

## Preview of Award 1650390 - Annual Project Report

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### Cover

Federal Agency and Organization Element to Which Report is Submitted:	4900
Federal Grant or Other Identifying Number Assigned by Agency:	1650390
Project Title:	DCL: NSF INCLUDES Conference on Multi-Scale Evaluation in STEM Education
PD/PI Name:	Louis J Gross, Principal Investigator Pamela R Bishop, Co-Principal Investigator Ernest Brothers, Co-Principal Investigator Suzanne Lenhart, Co-Principal Investigator
Recipient Organization:	University of Tennessee Knoxville
Project/Grant Period:	09/01/2016 - 08/31/2018
Reporting Period:	09/01/2016 - 08/31/2017
Submitting Official (if other than PD\PI):	N/A
Submission Date:	N/A
Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	N/A

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### Accomplishments

#### \* What are the major goals of the project?

The overall goals of the project are to (i) enhance the knowledge of current INCLUDES pilot project leadership, those who are planning to submit INCLUDES proposals, and other STEM educators about evaluation methods; (ii) present the experiences of individuals who have successfully developed alliances and carried out evaluation efforts for these; and (iii) provide advice regarding evaluation methods for those planning to participate in future requests for INCLUDES Alliances and/or the National Network. We carried out these goals via three components: (a) an initial webinar open to the broad community of STEM educators to introduce key concepts and vocabulary concerning evaluation methods; (b) a pre-Conference Tutorial to provide a one-day overview of modern methods in evaluation and connect these to projects suggested by the participants; and (c) a two-day Conference including as speakers leading experts on program evaluation as well as leaders of programs in STEM education that have operated at multiple scales. We also had goals of providing opportunities for virtual participation throughout the three components of the project, including a diverse group of participants, and conducting a formal evaluation of the project as well.

New goals in the approved no-cost extension year are to expand the previously developed openly available

resources on program evaluation on a variety of topics of particular interest to INCLUDES awardee through development of a series of additional webinars to foster understanding of various aspects of program evaluation that were only touched on in the previously held webinar and tutorial.

**\* What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?**

Major Activities:

A live webinar, "Program Evaluation 101", was presented by Dr. Pamela Bishop and Sondra LoRe on February 09, 2017. Dr. Louis Gross moderated the event. The webinar focused on: 1) an overview of program evaluation, 2) approaches to evaluation, 3) working with an evaluator, and 4) information about the evaluation process. A total of 140 attendees participated in the live webinar. Additionally, to date the webinar has been viewed over 170 times on YouTube <https://www.youtube.com/watch?v=ZGsNJ1jJD0>

A one-day pre-conference tutorial with 33 attendees (including four speakers) was held February 22, 2017. Tutorial applicants were asked if they would be interested in providing their current projects as case studies to use as examples during the tutorial. Four INCLUDES projects of tutorial participants were selected as case studies. Examples of the breakout session activities are provided in Appendix D of the attached Evaluation Report. Tutorial participants were placed into breakout sessions by conference organizers according to the information they provided on their applications. Participants were matched as closely to a project in their area of interest as possible. Four breakout sessions with 8-10 participants each (including one session leader and one facilitator) met for two 1.5 hour breakout sessions using the participant case studies to walk through several hands-on activities, including as time allowed: (1) mapping a project, (2) determining key stakeholders, (3) developing evaluation questions, and (4) determining data sources to answer evaluation questions. Online participation was allowed in breakout sessions via Zoom. Three breakout groups each had one active online participant.

A subsequent two-day conference with 100 attendees (including all tutorial participants, 11 speakers, and two additional organizers) was held February 23-24, 2017. The conference included a combination of presentations, breakout sessions, poster presentations, and panel discussions. Seven presenters, including STEM program evaluators and leaders of diversity-focused STEM initiatives, gave talks about issues such as creating and maintaining alliances, evaluating projects at multiple scales, and cultural contexts for evaluation (see Appendix B of the attached Evaluation Report for a full listing of presentations). Panel discussions fielded questions from the audience on Day one, and a formative evaluation at the end of Day one guided the theme of the panel discussions on Day two to focus more on multi-level, multi-site evaluation issues. Day one ended with a poster session and reception. A list of the 35 participant poster presentations is provided in Appendix F of the attached Evaluation Report. Several small-group breakout sessions were offered on both days. Session topics were selected from participant pre-survey responses regarding issues they would like to explore further. Session topics included data visualization, development of program models, research vs. evaluation, and best practices in creating evaluation reports.

**Specific Objectives:** Specific webinar objectives were to introduce prospective tutorial/conference participants and other STEM educators to the basic vocabulary and process of evaluation of a STEM education project.

Specific objectives of the one-day tutorial were to provide a quick overview of the processes of program evaluation, to walk participants through the evaluation process using real participant case studies, increase participant knowledge about evaluation, and to allow virtual participation throughout.

Specific objectives of the two-day INCLUDES conference were to (i) enhance the knowledge of the participants about evaluation methods; (ii) present the experiences of individuals who have successfully developed alliances and carried out evaluation efforts for these; and (iii) provide advice regarding evaluation methods for those planning to participate in future requests for INCLUDES Alliances and/or the National Coordination Hub.

The specific objective of the coming year will be to develop a series of additional webinars to foster understanding of various aspects of program evaluation that were only touched on in the previously held webinar and tutorial.

**Significant Results:** Webinar: The webinar had 140 attendees, and has been viewed on Youtube to date over 170 times. A post evaluation survey was sent to all 140 participants who registered for the webinar and was completed by 66 (47%) participants. Overall, feedback from participants was generally positive (please see attached Evaluation Report), including that the webinar met their expectations and provided sufficient time and information during the Q &A session at the end. Knowledge gains were reported by webinar attendees in all of the learning outcome categories pre-determined by the webinar presenters, including mapping a STEM education project, defining key stakeholders, developing evaluation questions, and the importance of reporting evaluation data in a usable way.

Tutorial: Pre- and post-surveys were sent to all 28 tutorial attendees and 26 completed the post-survey. (23 attendees completed both the pre- and post-survey.) Overall, tutorial participants showed gains in knowledge and were generally satisfied. Areas in which participants indicated gains in knowledge included developing program evaluation questions, identifying key program stakeholders, creating a visual map of their programs, designing an evaluation plan, and understanding how evaluation could improve their programs. All evaluation survey respondents indicated that they would recommend participating in NISER/NIMBioS evaluation-focused tutorials to their colleagues, and all agreed that the presentations were useful. The vast majority also indicated that they felt the presenters were very knowledgeable about their topics, that the hands-on exercises were useful, and that the tutorial overall met their expectations. Analysis of open-ended participant responses about the most useful aspects of the tutorial indicated that participants felt the program evaluation education and breakout sessions provided the most value to them.

Conference: Pre- and post-surveys were sent to all conference attendees, and a total of 75 participants and 7 presenters completed the survey. Overall, findings were positive. All presenters reported being very satisfied with their interactions with the conference leadership, and almost all participants agreed

that the conference was organized and carried out successfully. Participants felt the presentations were useful, the instructors were very knowledgeable about their topics, the group discussions were useful, and that the conference overall met their expectations. The vast majority of survey respondents indicated that they would recommend participating in NISER/NIMBioS evaluation-focused conferences to their colleagues. Participants also reported learning gains in the areas on which the conference focused, including how to evaluate programs at multiple scales and sites, how cultural context affects program evaluation, and how to evaluate collaborations/alliances in STEM education.

Key outcomes or Other achievements: Since the theme of the activities supported by this project are all associated with program evaluation, a key outcome of this project is the project evaluation (Multi-Scale Evaluation in STEM Education) itself, some of the results of which are summarized above. The Evaluation Report for this project provides a template that others might use to guide evaluation processes for similar multi-component activities.

**\* What opportunities for training and professional development has the project provided?**

The entire suite of offerings of this project provided opportunities for training and professional development in STEM education program evaluation for both in-person participants and those participating remotely. Evaluation of the project activities showed that the project activities met the overall goals to train participants in the following areas: (i) enhance the knowledge of current INCLUDES pilot project leadership, those who are planning to submit INCLUDES proposals, and other STEM educators about evaluation methods; (ii) present the experiences of individuals who have successfully developed alliances and carried out evaluation efforts for these; and (iii) provide advice regarding evaluation methods for those planning to participate in future requests for INCLUDES Alliances and/or the National Network

**\* How have the results been disseminated to communities of interest?**

All project activities, including the webinar, tutorial, tutorial breakout sessions, and conference presentations and panel sessions were live streamed and freely available to the public. All of these activities were also recorded and placed online on the conference website: <http://www.nimbios.org/IncludesConf/> This website includes PDFs of all tutorial and conference presentations, live videos of presentations, all tutorial breakout materials, and PDF versions of many of the posters presented at the conference. Announcements of the availability of these items on the projects INCLUDES website were made via the NIMBioS bi-monthly newsletter, the NISER email list, the NIMBioS and NISER websites, and through emails to webinar, tutorial, and conference participants after the events and through announcements through Trellis to the INCLUDES projects community.

**\* What do you plan to do during the next reporting period to accomplish the goals?**

We have applied for and received approval for a no-cost extension for the coming year to further expand the evaluation-focused webinars that will be of use to the INCLUDES community. Dr. Bishop, Dr. Gross, and Sondra LoRe will lead the effort in expanding the previously developed openly available resources on program evaluation on a variety of topics of particular interest to INCLUDES awardees. We have considered alternative topics, based in part on evaluation results from the prior activities, and will host a series of additional webinars to foster understanding of various aspects of program evaluation that were only touched on in the previously held webinar and tutorial. Announcements of these webinars will be made broadly to the INCLUDES community through Trellis, direct correspondence with the many attendees at previous activities supported by this award, and through the large NIMBioS contact network of interdisciplinary researchers and educators. Evaluation of the proposed additional activities will be carried out as per the process in the original proposal. As was carried out for the previous webinar, slides, video and audience responses for each webinar will be posted on the project website.

The additional INCLUDES and evaluation webinars we propose are: Evaluating Social Media Impact in NSF INCLUDES Projects; Qualitative Data in Culturally Rich Evaluations of NSF INCLUDES Projects; Program Models as a Tool for Scaling up NSF INCLUDES Projects; Engaging Diverse Populations in Evaluations of NSF INCLUDES Projects; and Evaluation Strategies for Measuring the Broader Impacts (BI) of NSF INCLUDES Projects.

### Supporting Files

Filename	Description	Uploaded By	Uploaded On
INCLUDES Report FINALDRAFT.pdf	This is the evaluation report for all INCLUDES project activities to date.	Pamela Bishop	08/28/2017

## Products

### Books

### Book Chapters

### Inventions

### Journals or Juried Conference Papers

View all journal publications currently available in the [NSF Public Access Repository](#) for this award.

The results in the NSF Public Access Repository will include a comprehensive listing of all journal publications recorded to date that are associated with this award.

### Licenses

### Other Conference Presentations / Papers

### Other Products

*Evaluation report.*

This report, "Multi-Scale Evaluation in STEM Education, NSF INCLUDES Conference Evaluation Report", is posted on the website for this project.

### Other Publications

### Patents

### Technologies or Techniques

### Thesis/Dissertations

### Websites

*National Science Foundation INCLUDES Conference Multi-Scale Evaluation in STEM Education*  
<http://www.nimbios.org/IncludesConf/>

This website contains all of the products from the INCLUDES project activities supported by this grant, including video recordings of webinar, tutorial, and conference presentations, PDFs of presentations, tutorial breakout

session handouts, and PDFs of participant posters.

## Participants/Organizations

### What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Gross, Louis	PD/PI	1
Bishop, Pamela	Co PD/PI	1
Brothers, Ernest	Co PD/PI	1
Lenhart, Suzanne	Co PD/PI	1
Eskridge, Chandra	Other Professional	1
LoRe, Sondra	Other Professional	2

### Full details of individuals who have worked on the project:

#### Louis J Gross

**Email:** gross@NIMBioS.org

**Most Senior Project Role:** PD/PI

**Nearest Person Month Worked:** 1

**Contribution to the Project:** Dr. Gross coordinated all aspects of the Conference planning, including logistics arrangements with the UTK Conference Center, coordinating all IT needs, and coordinating the various speakers. He co-organized many activities associated with the grant, including facilitation of the webinar, contacting and managing all details of coordinating potential speakers for the tutorial and conference, creation of participant applications, selection of participants, development of agendas for activities, development of participant pre- and post-evaluation surveys, and development of the final evaluation report. Dr. Gross also gave the welcome talk for the tutorial, introduced speakers at both the tutorial and conference, facilitated two breakout sessions at the tutorial, and presented a talk at the conference entitled "Lessons for Educational Projects from Evaluation of Multi-Scale Quantitative Models."

**Funding Support:** NA

**International Collaboration:** No

**International Travel:** No

#### Pamela R Bishop

**Email:** pbaird@utk.edu

**Most Senior Project Role:** Co PD/PI

**Nearest Person Month Worked:** 1

**Contribution to the Project:** Dr. Bishop co-organized all activities associated with the grant, including

development and delivery of the webinar, researching potential speakers for the tutorial and conference, creation of participant applications, selection of participants, developing tutorial materials for breakout groups, development of agendas for activities, development, deployment, and analysis of participant pre- and post-evaluation surveys, and development of the final evaluation report. Dr. Bishop also presented "How Evaluation can Help Your Program" at the tutorial, led two breakout sessions at the tutorial, and led a breakout session at the conference on effective reporting strategies.

**Funding Support:** NA

**International Collaboration:** No

**International Travel:** No

**Ernest Brothers**

**Email:** ebrother@utk.edu

**Most Senior Project Role:** Co PD/PI

**Nearest Person Month Worked:** 1

**Contribution to the Project:** Dr. Brothers collaborated on the evaluation of all project activities as they related to diversity and inclusion, including application details and participant selection. He coordinated outreach efforts to minority serving institutions in attracting participants both in-person and virtually, and collaborated with co-PIs on accepting applications for the Tutorial and Conference.

**Funding Support:** NA

**International Collaboration:** No

**International Travel:** No

**Suzanne Lenhart**

**Email:** lenhart@math.utk.edu

**Most Senior Project Role:** Co PD/PI

**Nearest Person Month Worked:** 1

**Contribution to the Project:** Dr. Lenhart coordinated all publicity efforts for the project and managed the application process for requests to attend the Tutorial and and conference. She coordinated with co-PIs on selecting participants to the Tutorial and conference and co-facilitated two tutorial breakout sessions.

**Funding Support:** NA

**International Collaboration:** No

**International Travel:** No

**Chandra Eskridge**

**Email:** ceskridge@utk.edu

**Most Senior Project Role:** Other Professional

**Nearest Person Month Worked:** 1

**Contribution to the Project:** Chandra Eskridge NIMBioS Executive and Business Assistant, handled logistics of participant scheduling, meal and travel planning, and participant reimbursement processing. The magnitude

of effort associated with logistics for the number of participants in the planned activities is beyond the standard scope of her NIMBioS responsibilities, and her effort on other NIMBioS activities was reduced to provide time to meet the needs of the proposed Conference and Tutorial.

**Funding Support:** na

**International Collaboration:** No

**International Travel:** No

**Sondra LoRe**

**Email:** [sondra@utk.edu](mailto:sondra@utk.edu)

**Most Senior Project Role:** Other Professional

**Nearest Person Month Worked:** 2

**Contribution to the Project:** Ms. Lore collaborated with project PIs to coordinate on the planning and implementation of the Webinar and Tutorial, coordinated with Dr. Lenhart on the tracking and processing of all applications to participate, and assisted in carrying out the evaluation of the project activities. Ms. LoRe also presented "Designing the evaluation plan" at the tutorial, and facilitated two breakout sessions.

**Funding Support:** NA

**International Collaboration:** No

**International Travel:** No

#### **What other organizations have been involved as partners?**

Nothing to report.

#### **What other collaborators or contacts have been involved?**

Speakers at the tutorial:

Dr. Barbara P. Heath is the Managing Member and Lead Consultant for East Main Evaluation & Consulting, LLC; a company she started in January 2004. Dr. Heath has been actively involved with several STEM and STEM education related projects from inception through funding, development, and implementation.

Dr. Frances Lawrenz is the Associate Vice President for Research at the University of Minnesota and a professor in the Department of Educational Psychology.

Ms. Sondra LoRe is an Evaluation Associate at the National Institute for STEM Evaluation and Research.

Speakers at the conference:

Dr. David Bressoud is DeWitt Wallace Professor of Mathematics at Macalester College, former President of the Mathematical Association of America, and a Fellow of the American Mathematical Society.

Mr. Byron Greene of Florida A&M University has a career spanning more than 15 years in higher education, where he utilizes keen business insights to successfully build relationships and collaborative partnerships.

Dr. Melvin Hall is a Professor of Educational Psychology with Northern Arizona University whose background includes focused study in program evaluation, psychological assessment, and comparative inquiry methodology.

Dr. Ashanti Johnson is the Assistant Vice Provost for Faculty Recruitment and Associate Professor of Earth and Environmental Sciences at the University of Texas at Arlington.

Dr. Kirk Knestis is CEO of Hezel Associates, an 11-person research and evaluation firm in Syracuse, NY, that specializes in studying education innovations.

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## Impacts

### **What is the impact on the development of the principal discipline(s) of the project?**

The project advanced the knowledge base of STEM educators and evaluators concerning methods to design and combine evaluations at multiple scales, building upon what has been developing in the blossoming area of multi-scale computational modeling. The activities impacted the evaluation of STEM education projects, particularly those dealing with diverse participants at multiple sites and multiple scales, by helping those who implement an evaluation of a STEM education project to consider novel schemes to evaluate, using their own "return-on-investment" metrics, projects operating at scales above a single educator/researcher/institution. Evaluation data from the activities indicates that the project led participants to understand the need to implement transformative evaluation methods to inform public understanding of the benefits of educational investments at diverse scales.

### **What is the impact on other disciplines?**

Beyond impacting the field of evaluation in STEM in general, the project activities potentially impact educational initiatives in any of the science, technology, engineering, and mathematics fields by providing information to practitioners in these fields about ways in which they can evaluate educational outcomes of their STEM education projects. The availability of all project activity presentations, handouts, and other materials through the project website allows for the potential of a broad range of STEM educators and evaluators to access and use the materials for years to come.

### **What is the impact on the development of human resources?**

The activities supported by this project led to improved knowledge for participants of program performance expectations, and skills in program evaluation with particular emphasis on evaluating STEM education projects that focus on members of underrepresented groups. Evidence for this improvement in participants knowledge was provided through the surveys of participants carried out as part of the project evaluation. Providing this knowledge to the targeted participants in the project activities should ultimately help improve underrepresented minority access to and retention in STEM research and/or teaching professions, which is a focus of the INCLUDES program. In addition, this project developed and disseminated new educational materials about STEM educational evaluation, with emphases on underrepresented minorities, multi-site, and multi-scale evaluation. The project provided exposure to current methods in multi-scale, multi-site STEM education evaluation methods for INCLUDES PIs, INCLUDES project staff, those planning to submit INCLUDES proposals, and other STEM educators interested in learning more about efficient ways to evaluate both simple and complex projects focused on underrepresented minorities in STEM.

### **What is the impact on physical resources that form infrastructure?**

Nothing to report.

### **What is the impact on institutional resources that form infrastructure?**

Nothing to report.

### **What is the impact on information resources that form infrastructure?**

This project has curated and provided electronically all materials from the webinar, tutorial, and conference and made these information resources freely available online to anyone via our project website. The data on this website will be maintained for many years after the project has completed.

**What is the impact on technology transfer?**

Nothing to report.

**What is the impact on society beyond science and technology?**

Nothing to report.

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## Changes/Problems

**Changes in approach and reason for change**

Nothing to report.

**Actual or Anticipated problems or delays and actions or plans to resolve them**

Nothing to report.

**Changes that have a significant impact on expenditures**

Nothing to report.

**Significant changes in use or care of human subjects**

Nothing to report.

**Significant changes in use or care of vertebrate animals**

Nothing to report.

**Significant changes in use or care of biohazards**

Nothing to report.