



# **Call for Posters**

## **Student Technical Poster Competition**

### **NTCC 2006**

**Lake Buena Vista, FL  
January 4 - 8, 2006**

#### **Important Dates:**

**October 21, 2005  
Abstract Submission Deadline**

**October 28, 2005  
Notification of Accepted Poster**

**IMPORTANT:** If you have submitted an abstract to the technical paper competition, **do not** submit an abstract for the poster competition. You will automatically be considered for both competitions. However, submission to the poster competition does not automatically place you for consideration in the technical paper competition.

**For more information contact:  
Dr. Olivia A. Graeve ([oagraeve@unr.edu](mailto:oagraeve@unr.edu))**

**National Technical and Career Conference  
Lake Buena Vista, FL  
January 4 - 8, 2006**



## MEMORANDUM

TO: SHPE Students

FROM: Dr. Olivia A. Graeve  
NTCC 2006 Student Technical Paper and Poster Competition Chair

Date: September 8, 2005

Subject: Call for Posters – NTCC 2006 Student Technical Poster Competition

SHPE would like to invite all graduate and undergraduate students to submit technical poster abstracts for consideration to the NTCC 2006 Student Technical Poster Competition.

**ELIGIBILITY:**

- ◆ **Must be a SHPE Member**
- ◆ Must be a graduate or undergraduate student.
- ◆ The topic of the technical poster must be related to the technical fields of engineering and science.

## OVERVIEW OF TECHNICAL POSTER COMPETITION:

1. Technical poster abstracts must be submitted by October 21, 2005 via email to [oagraeve@unr.edu](mailto:oagraeve@unr.edu).
2. Participants will be notified of acceptance of poster by October 28, 2005.
3. Selected participants will present their technical posters during the NTCC 2006 Student Technical Poster Competition in Lake Buena Vista, FL.
4. A panel of professionals will judge the posters and make final decisions on the winners.

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# Society of Hispanic Professional Engineers

**SELECTION CRITERIA:** Abstracts and posters will be reviewed and judged by a committee on the basis of the following criteria:

1. **Originality**
2. **Social impact**
3. **Completeness**

Notes: It is the author's responsibility to obtain all requisite permissions to release the information presented in the technical poster. Posters presented at this conference must not be classified.

**AWARDS:** ♦ Monetary awards will be presented to the first-place winners in each category at the conference.

## **ABSTRACT GUIDELINES:**

1. All abstracts are limited to one 8.5 x 11 inch (letter-size) page.
2. Minimum font is 10-point.

The abstract must include the following:

1. Title of paper
2. Name (underlined), affiliation, mailing address, phone number, and e-mail address of presenting author.
3. Names and affiliations of co-authors.
4. Main text of abstract
5. Notice that the abstract is for the poster competition

Note: Abstracts with incomplete information will not be considered for the competition.

## **CONTACT INFORMATION:**

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**National Technical and Career Conference**  
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|                        |  |
|------------------------|--|
| Presenting Author      | <p><b>Title</b>   <b>Reactive Ferrous Sulfide/Ferric Oxide Multi-Layer Films for Remediation of Arsenic Contaminated Groundwater</b></p>   |
| Addresses              | <p>Tanya J. Gallegos,<sup>#</sup> Kim F. Hayes, and Linda M. Abriola<sup>**</sup></p>  |
|                        | <p><sup>#</sup> University of Michigan, Department of Civil and Environmental Engineering<br/>1351 Beal Avenue, Ann Arbor, MI 48109</p>  |
|                        | <p><sup>**</sup> Tufts University, College of Engineering</p>  |
| Social Impact          | <p>Arsenic contamination of groundwater is a widespread problem affecting aquifers in the United States, as well as abroad. Recent strengthening of the US EPA Maximum Contaminant Level (MCL) for arsenic has prompted the need for technology capable of removing both the oxidized and reduced forms of arsenic (arsenite and arsenate, respectively) from solution. In particular, trivalent arsenite or As(III), the more persistent and toxic form in the anoxic groundwater zones, is the most difficult to remove from solution. Although some iron oxides, such as ferrihydrite, have been effective in removing As(III) from solution at circumneutral pH, these oxides have a tendency to dissolve when reducing conditions prevail in groundwater releasing the arsenic back into solution. However, iron sulfide minerals such as troilite, pyrite and the amorphous iron sulfide have demonstrated effective uptake of As(III) in batch solutions at high pH. Applications of reduced iron sulfides are currently under investigation for As(III) sequestration for in-situ subsurface permeable reactive barriers. Direct application, however, in such a flow-through system is dependent not only upon ability to synthesize the reactive media on a large-scale industrial level but also at various ranges of particle sizes.</p> |
| Objective / Hypothesis | <p>The purpose of this study was to develop reactive iron sulfide porous media in a range of particle sizes for remediation of As(III)-contaminated groundwater. A method was developed to produce multilayer films on quartz sand consisting of both an iron oxide layer and a protective layer of iron sulfide for uptake of As(III) under reducing conditions. Additionally, the macroscopic behavior of the films were characterized in the presence of As(III) with respect to variations in time, ionic strength, pH and initial total As(III) concentrations. This information was used to determine the likely mechanisms and optimal conditions for effective As(III) uptake.</p>   |
| Experiment             | <p>The results indicate that iron sulfide/oxide coated sand removes As(III) from solution from pH 3 to pH 11. As(III) sorption onto iron sulfide/oxide coated sand increases with increasing pH, reaching maximum removal between pH 7 and 9. As(III) removal at low pH (below pH 5) is constant indicating a different removal mechanism. Isotherm studies show that at low concentrations, removal follows Langmuir adsorption behavior whereby sorption levels off with increasing solution concentration of As(III). As(III) sorption, however, abruptly converts to linear behavior at high concentrations, possibly attributed to the saturation of the monolayer and subsequent multilayer surface precipitation. Ionic strength effects were assessed by comparing pH edge data developed for three different concentrations of NaCl background electrolyte solution. Increases in ionic strength enhance the removal of As(III) from solution, suggesting possible inner-sphere surface complexation removal mechanisms.</p>  |
| Results                | <p>Information gathered in this study can be used to develop surface complexation models to describe and predict reactivity of As(III) in the presence of iron sulfide/oxide coated sands in anoxic regions. The results indicate that iron sulfide/oxide coated sands provide a feasible reactive medium for implementation in subsurface permeable reactive barriers.</p>  |
| Conclusion             | <p>This abstract is submitted for the poster competition.</p>  |

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