



GREAT[™]
Minds
in STEM

**2017 Research Posters Competition
Guidelines**

29th Annual HENAAC Conference
October 18-22, 2017
Pasadena Convention Center
Pasadena, CA

Great Minds in STEM™
2017 Research Posters Competition Guidelines

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OVERVIEW

Great Minds in STEM™ announces its Eighth Annual Research Posters Competition to be held from October 18-22, 2017, at the 29th Annual HENAAC Conference, in Pasadena, CA.

The Research Posters Competition is intended to provide underserved and underrepresented high school students, undergraduate and graduate students pursuing full-time studies in a related science, technology, engineering, mathematics, or health discipline the opportunity to display their technical accomplishments and receive recognition for their scholarly scientific investigations. High school students, undergraduates and graduate students who have played a key role in a research project are invited to submit an abstract to the poster competition. Students are encouraged to submit their senior design projects, thesis, dissertations, internship projects and research lab projects, regardless of the progress of their research. A limited number of competitive travel grants are available for undergraduate and graduate students.

Awards will be presented to the top high school, undergraduate and graduate students¹. Winning abstracts will be profiled online at www.greatmindsinstem.org

ELIGIBILITY

	High School Students	Undergraduate Students	Graduate Students
Hispanic/Latino, African American, or Native American descent	X	X	X
Must be enrolled full-time (12 hrs undergraduate/9 hours graduate) at an accredited college/university in the U.S. or Puerto Rico <i>Exception: Doctoral students classified as doctoral candidates, but not working full-time and making satisfactory progress toward dissertation</i>		X	X
Must be pursuing a technical degree in science, technology, engineering, math or related health		X	X
Must be juniors or seniors attending an accredited public, private or charter high school in Pasadena, CA	X		
Must intend to pursue a STEM degree	X		
Only individual students may present; teams are ineligible per poster presentation	X	X	X
Projects must be unclassified	X	X	X
Students may submit only one poster	X	X	X
Projects may be at any stage of the research process	X	X	X
Eligible for travel grants		X	X
Conference registration fee required		X	X

¹ Awards are subject to change depending on funding

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ABSTRACT DEADLINES

Priority Deadline (With Travel Grant)	September 8, 2017 (11:59 PM EST)	If college applicants would like to be considered for a travel grant, the abstract and competition form MUST be received by this deadline. NOTE: High school students are NOT eligible for a travel grant.
Regular Deadline (Without a Travel Grant)	September 22, 2017 (11:59 PM EST)	If applicants DO NOT want to be considered for a travel grant, the abstract and competition form MUST be received by this deadline.

Students must submit their abstract along with their Research Posters Competition Entry Form **electronically** by the posted deadline to posters@greatmindsinstem.org.

Abstracts must be submitted as .doc or docx only. No Portable Document Format (PDF) will be accepted. Abstracts received in any format other than Microsoft Word will not be considered. **Late submissions will not be accepted and automatically disqualified.**

REGISTRATION

High School Students

There is no registration fee. There is no hotel option for high school students. High school juniors and seniors who are participating in the competition must be from the local vicinity of Pasadena, CA.

Undergraduate and Graduate Students

Finalists will need to pay their own conference registration fee, which includes hotel and most meals arriving Thursday, October 19, 2017 and departing Sunday, October 22, 2017. Finalists will be provided a registration code for the Early Bird Registration discount.

TRAVEL

High School Students

No travel stipends will be provided to high school students. High school juniors and seniors who are participating in the competition must be from the local vicinity of Pasadena, CA.

Undergraduate and Graduate Students

Travel grants, for airfare, are available on a highly competitive basis for finalists to and from the conference, based on a 21-day reservation. Finalists, who choose to travel by personal vehicle, may be reimbursed mileage to and from the conference. No other travel grant types are available. Further details will be provided to awardees.

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Finalists, whose travel has been arranged, in whole or in part by GMiS, and fail to present will be billed the costs of any associated travel expenses. In fairness to travel grant recipients, NO EXCEPTIONS will be made to this rule.

All poster presenters MUST attend the Student Leadership Awards Show on Saturday evening. Winners must be present to win.

AWARDS

Winners will be announced on Saturday evening at the Student Leadership Awards Show. **Winners must be present to receive award or will forfeit their award.** Awards and recognition will be presented in the following categories as follows²:

Undergraduate Students	Graduate Students
Computer Engineering/Computer Science	Computer Engineering/Computer Science
Engineering and Technology	Engineering and Technology
Math and Science	Math and Science

ABSTRACT SUBMISSION

High School Students

The length of the abstract should be between 300 – 500 words. Graphics, drawings, or tables are *not* permitted in the abstract. The abstract should explain how the research idea was developed, and discuss how the poster topic or theme was researched. The abstract will be judged on both content and adherence to formatting guidelines.

Undergraduate and Graduate Students

The length of the **extended abstract** must be between 600 – 800 words. Graphics, drawings, or tables are *not* permitted in the abstract. The abstract should be a concise summary of the research project and meet criteria as outlined in the Judging Section. The abstract will be judged on both content and adherence to formatting guidelines.

All Students

The general format of the abstract must adhere to the following:

- Typed, Single-spaced
- 1-inch margins
- Times New Roman, with 11 or 12-pt font (expect for header requirements)

² Awards are subject to change depending on funding

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The heading format of the abstract must adhere to the following:

<p style="text-align: center;">Title of Project (Bold, Centered, Times New Roman, 14 pt) Author(s) (Centered, Times New Roman, 12 pt) Institution, Department, City, State, Zip (Centered, Times New Roman, 12 pt) (If the authors are from different institutions, please add a superscript number to the matching author and matching institution)</p> <p>Keywords: List five (5) keywords for indexing</p>
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The content of the abstract should include:

- Introduction
- Hypothesis or Intent
- Materials and Methods
- Predicted or Actual Results
 - If research results are not available at the time of the submission, authors are encouraged to submit predicted results. Students are encouraged to discuss differences between their hypothesized results and their actual results when presenting their research at the conference.
- Summary/Conclusion

Authors are strongly encouraged to review their abstract prior to submission and ensure that proper spelling and grammar have been utilized and that all italicization, math and scientific notations, etc. are correct. Abstracts with incomplete information will not be considered for the competition.

POSTER FORMAT

The format of the poster is at the discretion of the presenter. However, it should be sufficient to technically explain and illustrate the research project to the public and the judges. Presenters should carefully critique the content and arrangement of their posters. The flow of information in the poster layout should be done in a way that easily reveals the research process and addresses salient points. Graphs, charts, tables and references must adhere to **APA 6th Ed.** formatting. Avoid the use of “whiz bang” pictures that are visually attractive, yet do not add much to the content. At minimum, it is recommended that the poster contain the following sections:

- | | |
|---------------------|--|
| • Abstract | • Proposed or Actual Testing (Procedure) |
| • Introduction | • Results |
| • Background | • Conclusion |
| • Problem Statement | • Reference |
| • Hypothesis | |

Presenters are encouraged to cite the sponsorship of their work, such as corporations or government agencies. Relevant resources to the work should be recognized and cited. Presenters are also encouraged to list their mentors.

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POSTER PRESENTATION

If selected to present, **only the authoring student may present his/her work** at the conference. No substitutions will be allowed under any condition. Mentors are not allowed to co-present. This is an individual competition and **not a team competition**.

Poster presenters will be provided with a display board that stands **8 ft (wide) x 4 ft (tall)**. No other audiovisual equipment, lighting, tables, chairs, stands, etc. will be provided or allowed. **Presenters MUST also bring at least 10 copies of their abstracts**. The abstracts are to be secured to the board, so the judges can easily take a copy to review. Push pins and tape adhesives will be provided.

Set-Up

Posters must be set up for display to the conference attendees on Friday, October 20, 2017 between 7:00 AM – 9:00 AM. Further details on the set-up process will be provided to the presenters.

Judging Time

Presenters should plan on being at their posters at the following dates and times:

High School Students & Undergraduate Students	Friday, October 20 – Afternoon, Time TBD
Graduate Students	Saturday, October 21 – 9AM – 12PM

Each poster will be individually judged by two (2) STEM professionals from academia, industry, or federal government. Once a poster has been judged twice, presenters may leave the session.

Tear-Down

Presenters will be able to remove their posters beginning at 3PM on Saturday, October 21. Posters that remain after the Graduate School and Career Fair closes will be discarded.

JUDGING

High School Students

Judging will be based upon the visual appearance of the project display, its technical merits, quality of the overall project, and the clarity of the brief project presentation by the student. Judges will rate students' presentations in their abstract, research design, visual and verbal presentation. Additional criteria include:

- Uniqueness of project
- Quality of technique and analysis
- Statement of Purpose
- Significance
- Creativity or Initiative
- Methodology

Undergraduate and Graduate Students

Each abstract and poster will be reviewed by a minimum of two STEM professionals based on the two principles outlined by the National Science Foundation. Abstracts and posters will be evaluated on the overall writing, content and presentation as it relates to the baseline principles of Intellectual Merit and Broader Impact. According to the National Science Foundation (*NSF Strategic Plan for FY 2006-2011*):

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Investing in America's Future (NSF 06-48), successful projects are able to demonstrate Intellectual Merit and Broader Impact if the following questions can be succinctly addressed:

Intellectual Merit

- How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields?
- How well qualified is the proposer to conduct the project?
- To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts?
- How well conceived and organized is the proposed activity? Is there sufficient access to resources?

Broader Impact

- How well does the activity advance discovery and understanding while promoting teaching, training and learning?
- How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)?
- To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks and partnerships?
- Will the results be disseminated broadly to enhance scientific and technological understanding?
- What may be the benefits of the proposed activity to society?

IMPORTANT DATES AND DEADLINES

Friday, September 8, 2017 (11:59 PM EST)	Priority Deadline - The Research Posters Competition Entry Form and abstract must be submitted electronically if applicants want to be considered for a travel grant.
Friday, September 15, 2017	Travel grant recipients notified.
Friday, September 22, 2017	Finalists, who are receiving a travel grant, must complete their conference registration (including payment) and submit their travel arrangements to Great Minds in STEM™ to ensure advance travel arrangements. Travel arrangements will not be made without a paid conference registration.
Friday, September 22, 2017	Regular Deadline - The Research Posters Competition Entry Form and abstract must be submitted electronically by applicants, who DO NOT want to be considered for a travel grant.
Wednesday, September 27, 2017	Last day for Great Minds in STEM™ to book travel for Travel Grant recipients.
Friday, October 20, 2017	Poster Finalists set-up posters from 7:00 am – 9:00 am. Poster Presentations: Undergraduate Students – afternoon TBD
Saturday, October 21, 2017	Poster Presentations: Graduate Students – 9 AM – 12PM Winners will be announced at the Student Leadership Awards Show

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CONTACT INFORMATION

Genevieve Montoya
Academic Affairs Specialist
posters@greatmindsinstem.org
(323) 262-0997 ext. 106

Gary A. Cruz, Ph.D.
Director, Academic Affairs & University Relations
posters@greatmindsinstem.org
(323) 262-0997 ext. 775

Please direct all communication regarding the competition, including abstracts and entry forms, to **posters@greatmindsinstem.org**.

INFORMATION RELEASE AND DISCLAIMER

Research posters presented at this conference must not be classified. It is the author's responsibility to obtain all requisite permissions to release the information presented in the research poster. By participating in the Great Minds in STEM™ Research Posters Competition, the author grants permission to Great Minds in STEM™ to publish and release, in whole or in part, information about the concept, participant photographs, contact information, and institutional and/or employer affiliation, and other such information for audio, video and print media. Posters must be original in content. They may not be identical to prior HENAAC Conference presentations. Posters must have all proper citations and permissions.

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**UNDERGRADUATE AND GRADUATE STUDENTS
RESEARCH POSTER - JUDGE'S SCORE CARD***

**Subject to change*

Presenter's Name: _____

Judge's Initials: _____

OVERALL SCORE _____

ABSTRACT

60 Possible Points	Points Possible	Points Earned
The extent, which the abstract conforms to the required formatting: Typed, single-spaced, 1-inch margins, Times New Roman, 10-12 pt Font	8	
The extent, which the abstract clearly summarizes the research project	22	
The extent, which the abstract clearly demonstrates Broader Impact	15	
The extent, which the abstract clearly demonstrates Intellectual Merit	15	
TOTAL SCORE	60	

POSTER

125 Possible Points	Points Possible	Points Earned
Clear and succinct Introduction	5	
Clear and succinct Background	5	
Clear and succinct Hypothesis/Intent	5	
Clear and succinct Problem Statement	5	
Clear and succinct Materials/Methods	5	
Clear and succinct Data and Results	5	
Tables, figures, graphs, and/or charts are clear, relevant and explain the project	5	
The extent to which the poster demonstrates innovative research	5	
The extent to which the poster is presented in a professional manner	5	
The extent to which the research is laid-out in an orderly and concise manner that is readable and logical	20	
The extent to which the poster demonstrates Broader Impact – The extent to which the findings may be utilized for society	15	
The extent to which the poster demonstrates Intellectual Merit	15	
The extent to which the presenter articulates knowledge of research	20	
The extent to which the presenter acknowledges questions thoroughly	10	
TOTAL SCORE	125	

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**HIGH SCHOOL STUDENTS
RESEARCH POSTER - JUDGE'S SCORE CARD***

**Subject to change*

Presenter's Name: _____

Judge's Initials: _____

OVERALL SCORE _____

ABSTRACT

30 Possible Points	Points Possible	Points Earned
The extent, which the abstract conforms to the required formatting: Typed, single-spaced, 1-inch margins, Times New Roman, 10-12 pt Font	10	
The extent, which the abstract clearly summarizes the research project	20	
TOTAL SCORE	30	

POSTER

100 Possible Points	Points Possible	Points Earned
Clear and succinct Introduction	5	
Clear and succinct Background	5	
Clear and succinct Hypothesis/Intent	5	
Clear and succinct Problem Statement	5	
Clear and succinct Materials/Methods	5	
Clear and succinct Data and Results	5	
Tables, figures, graphs, and/or charts are clear, relevant and explain the project	5	
The extent to which the research is laid-out in an orderly and concise manner that is readable and logical	25	
The extent to which the poster is presented in a professional manner	5	
The extent to which the poster demonstrates innovative research	10	
Presenter communicates knowledge of research	20	
Presenter acknowledges questions thoroughly	5	
TOTAL SCORE	100	

SAMPLE ABSTRACT

Single-Walled Carbon Nanotubes Chemically-Functionalized With Polyethylene Glycol Promote Tissue Repair in a Rat Model of Spinal Cord Injury

J. Roman, T. Niedzielko, R. Haddon, V. Parpura, and C. Floyd
University of Alabama at Birmingham, Birmingham, Alabama 35294

Keywords: axonal regeneration, gliosis, locomotor function, traumatic spinal cord injury, carbon nanotubes

Each year approximately 12,000 people in the United States receive a spinal cord injury predominately from vehicular accidents, falls, and violence. Traumatic spinal cord injury (SCI) induces tissue damage and results in the formation of a glial cavity (reactive gliosis) that inhibits axonal regrowth, regeneration, and functional recovery. Filling this cavity with a growth-permissive substrate would likely promote regeneration and repair. Single walled carbon nanotubes grafted with polyethylene glycol (SWNT-PEG) have been shown to increase the length of neuronal processes *in vitro* and promote the growth of axons *in vivo*.

We hypothesized that immediate administration of SWNT-PEG after an SCI transection injury will promote regeneration of axons into the lesion cavity and decrease reactive gliosis. We also hypothesized that a one-week delayed administration of SWNT-PEG after an SCI transection injury will promote regeneration of axons into the lesion cavity and functional recovery of the hind limbs.

To evaluate both hypotheses, the corticospinal and rubrospinal tracts of adult female Sprague Dawley rats were labeled by stereotaxic injection of 20 μ L of mini-ruby BDA (dextran, tetramethylrhodamine, and biotin, molecular weight 10,000 in dH₂O) at four sites in the motor cortex region of the brain. Spinal cord injury was induced 3-4 days later with a complete transection of the cord at the ninth thoracic vertebrae in adult female Sprague-Dawley rats. For the first hypothesis, a concentration of 10 μ g/mL of SWNT-PEG with a volume of 25 μ L or 50 μ L was delivered immediately into the lesion epicenter after transection of the spinal cord. For the second hypothesis, a constant volume of 25 μ L of either vehicle (sterile saline), 1.0 μ g/mL, 10.0 μ g/mL, or 100.0 μ g/mL of SWNT-PEG was administered one week after transection of the spinal cord into the epicenter of the lesion. For the one-week delayed administration with SWNT-PEG, behavior analysis was conducted before injury, before treatment, and weekly for twenty-eight days following treatment.

The Basso Bresnahan Beattie (BBB) open-field locomotor test was performed in order to determine improvement in gross hind limb locomotion. In order to determine a finer development of kinematic improvement, Noldus Catwalk™ gait analysis was conducted as well. Because of the uncertainty of the toxicity of carbon nanotubes *in vivo*, two pain and sensation tests were performed. The first test determined the sensitivity of the rat's forepaw to an increasing amount of forces using Von Frey filaments, which determined the amount of allodynia (hypersensitivity to an originally non-noxious stimulus) that the rat sensed. In

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addition, hyperalgesia (an originally noxious stimulus is now more painful) was tested using a TailFlick analysis. This test involved applying a thermal stimulus to the rat's tail and determining the latency for the rat to move it.

At 35-days post-injury the rats were euthanized and brain and spinal cord tissue were extracted. Brain and spinal cord tissue was then cryoprotected in increasing concentrations of sucrose, frozen, and then sectioned into five millimeter longitudinal sections. These sections were later sliced into 30µm serial sections on a cryostat and then positioned on gelatin coated microscope slides. Immunohistochemical and histological techniques were used to detect the area of the cyst, the thickness of the glial scar, and axonal morphology. Using brightfield microscopy, relative fluorescent intensity and cell counts were quantified using stereological techniques.

We found that acute and delayed post-SCI administration with SWNT-PEG increases neurofilament-positive fibers in the lesion epicenter and does not increase reactive gliosis. Also, one-week post-SCI administration with SWNT-PEG decreases the lesion volume and results in slightly improved hind limb locomotor recovery without inducing allodynia or hyperalgesia. These data suggest that SWNT-PEG may be an effective substrate to promote axonal repair and regeneration after SCI. This treatment could potentially be used clinically to improve the lives of paraplegic and quadriplegic patients by allowing them to walk and resume normal daily functions again.

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Abstract Title	
Primary Author	
Co-Authors	
Advisor	
Advisor Title and Department	
Advisor Institution	

Please Note: Only the primary author may present the research.

By participating in the Great Minds in STEM™ Research Posters Competition, I grant permission to Great Minds in STEM™ to publish and release, in whole or in part, information about my poster, photograph, contact information, and institutional and/or employer affiliation; and other such information for audio, video and print promotional materials, and to share with sponsors and stakeholders.

*I affirm that the poster presented at this conference is **not classified**. I have obtained all requisite permissions to release the information presented in the research poster.*

I affirm that this poster is my original work and not identical to prior HENAAC Conference presentations.

By providing my PRINTED NAME, below as an electronic signature, I agree to the above statements.

PRINTED NAME:

DATE:

Please submit this complete form along with your abstract to posters@greatmindsinstem.org by the appropriate deadline.