



**2011 Technical Posters Competition
Guidelines**

Great Minds in STEM™
2011 Technical Posters Competition Guidelines

OVERVIEW

Great Minds in STEM™ announces its Second Annual Technical Posters Competition to be held on Friday, October 7, 2011, at the 2011 HENAAC Conference, at the Disney's Coronado Springs Resort, in Lake Buena Vista, Florida. This competition is open to racial/ethnic underrepresented undergraduate and graduate students pursuing full-time studies in a related science, technology, engineering, math or health discipline.

The intent of this competition is to provide students the opportunity to display their technical accomplishments and receive recognition for their scholarly scientific investigations. 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.

Based on the abstracts, students will be selected and invited to present their research posters at the HENAAC Conference. For each selected student, travel (excluding registration) will be provided.

Cash awards ranging from \$400 to \$1200 will be awarded to the top undergraduate and graduate students. In addition, a "Best Overall" winner will be selected. Winning abstracts will be profiled in the TECHNICA Magazine and online at Great Minds in STEM™.

ELIGIBILITY

- Hispanic/Latino, African American, or Native American descent
- Undergraduate or graduate student enrolled full-time (12 hrs undergraduate/9 hours graduate) at an accredited college/university in the U.S. or Puerto Rico
 - *Exception: Doctoral students classified as doctoral candidates, but not working full-time and making satisfactory progress toward dissertation*
- Pursuing a technical degree in science, technology, engineering, math or related health
- Only individual students may present; teams of two or more students are ineligible per poster presentation
- Projects must be unclassified
- Each student may submit only one poster
- Projects may be at any stage of the research process

SUBMISSION INFORMATION

Students interested in participating in the Technical Posters Competition must submit the Technical Posters Competition Entry Form along with their abstract. No materials will be accepted by fax or mail. The form and abstract must be submitted electronically by **11:59 PM EST, Friday, August 5, 2011**, to gcruz@greatmindsinstem.org. Abstracts may 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 be automatically disqualified. ***Late submissions will not be accepted and automatically disqualified.***

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

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criteria as outlined in the Judging Section. The abstract will be judged on both content and adherence to formatting guidelines.

The format of the abstract must adhere to the following:

- Typed
- Single-spaced
- 1-inch margins
- Times New Roman
- 10 to 12-pt font (except for header requirements)

The abstract must include the following header and format:

<p>Title of Project (Bold, Centered, Times New Roman, 14 pt) Author(s) (Centered, Times New Roman, 12 pt) Institution (Centered, Times New Roman, 12 pt) Institution City, State, Zip (Centered, Times New Roman, 12 pt)</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 PRESENTATION

If selected to present, only the author may present his/her work the conference. No substitutions will be allowed under any condition.

Poster presenters will be provided solely with an 8 ft (wide) x 4 ft (tall) stand-alone corkboard. No other audiovisual equipment, lighting, tables, chairs, stands, etc. will be provided or allowed. Presenters are encouraged to bring additional copies of their abstracts, related handouts, and resumes. Push pins, Velcro and tape adhesives will be provided.

Poster Format

The format of the poster is at the discretion of the author. However, it should be sufficient to technically explain and illustrate the research project to the reviewers. The author should carefully critique the

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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 5th 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
- Introduction
- Background
- Problem Statement
- Hypothesis
- Proposed or Actual Testing (Procedure)
- Results
- Conclusion
- References

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.

Set-Up, Judging and Removal Schedule

SETUP: Posters must be set up by 9:00 AM on Friday, October 7. Posters may be set-up from 1:00 PM – 5:00 PM on Thursday, October 8, or from 8:00 AM – 9:00 AM on Friday, October 7.

JUDGING: Presenters should plan on being at their posters from approximately 9:00 AM – 12:00 PM or 1:00 PM – 5:30 PM on Friday, October 7. Each poster will be individually judged by two (2) STEM professionals from academia, industry, or federal government.

REMOVAL: On Saturday, the posters will be moved into the Career Fair for general viewing. Students may collect their posters *after* the Student Leadership Dinner. Posters will be available for pick-up at the conference headquarters office. Posters which are not removed will be discarded.

REGISTRATION

Finalists will need to provide their own registration fee, which includes hotel and most meals arriving Thursday, October 6 and departing Sunday, October 9, 2011. Finalists will be provided a registration code for the **Early Bird Registration of \$115**. (*NOTE: Students who choose to stay beyond Sunday will be required to pay their own additional hotel nights and travel*).

TRAVEL

Finalists **will be provided airfare** to and from the conference, based on a 21-day reservation. Finalists, who choose to travel by vehicle will be reimbursed mileage to and from the conference. Further details will be provided upon acceptance.

Finalists, whose travel has been arranged and fail to present will be billed the costs of any associated travel expenses. No exceptions will be made to this rule.

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JUDGING

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. The baseline principles are Intellectual Merit and Broader Impact. According to the National Science Foundation (*NSF Strategic Plan for FY 2006-2011: 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 (individual or team) 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?

In addition, the abstracts and posters will be evaluated on the overall writing and content.

AWARDS

Winners will be announced on Saturday evening at the Student Leadership Dinner. Awards will be presented at the undergraduate and graduate level for engineering/technology, science and math categories. Up to three award places may be presented in each category.

	1st Place	2nd Place	3rd Place
Undergraduate			
Engineering/Technology	\$800	\$600	\$400
Science	\$800	\$600	\$400
Math	\$800	\$600	\$400
Graduate			
Engineering/Technology	\$1200	\$1000	\$800
Science	\$1200	\$1000	\$800
Math	\$1200	\$1000	\$800

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INFORMATION RELEASE & DISCLAIMER

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™ Technical Posters Competition, the author(s) grant permission to Great Minds in STEM™ to publish and release, in whole or in part, information about their 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 and not identical to prior HENAAC Conference presentations.

CONTACT INFORMATION

All questions should be directed to Gary Cruz via email to gcruz@greatmindsinstem.org or phone at (323) 262-0997 x 775.

IMPORTANT DATES & DEADLINES

Friday, August 5, 2011 (11:59 PM EST)	The Technical Posters Competition Submittal Form and abstract must be submitted electronically to gcruz@greatmindsinstem.org . Abstracts may be submitted as .doc or docx only. No pdf files. <i>Late submissions will not be accepted and automatically disqualified.</i>
Monday, August 15, 2011	Finalists will begin to be notified of their selection via email
Friday, September 2, 2011	Finalists must completed their travel arrangements with Great Minds in STEM to ensure advance travel arrangements.
Friday, September 16, 2011	Finalists must remit their \$115 registration fee.
Thursday, October 6, 2011	Presenters may set-up their posters from 1:00 PM – 5:00 PM.
Friday, October 7, 2011	Posters must be set-up by 9:00 AM. Presenters should plan on being with their posters for judging from approximately 9:00 AM – 12:00 PM or 1:00 PM – 5:30 PM. Presentation time subject to change.
Saturday, October 8, 2011	Posters will be moved into the career fair exhibit area. Posters may be picked up at the conference logistics room after the conclusion of the Student Leadership Dinner. Winners will be announced at the Student Leadership Dinner.

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JUDGE'S SCORE CARD *

** Subject to Change*

Presenters Name _____

Judge's Initials _____

ABSTRACT

60 Possible Points	Points Possible	Points Earned
The extent, which the abstract approximates the required word count	5	
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	15	
The extent, which the abstract clearly demonstrates Broader Impact	15	
The extent, which the abstract clearly demonstrates Intellectual Merit	15	
Total Score	60	

POSTER

130 Possible Points	Points Possible	Points Earned
Clear statement of Introduction	5	
Clear statement of Background	5	
Clear statement of Hypothesis/Intent	5	
Clear Statement of the Problem	5	
Clear statement of Materials/Methods	5	
Clear statement of Data and Results	5	
Tables, figures, graphs, and/or charts used are clear, relevant and assist in explaining the project	5	
Overall Innovation	10	
Demonstrates Broader Impact – The extent to which the findings may be utilized for society	15	
Demonstrates Intellectual Merit	15	
The extent to which the poster layout is readable and logical	10	
The extent to which the poster is presented in a professional manner	5	
Important phases of the research are presented in an orderly and concise manner	10	
Presenter communicates knowledge of research	15	
Presenter has an idea of what further research is warranted	10	
Presenter acknowledges questions thoroughly	5	
Total Score	130	

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TECHNICAL POSTER COMPETITION ENTRY FORM

First Name

Last Name

Mailing Address/City/State/Zip

Email Address

Phone Number

NOTE: All correspondence will be made to the above addresses and/or phone number.

Classification: Freshman Sophomore Junior Senior
 Masters Doctoral Doctoral Candidate
 MD/DVM Student

College/University _____

Major _____

Abstract Title _____

Primary Author _____

Co-Authors _____

Gender Male Female

Race/Ethnicity African American Asian American
 Central/South American Mexican American
 Native American Puerto Rican
 White Other

I affirm that the poster presented at this conference is not classified. It is my responsibility to obtain all requisite permissions to release the information presented in the research poster. By participating in the Great Minds in STEM™ Technical Posters Competition, I grant permission to Great Minds in STEM™ to publish and release, in whole or in part, information about their concept, participant photographs, contact information, and institutional and/or employer affiliation, and other such information for audio, video and print media. I affirm that this poster is my original work and not identical to prior HENAAC Conference presentations.

PRINTED NAME: _____

DATE: _____

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 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.

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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.