Intelligent Machines
Chemistry	Environmental Engineering	System Software
Computational Biology and Bioinformatics	Materials Science	Translational Medical Sciences

*For more info on the categories and subcategories, refer to:
https://student.societyforscience.org/intel-isef-categories-and-subcategories
NOTE: Behavioural and Social Sciences is NOT offered at SSEF.

Singapore Science and Engineering Fair (SSEF) 2020

↗ SSEF is affiliated to International Science and Engineering Fair (ISEF)

↗ Top SSEF projects (main category) will be selected to represent Singapore at **ISEF 2020**

    ↗ **Anaheim, California, USA**

    ↗ **10 – 15 May 2020**

↗ Singapore Citizens or PRs

↗ Official Website: https://student.societyforscience.org/intel-isef

Singapore Science and Engineering Fair (SSEF) 2020

↗ SSEF winners will also be shortlisted to take part in A*STAR Talent Search

 ↗ to recognise students who have excelled in Scientific Research

 ↗ website: http://www.science.edu.sg/ats

↗ SSEF winners may also be selected to take part in regional Science Fairs:

 ↗ Taiwan International Science Fair (TISF)

 ↗ ASEAN Science Project Conference (ASPC)

 ↗ SEAMEO Search for Young Scientist Plus (SSYS$^+$)

 ↗ (and others)

Singapore Science and Engineering Fair (SSEF) 2020

↗ **Junior Scientists Category** is open to **Sec 1 and Sec 2 students (in 2019)** studying in MOE schools

↗ **Preferably** having at least 1 member below age 15 as of **01 May 2020**

↗ Projects in Sciences / Math / Computing / Engineering

↗ Eligibility:

  ↗ Each student can only submit **one** project

  ↗ Include no more than 12 months of continuous research and may not include research performed before Jan 2019

  ↗ Individual or Team (no more than 3 members) projects

Singapore Science and Engineering Fair (SSEF) 2020

↗ **Junior Scientists Category** is open to **Sec 1 and Sec 2 students (in 2019)** studying in MOE schools

↗ 1 student **may** be selected to represent Singapore at the Broadcom MASTERS International (BCMI) 2020 (to update after Sep 2019)

↗ Held in conjunction with ISEF 2020

Registration for SSEF 2020

SSEF / ISEF Rules and Regulations

↗ https://student.societyforscience.org/international-rules-pre-college-science-research

↗ Scientific fraud and misconduct are not condoned at any level of research or competition.

↗ Plagiarism, forgery, using other researchers' work as one's own and fabrication of data will result in immediate disqualification.

↗ **Projects that do not comply with safety & ethical guidelines will be disqualified.**

Online registration of projects

1 Nov - 1 Dec 2019

Step 1: Online Registration of Projects

↗ To register, your students must log-on to **FormsSG**:

   ↗ (The links will be sent to you nearer to the date)

↗ The completed form must be submitted between **1 Nov – 1 Dec 2019** (both dates inclusive). Late submissions will **NOT** be accepted.

↗ A confirmation email will be sent upon successful registration to both team leader and teacher i/c.

↗ On 16 Dec 2019, schools will be provided with the allocated **project codes** and the **log-in details** for online submission of project report.

Online registration of projects

1 Nov - 1 Dec 2019

→

Submit project by

08 Jan 2020

The Singapore Science and Engineering Fair

Step 2: Submission of Project

↗ <u>Main category projects</u> need to submit the following items:

1. **Cover Page, Abstract, Project Report, Research Plan**
   - Students to upload softcopy via online portal (using login details provided)
   - The online portal would be 'live' between 1 Jan and 8 Jan 2020
   - Deadline: **08 Jan 2020, 2359 h** (Wednesday)
   - Project Code and Project Title to be indicated on **ALL** submissions.
   - Participants' names and affiliations (e.g. school) are **NOT** to be included.

2. **SSEF & ISEF Registration Forms**
   - School coordinators to submit password-protected softcopy to Science Centre via google drive by 9 Jan 2020, 1700 h

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Step 2: Submission of Project

↗ Details of submission requirements and forms can be found at: https://www.science.edu.sg/for-schools/competitions/singapore-science-and-engineering-fair

↗ Late submissions will not be accepted

Step 2: Submission of Project

↗ <u>Junior Scientist category projects</u> need to submit the following items:

1. **Cover Page, Abstract, Project Report, Research Plan**
   - (as per SSEF projects)

2. **SSEF Registration Forms**
   - Only one registration form (i.e. SSEF)
   - School coordinators to submit password-protected softcopy to Science Centre via google drive by 9 Jan 2020, 1700 h

3. **Video Awards**
   - A short video clip (max 2 min, summarising the research project)
   - To be uploaded to a selected platform by 05 Feb 2020, 2359 h
   - More details would be put up on SSEF website.

Online registration of projects

1 Nov - 1 Dec 2019

Submit project by

08 Jan 2020

Prejudging Results Mid-Feb 2020

SSEF judging

11 & 12 Mar 2020

SSEF Winners

ATS and SSEF Joint Award Presentation Ceremony

April 2020

ATS short-listing

March 2020

ATS Winners

ATS finalists

SSEF top winners go to ISEF 10 - 15 May 2020

ATS final judging

April 2020

SSef

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Completion of Forms

and Common Issues

SSEF / ISEF Rules and Regulations

↗ Expanded Ethics Statement
(**to include adults involved** *NEW!*)

    ↗ addresses integrity, legality, respect for confidentiality and intellectual property, and stewardship of the environment

| integrity | legality | confidentiality | intellectual property | environment |

SSEF / ISEF Forms

↗ SSEF/Intel ISEF forms serve to:

  ↗ ensure safe laboratory practices and adherence to regulations

  ↗ protect the rights and welfare of the
    - student researcher(s)
    - human participant(s)
    - vertebrate animal subject(s)

  ↗ protect the environment

↗ It is **<u>NOT</u>** an additional administrative burden but a necessary part of scientific research.

SSEF / ISEF Forms

↗ **Every project submission** must include:

   ↗ Form 1 (Checklist for Adult Sponsor)

   ↗ Form 1A (Student Checklist) + Research Plan / Project Summary

   - In the research plan, state very clearly which steps are carried out by students and which are carried out by qualified adults.

   - If there are deviations to the original research plan, those changes must have been approved and be recorded in the project summary.

   ↗ Form 1B (Approval Form) – 1 per **member**

   ↗ Form 3 (Risk Assessment)**

   - Compulsory <u>except</u> for work that are purely computational

SSEF / ISEF Forms

↗ **Additional forms** if applicable:

    ↗ Form 1C: If work conducted in regulated research institutions (RRIs)

       - **BSL2 projects must <u>NOT</u> be conducted in school labs**

    ↗ Form 7: If the project is a continuation / progression of a previous project in the same field of study

       - + previous abstract

       - + previous research plan

SSEF / ISEF Forms

↗ **Additional forms** required if project involve:

  ↗ **Human Participants**

  ↗ **Vertebrate Animals**

  ↗ **Potentially Hazardous Biological Agents**

↗ Approval from school or RRI's IRB / SRC
  before experimentation required
  (Form 1B and other relevant forms)

IRB / SRC

↗ Institutional Review Board (IRB)

　　↗ Role: To evaluate potential physical and / or psychological risk of research involving humans. Includes reviewing of surveys / questionnaires to be used in project.

　　↗ Composition: min 3 members
- 1 × Educator
- 1 × Principal / Vice principal (or equivalent administrator)
- **1 × Medical or mental health professional**

IRB / SRC

↗ Scientific Review Committee (SRC)

   ↗ Role: To evaluate student research for compliance with rules, laws and regulations

   ↗ Composition: min 3 members

      - **1 × Biomedical scientist with a doctoral degree**
      - 1 × Educator
      - 1 × Additional member

Setting up school's IRB / SRC

↗ For schools that are interested to set up their own IRB/SRC, please seek Affiliated Fair approval by sending the necessary documents and forms to:
Science Centre Singapore
SSEF Secretariat
15 Science Centre Road
Singapore 609081

↗ No Adult Sponsor, parent or other relative of the student(s), the Qualified Scientist, or the Designated Supervisor who oversees the project may serve on the IRB / SRC reviewing that project.

SSEF / ISEF Forms

↗ **Additional forms** required if project involve:

   ↗   **Human Participants**

- IRB approval required (Form 1B, Form 4)

- Qualified Scientist Form 2 (if applicable)

- Human Informed Consent form (if applicable)

- Sample Survey form (if applicable)

SSEF / ISEF Forms

↗ **Additional forms** required if project involve:

   ↗ **Vertebrate Animals**

- SRC approval required (Form 1B)
- Qualified Scientist Form 2
- Vertebrate Animal Form 5A (if done at non-regulated RI) / Vertebrate Animal Form 5B (if done at regulated RI)
- PHBAs Risk Assessment Form 6A (if applicable)
- Human & Vertebrate Animal Tissue Form 6B (if applicable)
- IACUC Approval (if applicable)

SSEF / ISEF Forms

↗ **Additional forms** required if project involve:

   ↗ **Potentially Hazardous Biological Agents**
   - SRC approval required (Form 1B)
   - Qualified Scientist Form 2 (if applicable)
   - PHBAs Risk Assessment Form 6A
   - Human and Vertebrate Animal Tissue Form 6B (if tissue is involved)

SSEF / ISEF Forms

Type of project	Documents to submit
ALL projects	Form 1 Form 1A + Research Plan/Project Summary Form 1B – 1 per **member** **Form 3** - Compulsory except for purely computational work)**
Work conducted in regulated RIs	+ Form 1C
Continuation of project	+ Form 7 (and previous years' abstracts and research plans)
Involved human participants	+ Form 1B, Form 4 + Form 2 (if applicable) + Human Informed Consent form (if applicable) + Sample Survey form (if applicable)

SSEF / ISEF Forms

Type of project	Documents to submit
Involve vertebrate animals	+ Form 1B + Form 2 + Form 5A (if done at non-regulated RI) / Form 5B (if done at regulated RI) + Form 6A (if applicable) + Form 6B (if applicable) + IACUC Approval (if applicable)
Involve potentially hazardous biological agents	+ Form 1B + Form 2 (if applicable) + Form 6A + Form 6B (if tissue is involved)

SSEF / ISEF Forms

↗ Form wizard: generate a list of forms required for your project
https://ruleswizard.societyforscience.org

↗ Download Intel ISEF forms from
https://student.societyforscience.org/intel-isef-forms

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SSEF / ISEF Forms

↗ In addition to Intel ISEF forms, download SSEF entry form from Science Centre website:
https://www.science.edu.sg/for-schools/competitions/singapore-science-and-engineering-fair

↗ For more details, please refer to: Intel ISEF International Rules and Guidelines 2020 **(DRAFT)**
https://sspcdn.blob.core.windows.net/files/Documents/SEP/ISEF/2020/Rules/Book.pdf

SSEF / ISEF Forms

↗ **Key Points to note:**

↗ **Pl**ease read forms carefully before completing them:

↗ [MM/DD/YY](#) format for ALL dates

- ambiguous cases could imply non-compliance with SSEF/Intel ISEF rules

↗ Take note whether forms should be completed **before (most forms)** or **after (Form 1C, Form 5B)** the research has taken place

Updates

from Intel ISEF 2019

Key Rule Changes
(mainly just clarifications / tweaks)

↗ Roles and Responsibilities of Students and Adults have been rewritten and reformatted

　　↗ added **responsibilities for Qualified Scientists and Designated Supervisors** *NEW!*

↗ Expanded Ethics Statement (**to include adults involved** *NEW!*)

　　↗ addresses integrity, legality, respect for confidentiality and intellectual property, and stewardship of the environment

| integrity | legality | confidentiality | intellectual property | environment |

Key Rule Changes
(mainly just clarifications / tweaks)

↗ Human Participants Rules

    ↗ students are **prohibited** from **independently diagnosing disease**, administering medication and / or performing medical procedures

    ↗ IRB review and pre-approval is necessary when the student-designed invention, prototype, application, etc. is tested by human participants **other than the student researcher(s) or a single adult guardian or adult sponsor / QS / DS** when the testing requires an adult tester *NEW!*

Key Rule Changes
(mainly just clarifications / tweaks)

↗ Potentially Hazardous Biological Agents (PHBA) Rules (**rephrased**)

↗ insertion of antibiotic resistance markers for the **clonal selection of bioengineered organisms is permitted**, with the following exceptions:

- students are prohibited from the insertion of antibiotic resistance traits or selection of organisms expressing traits that may **affect the ability to provide effective treatment of infections** acquired by humans, animals, or plants.
- students are prohibited from **designing or selecting for multiple drug resistance organisms (MDROs)** to investigate the pathology, development, or treatment of antibiotic-resistant infections.

Reasons for Failed to Qualify (FTQ) for Intel ISEF 2019

↗ No Institutional Review Board (IRB) approval

↗ Home Lab (no Qualified Scientists involved)

↗ Practicing medicine without proper medical supervision

↗ Contamination of the environment (to test effectiveness of process / device)
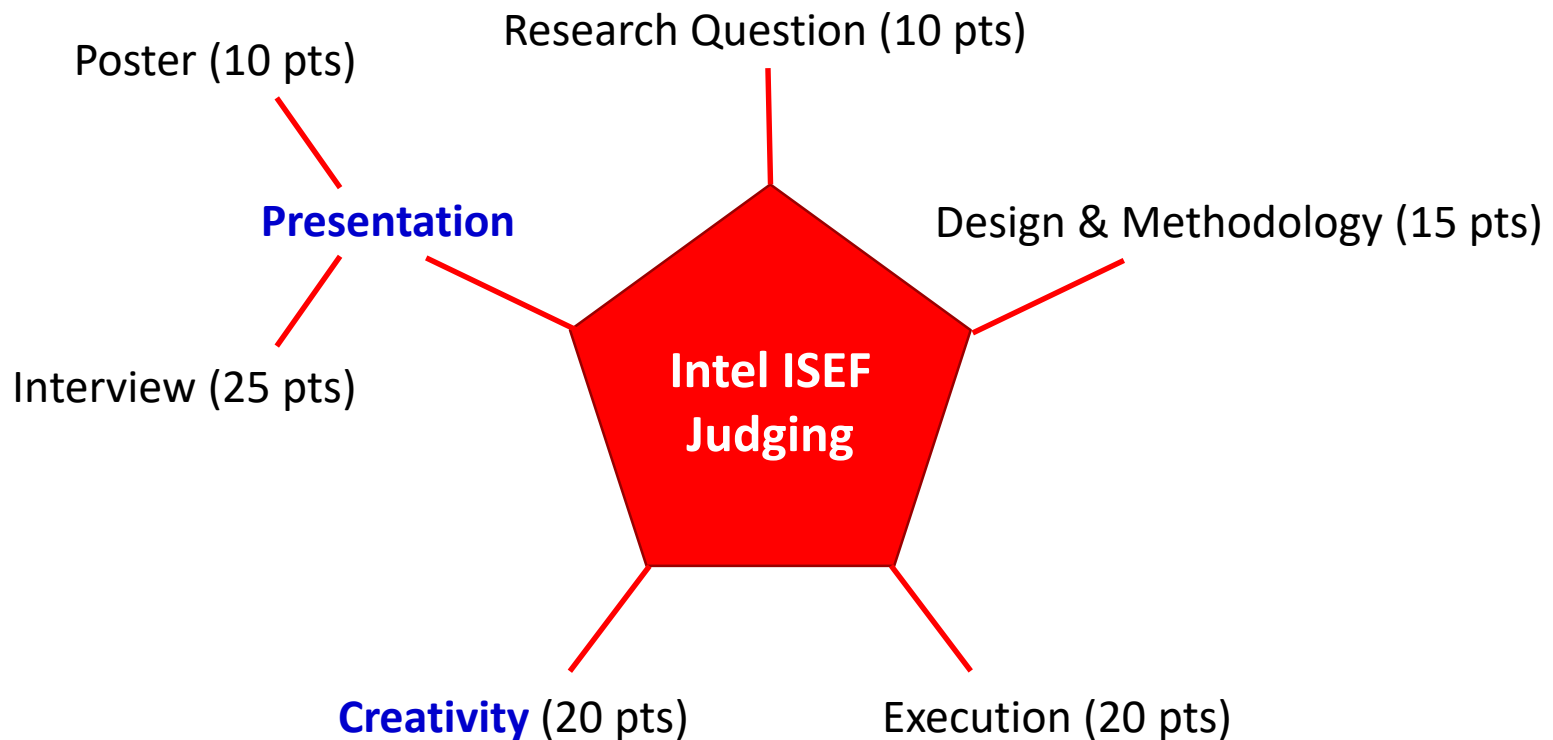
Other Scientific Review Committee (SRC) Issues

↗ Conflict of interest: any adult involved with the project (AS / QS / DS) cannot be on the approving IRB or SRC

↗ Missing forms or signatures, dates wrong format, too much info
  - **info given in research plan could be used** to triangulate missing info required in forms

Considerable for __Judging__

↗ Considerable emphasis was placed on two areas: *Creativity* (20 pts) and *Presentation* (35 pts)

Research Question (10 pts)

Poster (10 pts)

Presentation

Design & Methodology (15 pts)

Interview (25 pts)

Intel ISEF Judging

Creativity (20 pts)

Execution (20 pts)

Considerations for Judging

↗ Considerable emphasis was placed on two areas: *Creativity* (20 pts) and *Presentation* (35 pts)

↗ Examples of *creativity* may include:

- an unusual approach to answer a research question

- a novel experimental design or apparatus

- an innovative use of techniques or technologies

- developing a new way to view, understand or interpret the results of the investigation

Considerations for **Judging**

↗ Team projects vs Individual projects

are judged on the same basis except:

- need to evaluate the contribution to and understanding of the project for **each member** of the team (through **individual questioning**)

- additional criterion of "Teamwork"

First Award (Chemistry)

↗ **Cassia Cinnamon Extract Mosquito Larvicide**

- Team of two boys from Penang, M'sia

- Project was **very thorough** with **real-world application**

- Students had good understanding of the project and were **able to answer questions very well**, with **excellent teamwork** during presentation and Q&A

H3 Science Research

Guidelines on the use of H3 Science Research Projects for SSEF

↗ H3 Science Research examination documents are **not** permitted for exhibition, competition or publication without the authorisation by the Chief Executive, SEAB

Time Frame

↗ Candidates must submit the H3 science research papers to the examining agencies and clear the Oral Defence of the science projects **before** the start of the SSEF in March.

↗ Candidates **should not** have any further contact with NUS / NTU / equivalent examination authority upon submission to the examining agencies when preparing for SSEF.

Guidelines on the use of H3 Science Research Projects for SSEF

Materials

➶ Candidates **should not** use the same H3 examination documents submitted to the examining agencies for the SSEF.

➶ The written report submitted for the SSEF is different from the H3 Science research paper submitted as an examination work.

➶ The mode used for the SSEF's oral presentation (poster) is different from the H3 Oral Defence (e.g. PowerPoint).

➶ Candidates **should not** make reference to the work submitted for the SSEF as having been an examination submission (e.g. by removal of examination labels, candidate index, title of H3 programme and examining agency).

Guidelines on the use of H3 Science Research Projects for SSEF

Results

↗ Candidates **should not** use the results obtained from the SSEF as a basis to contest the results awarded by SEAB for the H3 science research programmes.

Guidelines on the use of H3 Science Research Projects for SSEF

Declaration (Teachers to note)

➚ Candidates in the H3 Science research programmes are required to submit a **declaration form** to Curriculum Policy Office (MOE) and acknowledge the conditions and implications for participation in the SSEF.

➚ Schools will collate and submit the declaration forms by <u>first week of December 2019</u>.

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Networking

and Sharing of Practices

Networking and Sharing of Practices

↗ Rationale:
STEM / Science Research in its many forms is an enriching experience and it will benefit a wide range of students in our schools

↗ Sharing of practices by schools with well-established Science Research Programmes and exploration of possible collaborations

↗ To Nurture Science Research Talents (both in terms of absolute numbers and also the number and range of schools involved)

Q & A?

Contacts

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Mr Marcus Fa	6425 2500 marcus_fa@science.edu.sg	For ATS and SSEF matters

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Thank you for your kind attendance!!