



Effective STEM Curriculum for Girls

Dr. Stacy S Klein-Gardner, Harpeth Hall School and Vanderbilt University

Dr. Stacy Klein-Gardner serves as the Director of the Center for STEM Education for Girls at the Harpeth Hall School in Nashville, TN. Here she leads professional development opportunities in STEM. This Center also leads a program for rising high school girls that integrates community service and engineering design in a global context. She continues to serve as an Adjoint Professor of the Practice of Biomedical Engineering Vanderbilt University.

WORKSHOP PROPOSAL FORM

2015 Annual ASEE K-12 Workshop on Engineering Education
“Authentic Engineering: Representing & Emphasizing the E in STEM”
Presented by Dassault Systems

Saturday, June 13, 2015
8:00 A.M. – 5:00 P.M.
Sheraton Seattle | Seattle | WA

Please complete this form, save it as a PDF file *only* and upload it through the ASEE Paper Management system as shown in the K12 Workshop Presenter’s Kit.

All notifications will be by email from the ASEE Paper Management system.

NOTE: To ensure that emails are not obstructed by spam blockers, please make sure to WHITELIST the email addresses: monolith@asee.org and conferences@asee.org and s.harrington-hurd@asee.org.

Direct questions to Stephanie Harrington-Hurd, ASEE K-12 Activities Manager, at s.harrington-hurd@asee.org. Additional workshop details are available at: <http://www.asee.org/K12Workshop>. Thank you!

Deadline

Friday, January 23, 2015 by 5:00PM EST

Presenters will be notified of acceptance status by March 14.

Late submissions will not be accepted.

Advanced Workshop Registration will open December 6, 2013.

SUBMISSION INFORMATION

Provide the first and last name of each presenter, including affiliations. If there is more than one presenter, designate one person as the organizer and provide only that person’s contact information. The organizer is responsible for communicating to co-presenters.

Number of Presenters: 1

Presenter Name(s):

1) Last Klein-Gardner First Stacy Affiliation Harpeth Hall School and Vanderbilt University

2) Last First Affiliation

3) Last First Affiliation

Contact Person’s Name: Stacy Klein-Gardner

Contact Person’s Email: stacy.gardner@harpethhall.org

Contact Person’s Phone: 615-346-0110

Contact Person’s Alternate Phone: 615-294-7964

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Please provide a one-paragraph bio for each presenter (in the order listed above). The bio should not exceed 70 words and should be written as you would want it to appear on the ASEE website and program materials.

1)

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2)

3)

WORKSHOP INFORMATION

Proposed Title:

Effective STEM Curriculum for Girls

Abstract: Please provide a concise description that includes the workshop’s learning objectives (maximum 750 characters). The abstract is used on the ASEE website, program materials, and other K-12 Workshop promotional activities.

Each summer the Center for STEM Education for Girls (<http://stemefg.org>) hosts two week camps for local rising high school girls called the STEM Summer Institutes. Our curriculum revolves around real engineering design projects for the Lwala (Kenya) Community Alliance. The curriculum is truly STEM integrated and is an effective model for school-wide STEM based programming. This workshop will share the research results and curriculum from these programs, including the opportunity to participate in one hands-on engineering design project. We will also discuss the specific needs of girls in STEM, based on the literature. Tips for authentic assessment of this work will be provided and links to standards made.

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Workshop Description. Please provide a detailed description of the proposed workshop that, at minimum, explicitly addresses the following (maximum 4,000 characters):

- a. Learning objectives
 - b. Hands-on activities and interactive exercises
 - c. Materials that participants can take with them
 - d. Practical application for teachers and outreach staff
-
- a. Participants will be able to review their own STEM plans with effectiveness for girls in mind. They will also be able to take back general ideas on how to create new STEM-based school-wide curriculum or simply how to do effective STEM-integrated curriculum in an individual teacher’s classroom. For participants who are new to engineering design, they will participate in a hands-on activity that they could implement in their home schools. Participants should learn how to seek and implement service learning projects – shown to be important especially to girls – as a means of creating STEM integrated curriculum. Participants will be introduced to authentic assessment measures, including the Innovation Portal.
 - b. Hands-on Activities and Interactive Exercises – Session Outline, with hands-on bolded
Overview of the Center for STEM Education for Girls (5 min)
What the literature says about Girls in STEM (5 min)
Specifics of the STEM Summer Institute 2014 Curriculum (10 min)
Assessment Methods for STEM (5 min)
Research Results from the STEM Summer Institute 2012-2014 (5 min)
Improving a Bridge Design from Lwala (35 min)
Brainstorming service-learning, engineering-based opportunities in your area (5 min)
Wrap-Up and Questions (5 min)
 - c. Materials
Specifics of the STEM Summer Institute 2014 Curriculum
 - d. Practical Application for teachers and outreach staff

This curriculum could be used at a grade-level as a means of integrating STEM across the subjects. Assessment methods will be addressed. Schools often need more examples of real-world STEM integration to use in their classrooms. Utilizing service learning and engineering is a key way to accomplish that. Other outreach staff could implement a similar program at their university, which is actually one of the goals of my Center for STEM Education for Girls.

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Authentic Engineering Connection. Identify and describe how you will explicitly address the ways in which your lesson or activity is representative of the processes, habits of mind and practices used by engineers, or is demonstrative of work in specific engineering fields.¹ At least one of those must be within the first four listed, below; i.e., do not only check “other”. Check all that apply:

- Use of an engineering design process that has at least one iteration/improvement
- Attention to specific engineering habits of mind
- Attention to engineering practices (as described in the NGSS/Framework and as practiced by engineers)
- Attention to specific engineering careers or fields related to the lesson/activity
- Other (please describe below)

Provide a description of how you will explicitly address these aspects of authentic engineering in your workshop (maximum 2,000 characters):

Participants will be exposed to all steps of the engineering design process during the workshop and will actually take part in some of those steps (brainstorm, plan, some building). Ties will be made between the curriculum at hand and the engineering careers/fields which utilize the concepts and specific project. Ways to bring those types of engineers into the classroom in meaningful ways will be discussed.

Diversity. This year is the American Society for Engineering Education’s “Year of Action on Diversity.” It is essential that we have a diverse engineering workforce to solve diverse problems. To do that and to have an engineering-literate public, it is essential that we reach *every* preK-12 student with high-quality engineering education, drawing on issues of access and equity in the classroom and in the curriculum. Reviewers would like to know how your proposed workshop will address diversity.

Provide a description of how you will explicitly address diversity – e.g., diversity with respect to gender/sex, ethnicity or race, special education inclusion, socio-economic status, or LGBT status – in your workshop (maximum 2,000 characters):

This workshop and the curriculum it is based on come from the Center for STEM Education for Girls where we specifically focus on the needs of girls. We will discuss what makes effective STEM curriculum for girls – or at least aspects of it – and provide the participants with specific examples.

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Are there any online components to the proposal or presentation? (Note that these online components may only be available to presenters or those who have their wireless subscriptions, since wireless may not be available during the workshop sessions.)

- No
 Yes

Please describe:

Grade Level Target Audience (check all that apply):

- Primary (EC–2)
 Elementary (3–5)
 Middle School (6-8)
 High School (9-12)

Maximum Number of Participants:

40

If this number is greater than 25, please describe how your workshop will equally engage all participants.

I would prefer the smaller audience of 25, but I can handle 40. Participants will work in small groups during the workshop, thus personalizing the experience.

All Seating is Classroom (tables and chairs).

Audio Visual Equipment Requests:

Note: An LCD projector, screen and podium with attached microphone are provided. Requests for additional equipment or resources (e.g., internet connection or laptops) will incur extra charges. If you do not have additional requests, please indicate with “Not applicable.”

Not applicable

Reminder:

Presenters must register and pay the registration fee to support their workshop attendance and audio/video costs.

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Thank you for completing this proposal form!
Please review this document prior to submitting it to ensure that all items are complete.

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