

# 2013 年美國機械工程師學會(ASME)

## 學生競賽(SPDC)國內賽簡章



### 壹、前言：

美國機械工程師學會(ASME)成立於 1880 年，協會為一非營利事業組織，致力於促進工程科學界的技術合作、知識共享以及技能發展，並提升工程師在學會中的重要性。ASME 不僅規範現行機械運作標準，還出版相關刊物，並定期舉行機械相關研討會，更致力於永續教育和先進的專業科技發展計畫，以提供科技知識與更良好的環境。

### 貳、競賽宗旨：

- 一、提供培養專業機械工程師、領導人的技術平台。
- 二、創造國際間工程技術分享與交流。
- 三、提供參賽學生認識美國機械工程師學會的機會。

### 參、辦理單位：

- 主辦單位：美國機械工程師學會台灣分會  
承辦單位：美國機械工程師學會清華大學學生分會  
贊助單位：國立清華大學動力機械工程學系  
國家實驗室研究院 國家高速網路與計算中心  
財團法人自強工業基金會  
國家實驗室研究院 儀器科技研究中心

### 肆、競賽方式：

本次 ASME SPDC 競賽屬於國內賽，成績優勝隊伍可取得 2013 年在馬來西亞舉辦的 ASME SPDC 亞太區 (District G) 競賽的參賽資格，與來自亞洲各國家的優勝隊伍相互競賽。若在亞太區競賽再次獲得佳績，則可代表亞太區前往美國參加 SPDC 全球總決賽，與來自全球各區的優勝隊伍一較高下。

國內賽(台灣新竹) → 優勝 → District G 分區競賽(馬來西亞) → 優勝 → 總決賽(美國)

### 伍、競賽項目：

全競賽分為三個項目，各項競賽規範請參見附錄：

#### 1. 學生設計競賽：

2013 年 SPDC 設計競賽題目為 Remote Inspection Device。請依照題目設計出作品進行參賽。詳細規格請參照附錄一。

#### 2. 演講競賽：

演講題目不限，機械相關即可，限制以個人參賽，並全程以英文演講。詳細資訊請參照附錄二。

#### 陸、參賽資格：

國內大專院校全職在學學生(非研究生)，可混合組隊，在職進修學生及教師不受理報名。取得 ASME SPDC 亞太區(District G)競賽資格之優勝隊伍，須成為 ASME 會員後方可參加亞太區競賽。

#### 柒、參賽方法：

各隊伍(各人)可自行選擇欲報名參加之項目，並於國內賽之前完成作品，國內賽當日前往比賽地點進行競賽。Student Design Competition 設計競賽限制每組最多 4 人，Old Guard Oral Presentation Competition 演講競賽以個人為單位報名，演講以英文進行。競賽各項目的最高分隊伍(個人)，ASME 台灣分會將會頒發獎金、證書。

由於 SPDC 亞太區(District G)競賽為一國際性機械競賽，全競賽以英文進行。

#### 捌、競賽流程：

##### 學生設計競賽：

競賽當天會場會備有準備區，參賽選手可以在準備區做最後的調整測試工作，在正式開始前的十分鐘，將回收所有參賽者的遠端控制器，交回時請參賽者自行關閉電源，之後依序取回進行比賽，順序將以抽籤方式決定，詳細競賽流程將於當天宣布或以行前通知方式告知。

##### 演講競賽：

請參賽者自備隨身碟以及簡報檔，現場提供筆記型電腦、投影機。

#### 玖、評分標準：

特商請美國機械工程師學會台灣分會遴選評審團，並按照美國機械工程師學會頒佈之評分標準進行評分。各項競賽的評分準則請見附錄。

#### 拾、競賽獎項與獎金：

獎項和獎金原則上以下方條列內容頒發，實際頒發獎項得因比賽成績從缺。

##### 一、學生設計競賽：

第一名：15,000 元

第二名：8,000 元

佳作(依參賽隊伍數量而定)：3,000 元

##### 二、演講競賽：

第一名：5,000 元

第二名：3,000 元

#### 拾壹、競賽時間與地點：

民國 102 年 3 月 10 日星期日。

新竹市科學園區研發六路七號。國家高速網路與計算中心。

電子地圖：[http://www.nchc.org.tw/tw/about/traffic/google\\_map.php](http://www.nchc.org.tw/tw/about/traffic/google_map.php)

(如遇不可抗拒之因素，主辦單位得更改競賽時間與地點)

拾貳、金額補助：

當天中午提供便當，不須另外付費。

拾參、報名辦法：

報名時間於即日起，至民國 102 年 2 月 20 日截止。

報名表請見附錄四。

保證金：每人 200 元整，比賽結束後，退還全額保證金 200 元。

報名時請使用郵局現金袋郵寄。內含：報名表、參賽成員學生證正反面影本、保證金（現金袋內現金只接受鈔票，如有收據請妥善保管）

詳細填寫後寄至：

(30013) 新竹市清大郵局 2-264 號信箱

拾肆、聯絡資訊：

ASME 學生競賽(SPDC)國內賽 總召 曾瑞發 0919-523-536 as9255@hotmail.com

ASME 學生競賽(SPDC)國內賽 副召 翁煜曉 0975-052-993 yuliang1231@ymail.com

拾伍、競賽網站：

相關資訊會公布在網站上，請密切注意。

請上 Facebook 搜尋：**2013 ASME 台灣國內賽**

---

## 2013 Student Design Competition

### Remote Inspection Device

Due to the tragedy that happened at the Fukushima nuclear facility after the March 2011 Tohoku earthquake and tsunami, the nuclear industry has issued a Request for Proposal (RFP) to design and build a small, remotely-controlled inspection vehicle. The purpose of the vehicle is to determine the level of radioactivity at specified locations and inspect for damage. This vehicle will protect the human operator from absorbing a high dose of radioactive contamination. There is information that could be gained by the inspection vehicle that could inform the plant operators so that they may avert an accident or begin repairs.

Your task is to design a remotely-controlled, proof-of-concept vehicle for inspection purposes. The vehicle must be able to negotiate around obstacles, both in getting to the inspection points and in bringing the sensor back to the designated return area. The vehicle must then return to its starting location, ready for another run.

#### Vehicle Requirements

1. The vehicle must be powered by rechargeable batteries.
2. The device must be controlled through a wireless transmitter/receiver radio link. The following requirements pertain specifically to the device controller:
  - A radio transmitter may have its own batteries rechargeable or non-rechargeable.
  - The transmitter/receiver radio link may be any commercially available model controller.
  - During the trial, the device must be completely controlled via the radio link no other contact/interaction or influence is permitted.
  - One team member must control the device throughout the trial.
  - All radio controllers will be impounded and shut off during the competition, except during the team's run.
  - The operator will be behind a protected barrier in an operator area without a direct visual view of the course. The barrier will be a curtain to separate the operator from the course.
  - A camera system will be employed to provide the only visual recognition of the course for the operator. The team must supply their own visual equipment.
  - Team members will not be allowed to communicate with the operator once the competition begins. No other visual equipment, such as mirrors, will be allowed.
  - Each operator will be brought to the course, without viewing the course, and placed in the operator area. The operator must surrender all means of communication while sequestered.
3. All devices must have a readily accessible and clearly labeled master shut-off switch.

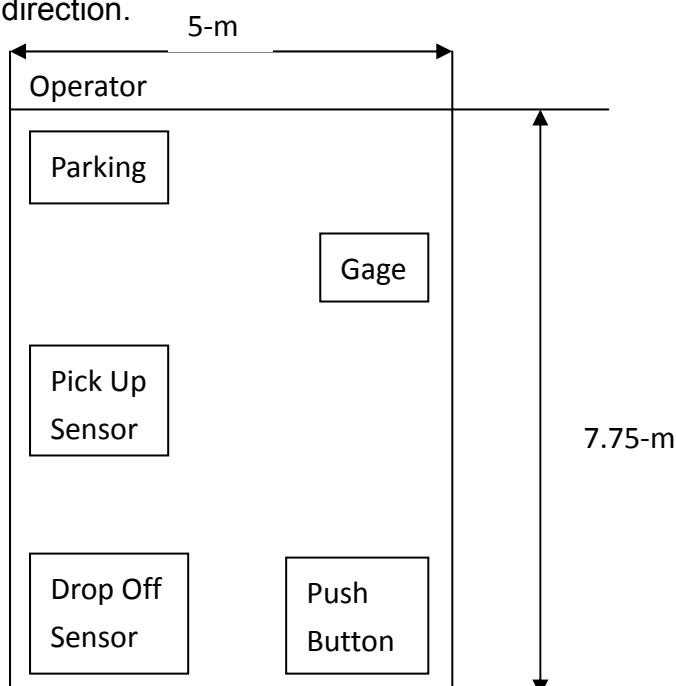
## Course Description

The test course will consist of a flat, level section of floor (the surface of the floor will not be specified and may be any typical flooring type) marked off with masking tape. The rectangular course will be 5-m by 7.75-m in size.

There will be barriers within the course. The barriers are not defined nor are their placements defined. The judges at the competition will place the barriers to create the pathway to the tasks.

Note that the barrier construction methods could be of many variations. The vehicle will not be required to go over the barriers there will be a path to go around the barriers. You will be required to inspect a simulated contaminated area

- There are five tasks to be accomplished.
  1. Navigate around simulated obstacles.
  2. Inspect the area and locate the digital pressure gage and report the reading. See drawing for location.
  3. Go to a simulated control panel and push a button that initiates a simulated cooling pump. See drawing for location. The simulated button will be a 25-mm red button on a white 100-mm by 100-mm white background. The button will be vertically oriented so it can be actuated with a horizontal push.
  4. Pick up a simulated remote radiation sensor and return the sensor to home. The simulated sensor is made from 25.4-mm diameter by 50.8-mm high cylindrical wooden dowel. The 50.8-mm dimension will be parallel to the vertical direction.
  5. Drop off a simulated remote radiation sensor at a specified location. See drawing for location. The simulated sensor is made from 25.4-mm diameter by 50.8-mm high cylindrical wooden dowel. The 50.8-mm dimension will be parallel to the vertical direction.



## Contest Operation

At the start signal the vehicle must proceed down the course, retrieve the sensor, inspect the gage and push the button. Time stops when all tasks have been completed and the vehicle is once again stationary inside the parking area and in its starting configuration.

A maximum of five minutes is allowed to complete the tasks. Unless you have completed all the tasks, you will receive the full maximum time (300 seconds).

The vehicle may not be touched or altered in any way during the run. Remember, the retriever is operating in an environment that is hazardous to humans.

## Scoring and Penalties

Correctly reporting the gage reading is worth 1000-points, the sensors are worth 2000-points each (if one is placed in the designated drop area and the second sensor is returned to the starting point) and pushing the button is worth 3000-points.

The winning device will have the highest score S where:

$$S = (R) - 10*s - 200*T$$

R = task score

T = Times device touches border tape

s = seconds to complete task, maximum 300

- Any vehicle that leaves the course must re-enter the course at the point of departure without being intentionally repositioned by anyone.
- Any damage to the course will result in an immediate disqualification.
- Any device not meeting the device requirements will be immediately disqualified.
- If you touch the device you receive maximum time and 0 R score

# Old Guard Oral Presentation Competition

## Rules and Procedures

Like all professionals, engineers must possess a well-developed ability to synthesize issues and communicate effectively to diverse audiences. Among the highlights of [ASME's Student Professional Development Conference \(SPDC\)](#) program is the Old Guard Oral Presentation Competition. This competition is designed to emphasize the value of an ability to deliver clear, concise and effective oral presentations, particularly pertaining to some sphere in which an engineer is or should be involved.

Each student presentation lasts fifteen minutes and is followed by a five minute "Question and Answer" (Q&A) period. First Place winners from each of the District Conferences are invited to compete at the Society level at the International Mechanical Engineering Congress & Exposition.

Each presentation in the Oral Presentation Competition must be delivered in English. The subject matter of each presentation must address a technical, economic or environmental aspect of engineering or other basic engineering theme, provided it pertains to some sphere in which an engineer is or should be involved. A major portion of a contestant's total score is based on the judges' evaluation of his/her relative capability to communicate orally, including evidence of a talent to respond effectively in the Q&A period.

A competitor may utilize any available resource but must realize that the presentation is to be an individual effort. Assistance in the use of visual aids is advisable (Powerpoint, etc.). Film clips, if used, may not exceed one-minute total duration (i.e. a maximum of one minute of each student presentation may be used for video). Film clips may not be accompanied by any recorded sound. Good practice and courtesy suggests credit be given during the presentation for any outside help related to the reported project. A written paper or manuscript is not required.

## Eligibility and Requirements

To be eligible to participate, each contestant must be a Student Member who:

- a. has not yet received an engineering degree\* and,
- b. has been selected by his/her Student Section or ME Department to participate; and,
- c. is a Student Member in good standing.

\* Student Members who complete the requirements for their baccalaureate engineering degree, or who actually receive that degree at the end of a term, semester, or quarter a short time before a scheduled conference may still participate. These Student Members, however, must not have completed their degree requirements before December 1 of the calendar year prior to the Conference.

At least two (2) weeks before the date of the District Conference, each participant's Student Section Advisor or his/her Student Section (or Department Head, if there is no Student Section) shall advise the Student Section

Advisor of the host institution and ASME Staff of the names of their contestants and titles of their presentation (ASME Staff can be reached at [oldguard@asme.org](mailto:oldguard@asme.org)).

## Competition Entry

The Old Guard Oral Presentation Competitions are held locally at ASME Student Professional Development Conferences (SPDCs). Students who wish to participate must:

- Visit the Student Professional Development Conferences website.
- Choose the location of the conference he/she plans to attend.
- Complete the appropriate entry form for that location.

Students entering the Old Guard Oral Competition may **not** enter the Old Guard Technical Poster Competition. There is **no restriction** on entering the Old Guard Technical Webpage Competition.

## Conduct of the Contest

Each presentation in the Old Guard Competition shall be made by one contestant. Any questions regarding procedure shall be resolved by the Student Section Advisor and District Leader before the Conference.

The Chair of the Host Student Section usually presides during the contest and ensures that there is adherence to the time schedule given in the printed program. The Presentation's duration is fifteen (15) minutes plus five (5) minutes for Q&A immediately thereafter. Any time remaining or exceeding the fifteen minutes must be added to or subtracted from the five minute discussion.

Questions may be asked by any attendee of the competition except those from the competitor's own educational institution. Each person posing a question to a speaker must stand, identify himself/herself and school, and then proceed with the question. The Host Student Section must appoint two timekeepers from two visiting student delegations. Timekeepers must be non-contestant Student Members. They are to be introduced by name and college at the beginning of each session and instructed to keep time as follows:

- At the end of twelve minutes, the first timekeeper will rise to signal to the speaker that there are three minutes remaining.
- After the speaker nods to acknowledge the signal, the timekeeper will sit down.
- At the end of fourteen minutes, the second timekeeper will rise to signal to the speaker that there is one minute remaining.
- After the speaker acknowledges the signal, the timekeeper will sit down.
- At the end of fifteen minutes, both timekeepers will rise together and remain standing until the speaker concludes the presentation.



- Both timekeepers will rise at the end of five minutes to terminate the discussion period.

## **Judging and Scoring Criteria**

Each contest is to be judged by the same individuals throughout, preferably ASME members of mature judgment, who are selected along with one or two alternates. Local ASME Sections and District Leaders will be pleased to cooperate in the search for judges. As an alternative, some Districts use one faculty member and one student from each represented school as judges, with the faculty and student not judging their own presenter(s).

The Presentations will be judged in four categories; Content, Organization, Delivery and Effectiveness, and Discussion.

### **Content**

To what extent is the subject of interest to a technical audience? Is credit given for source of material or contribution by others? How much knowledge of subject was exhibited? Is work independent and original? Is the subject technical or general in nature?

### **Organization**

Is there any novel approach to the subject? Is there sufficient background information provided in order to introduce the audience to the subject? Are the facts developed in logical and continuous sequence? Is there a definite conclusion, and was it adequately based on the facts or data presented?

### **Delivery and Effectiveness**

Are the words distinctly pronounced and was proper volume used to be heard by all? Is proper English used, and is the vocabulary sufficient? Is personal appearance appropriate? Are there any distracting mannerisms? Is the manner of delivery (conversation, memorized, read from manuscript) satisfactory? If visual aids are used, how effectively are they used? Is the presentation within the time limit of 15 minutes allowed?

### **Discussion**

- Is the presentation evoking spontaneous questions from the audience? Are the questions indicating the need for clarification of facts presented, or were they merely of the type seeking additional information? How readily and with what self-assurance did the speaker answer the questions? Are the answers indicating knowledge of the subject beyond that disclosed in the original presentation? Is the ability to think clearly demonstrated?

Judges are to use the Scoring Sheet provided (see [Appendix A](#)) as the basis for judging all the Student Professional Development Conferences. The Scoring Sheet has been developed for the convenience of the judges in evaluating the presentation in competition. Scoring Sheet samples should be sent to the judges for familiarity ahead of the contest. Scoring Sheets are not to be given to the presenters. Judges should be informed that they must agree to serve through the entire contest, be it one or two days.

Judges are encouraged to fill out the Feedback Sheet (see [Appendix B](#)) on each student’s presentation and give them to the contestants at the conclusion of the presentations. The Feedback Sheet has been developed for the convenience of the judge to assist him/her in this process.

## District Awards and Recognition

Each Student Member that participates in the District competition will receive an ASME membership upgrade to Member, compliments of the Old Guard.

Judges at each conference are to select First, Second, Third and Fourth Place winners based on the criteria specified in the competition score sheet. A Fifth Place winner may be selected, at the judges’ discretion. An additional award is available for “Best Technical Content.” This prize may be given to one of the top four winners or any other presenter at a conference.

Student Conference (SPDC) Awards		Society Awards (Finals at IMECE)	
First	\$500.00 plus a trip to compete in the final competition at ASME's IMECE	First	\$2,000.00
Second	\$150.00	Second	\$1,500.00
Third	\$100.00	Third	\$1,000.00
Fourth	\$50.00	Fourth	\$500.00
Fifth		\$25.00	
Technical		\$50.00	

## Competition Finals

Each ASME District is entitled to select one (1) Old Guard Oral Presentation finalist at its Student Professional Development Conference (SPDC) to represent the District at the finals of the Old Guard Oral Presentation Competition. Finals take place at the International Mechanical Engineering Congress and Exposition (IMECE) in November. North American Districts choosing to have more than one Student Professional Development Conference in a given year are entitled to select a maximum of two (2) Oral Competition winners, but no more than one per conference.

No substantial changes from the presentation given at the District Student Professional Development Conference may be made for the finals at IMECE. Any substantial change of title or major revision of the presentation given at the District SPDC will result in disqualification and may result in loss of travel reimbursement.

The final competition at IMECE is judged by a panel of volunteers from within the ASME community, based on the same criteria as the District events. The top four presenters among the finalists are eligible for Society awards. The winners are also recognized at Society events and featured in various ASME publications and web sites.

Adopted by the Old Guard Committee

August 11, 2011

## 2013 年美國機械工程師學會(ASME)學生競賽(SPDC)國內賽報名表

### 一、參加項目：

- Student Design Competition 設計競賽  
 Old Guard Oral Presentation Competition 演講競賽  
※附註：設計競賽組隊報名人數至多四人，演講競賽為單人性質，報名人數至多一人。

### 二、參賽名單：

隊長	姓名		連絡電話	
	學校/科系		E-mail	
隊員	姓名		連絡電話	
	學校/科系		E-mail	
隊員	姓名		連絡電話	
	學校/科系		E-mail	
隊員	姓名		連絡電話	
	學校/科系		E-mail	

※附註：如報名人數僅只一人，填寫隊長欄位即可。

### 三、注意事項：

1. 隨報名表請附上參賽成員學生證正反面影本以及保證金(每人 200 元整)。
2. 每參加一項競賽請填寫一份報名表。
3. 報名日期：即日起，至 102 年 2 月 20 日截止。
4. 詳細填寫後寄至：  
(30013) 新竹市清大郵局 2-264 號信箱
5. 聯絡人：  
ASME 學生競賽(SPDC)國內賽 總召 曾瑞發 0919-523-536 [as9255@hotmail.com](mailto:as9255@hotmail.com)  
ASME 學生競賽(SPDC)國內賽 副召 翁煜暉 0975-052-993 [yuliang1231@ymail.com](mailto:yuliang1231@ymail.com)