

# Preview of Award 1047714 - Final Project Report

## Cover

Federal Agency and Organization Element to Which Report is Submitted: **4900**

Federal Grant or Other Identifying Number Assigned by Agency: **1047714**

Project Title: **Collaborative Research: Women's International Research Engineering Summit**

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Submitting Official: **Mary L Realff  
Principal Investigator**

Submission Date: **12/20/2013**

Recipient Organization: **Georgia Tech Research Corporation**

Project/Grant Period: **9/15/2010 - 8/31/2013**

Reporting Period: **9/15/2012 - 8/31/2013**

Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions): **Mary L Realff**

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## Accomplishments

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

Through efforts of WIRES1 (2009), WIRES2 (2011), and the WIRES online research discussions (2013), we have established a network of collaborators that extends beyond the activities of the summit itself. WIRES1 and WIRES2 results have provided evidence of considerable impact in terms of publications, new collaborations and joint research projects. Additionally, the participants from these previous summits have acted as role models for other women who want to engage in international research collaborations. By working to create women-led teams engaging in meaningful and sustained research, the WIRES Network members are collaborating to solve the large engineering problems of the world. Specifically, our network aims to connect women from different countries and continents who have similar career experiences while providing forums for them to collaborate on research as well as share challenges and successes.

### What are some of the goals of WIRES?

- Provide a community of excellence for forging personal, sustainable relationships among female engineers around the world by revealing facilities/expertise available in the respective countries.
- Provide a clear, visible pathway for females to pursue international collaborations.
- Identify methods of securing funding for international collaborations from federal agencies, international sources (e.g., NATO, UNESCO), the private sector, foundations, etc.
- Identify common issues faced by female researchers pursuing careers in engineering such as inclusiveness in research endeavors, gender lens in innovation, female-friendly environments, institutions, & companies, family leave policies, "dual-career couple" issues.
- Focus on the global engineering research enterprise by enabling the participants to develop a personal understanding of how engineering research, innovation and technology to the market (T2M) are conducted in various countries around the world.
- Generate a database of female faculty who are interested in conducting international research.

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

Major Activities: The major activities of this reporting period have been the on-line research discussions, dissemination of our results, expansion of the WIRES Network, generation of further support for future WIRES Network activities and further analysis of the three sets of WIRES Network survey results.

Specific Objectives: The objectives during this reporting period was to expand the size and engagement in the WIRES Network through the addition of the on-line research discussions, to disseminate the findings of the WIRES research and to gain support to make the WIRES Network sustainable.

Significant Results: About 60 women have been engaged in the WIRES Network on-line research discussions. They have formed collaborative teams and have developed research proposals which are currently being finalized or evaluated for funding. The WIRES research will be disseminated through a journal article that is currently being finalized.

Key Outcomes or Other Achievements: The key outcomes are evidenced in the engagement of the WIRES Network participants in international research collaborations. Here we summarize the results of the 2011 survey assessing the engagement in international research collaborations.

Level of International Research Collaborations (IRC)

67.1% report an increased level of international research collaboration\*

27.6% report that their level of international research collaborations has remained the same\*

IRC Outcomes that resulted from connections made or information received at WIRES1

Number of research proposals

Written and submitted: 42

Funded: 10

Number of research papers

Submitted: 10

Fully accepted: 10

23 students trained

56 visits between IRC collaborators

\* as compared with the level of international research collaboration in the prior three years.

With whom were these international research collaborations conducted?

Number of respondents reporting international research collaborations with:

Faculty at other universities: 52

Post doctoral researcher: 16

Graduate students: 10

Undergraduate students: 0

Industry: 7

Other agencies: 9

Research outcomes with collaborators in home country that resulted from connections made or information received at WIRES1

Number of research proposals

Written and submitted: 43

Funded: 16

Number of research papers

Submitted: 10

Fully accepted: 5

22 students trained

37 visits between research collaborators within the same country

With whom were these "in home country" research collaborations conducted?

Number of respondents reporting "in home country" research collaborations with:

Faculty at other universities: 45

Post doctoral researcher: 10

Graduate students: 9

Undergraduate students: 4

Industry: 5

Other agencies: 6

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

The WIRES summit included 1/2 day workshops as part of the summit. These workshops addressed building the skills needed for advancing an academic career. They included negotiation, how to support fellow faculty, gender equity, global strategies for increased gender equity and skills needed to secure funding for international research collaborations.

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

The results of this grant have been presented in Europe at the European Gender Summit, the ICT 2013 conference and in meetings with personnel of the European Commission and the European Center for Women and Technology (ECWT). They have also been presented in conferences as detailed in the previous annual reports.

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

### Uploaded Files

See supporting files:

None reported

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## Products

### Websites

#### Website 1 of 2

##### WIRES Network Web site

Description:

The current website is being updated to better represent the WIRES Network that is an expansion of the efforts that were supported by this grant. The web site currently contains information about the WIRES 2009 and WIRES 2011 conferences, including the participant directory. It also contains the reports for the WIRES research and for the evaluation of the WIRES summits.

#### Website 2 of 2

##### WIRES Network Research Discussion Participants

Description:

This is a prezi that was developed to house the information about the researchers involved in the WIRES Network On-Line Research Discussions. The on-line discussions provide an opportunity for researchers to find collaborators with complementary expertise and skills.

### Other Products

#### Other Product 1 of 1

Product Type:

Other: Slide Template

Description:

The WIRES On-line Research Discussion template was designed to enable many researchers to quickly share their research interests, expertise, and laboratory facilities and equipment. Additionally, they use the template to let the other participants know something about their personal interests and hobbies. See the appendix for an example of the slides used for the On-line Research Discussions.

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### Uploaded Files

See supporting files:

#### File 1 of 1:

File Name: WIRENetworkDescriptionSlides.pdf

Description: WIRES Network (pg 1), a sample WIRES Network Prezi (pg 2-6) for the On-Line research discussions, the introduction slides used for the on-line discussions(pg7-10), the WIRES Network on-line discussion template (pg 11-12), and an example of the on-line di

## Participants

### Research Experience for Undergraduates (REU) funding

What individuals have worked on the project?

Name	Most Senior Project Role	Email Address	Nearest Person Month Worked
Ji-Young Yun	Graduate Student	<a href="mailto:jiyyun@gmail.com">jiyyun@gmail.com</a>	3
Holly Jean Brown	Graduate Student	<a href="mailto:brown.hollyj@gmail.com">brown.hollyj@gmail.com</a>	3
Jillian Morn	Graduate Student	<a href="mailto:jpilch3@gatech.edu">jpilch3@gatech.edu</a>	3
Diana Roldan	Graduate Student	<a href="mailto:dmrr6@gatech.edu">dmrr6@gatech.edu</a>	5
Mary L Realff	PD/PI	<a href="mailto:mr37@mail.gatech.edu">mr37@mail.gatech.edu</a>	2
Mary F Fox	Co-PD/PI	<a href="mailto:mary.fox@pubpolicy.gatech.edu">mary.fox@pubpolicy.gatech.edu</a>	2
Carol Colatrella	Co-PD/PI	<a href="mailto:carol.colatrella@lcc.gatech.edu">carol.colatrella@lcc.gatech.edu</a>	1

#### Participant 1 of 7

<b>Ji-Young Yun , <a href="mailto:jiyyun@gmail.com">jiyyun@gmail.com</a></b>	
Nearest Persons Months Worked:	3
Funding Support:	This Grant.
International Country(ies) of Collaboration:	N/A
Foreign Travel:	N/A
REU: Year of Schooling Completed:	
REU: Home Institution:	
REU: Government Fiscal Year(s) Participant was Supported:	
Contribution: This graduate student worked on analyzing the results of the WIRES research survey. They generated tables, charts and plots of the survey results and contributed to an article about these results that will be submitted to a referred journal.	

#### Participant 2 of 7

<b>Holly Jean Brown , <a href="mailto:brown.hollyj@gmail.com">brown.hollyj@gmail.com</a></b>	
Nearest Persons Months Worked:	3
Funding Support:	This NSF Grant
International Country(ies) of Collaboration:	N/A

Foreign Travel:	N/A
REU: Year of Schooling Completed:	
REU: Home Institution:	
REU: Government Fiscal Year(s) Participant was Supported:	
Contribution: This graduate student worked on analyzing the results of the WIRES research survey. They generated tables, charts and plots of the survey results and contributed to an article about these results that will be submitted to a referred journal.	

### Participant 3 of 7

<b>Jillian Morn , <a href="mailto:jpilch3@gatech.edu">jpilch3@gatech.edu</a></b>	
Nearest Persons Months Worked:	3
Funding Support:	Georgia Tech Center for the Study of Women, Science and Technology (WST)
International Country(ies) of Collaboration:	N/A
Foreign Travel:	N/A
REU: Year of Schooling Completed:	
REU: Home Institution:	
REU: Government Fiscal Year(s) Participant was Supported:	
Contribution: Collaboration in coding, building data-set of respondents to three surveys, creating graphics to represent data.	

### Participant 4 of 7

<b>Diana Roldan , <a href="mailto:dmrr6@gatech.edu">dmrr6@gatech.edu</a></b>	
Nearest Persons Months Worked:	5
Funding Support:	This grant.
International Country(ies) of Collaboration:	N/A
Foreign Travel:	N/A
REU: Year of Schooling Completed:	
REU: Home Institution:	

REU: Government Fiscal  
Year(s) Participant was  
Supported:

Contribution: Collaborated in coding of data from survey; and building data set for three surveys of respondents to WIRES surveys.

#### Participant 5 of 7

**Mary L Realf** , [mr37@mail.gatech.edu](mailto:mr37@mail.gatech.edu)

Nearest Persons Months  
Worked: 2

Funding Support: During the past year, Georgia Tech has supported her effort through support of the Center for the Study of Women, Science and Technology.

International Country(ies)  
of Collaboration: NLD

Foreign Travel: LTU: 0 yrs, 0 mos, 8 days  
BEL: 0 yrs, 0 mos, 6 days

REU: Year of Schooling  
Completed:

REU: Home Institution:

REU: Government Fiscal  
Year(s) Participant was  
Supported:

Contribution: Mary Lynn Realf coordinates the project and leads the on-line research discussion groups. She leads the strategic planning efforts for WIRES and is in contact with the European Center for Women and Technology (ECWT) - our partner - regularly.

#### Participant 6 of 7

**Mary F Fox** , [mary.fox@pubpolicy.gatech.edu](mailto:mary.fox@pubpolicy.gatech.edu)

Nearest Persons Months  
Worked: 2

Funding Support: The Georgia Tech Center for the Study of Women, Science and Technology supports Dr. Fox's involvement in WIRES.

International Country(ies)  
of Collaboration: NOR

Foreign Travel: N/A

REU: Year of Schooling  
Completed:

REU: Home Institution:

REU: Government Fiscal  
Year(s) Participant was  
Supported:

Contribution: Dr. Fox leads the WIRES research effort and supervises the graduate students involved in the research. She is also the main contributor the journal article that presents the WIRES research.

**Participant 7 of 7**

<b>Carol Colatrella , <a href="mailto:carol.colatrella@lcc.gatech.edu">carol.colatrella@lcc.gatech.edu</a></b>	
Nearest Persons Months Worked:	1
Funding Support:	Funding for Dr. Colatrella's involvement in WIRES is provided by the Georgia Tech Center for the Study of Women, Science and Technology.
International Country(ies) of Collaboration:	N/A
Foreign Travel:	N/A
REU: Year of Schooling Completed:	
REU: Home Institution:	
REU: Government Fiscal Year(s) Participant was Supported:	
Contribution: Dr. Colatrella is involved in the outreach efforts of the WIRES grant. She helps coordinate the Girls Excelling in Math and Science (GEMS) at Samuel Inman Middle School.	

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

Name	Location	Type of Partner Organization
European Center for Women and Technology	Norway	Non-profit
The Ohio State University	Ohio, USA	Academic
ASME Foundation	New York, USA	Non-profit
The European Commission	Belgium	State/Local

**Organization 1 of 4**

<b>European Center for Women and Technology, Norway, Non-profit</b>	
Partner's Contribution to the Project:	Financial In-kind Support Other Contribution: Helped generate funds from other sources
The European Center for Women and Technology (ECWT) is a partner for WIRES Network and WIRES 3 that will be held in Norway in June 2014. They have met via SKYPE calls and in-person meetings with Realf and Juhas to plan for WIRES3 and to build a strategic plan for the WIRES Network. They have gained support for WIRES from non-US-based academics, non-Governmental and Governmental units.	

#### Organization 2 of 4

##### The Ohio State University, Ohio, USA, Academic

Partner's Contribution to the Project: Financial Collaborative Research

The college of Engineering at The Ohio State University partnered with WIRES by donating \$5000 to cover the cost of the Dean's Banquet and other expenses at the WIRES2 summit. Dr. Mary Juhas is the co-chair for WIRES3 and has helped expand the WIRES Network.

#### Organization 3 of 4

##### ASME Foundation, New York, USA, Non-profit

Partner's Contribution to the Project: Financial

The ASME Foundation supported the WIRES summits by donating \$15,000 of funds to cover some of the costs of the WIRES2 opening reception. They also helped recruit participants for WIRES.

#### Organization 4 of 4

##### The European Commission, Belgium, State/Local

Partner's Contribution to the Project: Other Contribution: Helped recruit participants for WIRES

The European Commission partnered with WIRES Network by helping with recruitment of non-US participants. They also included WIRES in the European Gender Summit held in Brussels. WIRES posters were presented and some WIRES results were presented by NSF staff.

Have other collaborators or contacts been involved? NO

## Impacts

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

We have developed tools to enable researchers to find collaborators and to find research funding for international research collaborations. These were the two things that were identified as the biggest barriers to engaging in international research collaborations (based on our research). We have developed templates and a method for conducting on-line research discussions as well as a template for a unique poster format that enables researchers to find collaborators. These tools are available at our web site.

### What is the impact on other disciplines?

A range of disciplines have been involved in the WIRES Network. All of these disciplines have benefitted from the WIRES Network. The research discussion topics and WIRES summit topics include: sustainable energy, water, providing sustainable health care, information technology and cyber safety, improving and making urban infrastructure sustainable, nanotechnology, gender and learning, wind energy, the grid, materials, and biomedical engineering.

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

This program has enabled many Associate Professor female faculty to engage in international research collaborations. Our research has shown that international reputation is a key career component to enable promotion to Full Professor. The inclusion of other researchers: graduate students, post-docs, Assistant Professor, Full Professor and industrial researchers has contributed to their career growth as well.



**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?**

By information resources, we mean technologies, resources, and services to support learning, research, and business operations. They include relevant, sustainable, innovative, and cost effective technology solutions and resources. The information resources that were developed in this grant include utilizing "Go-To-Meeting" and an innovative format in the on-line research discussions, utilizing "Prezi" to collect and access information about the participants in the WIRES network, and development of a web site that is the hub of the WIRES Network (note that at the time of this report, the web site is being renovated).

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

One of the key topics for WIRES3 will be innovation and technology to market/entrepreneurship. This should help female researchers engage in these endeavors.

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

Engagement of industry has enabled the WIRES Network to have a larger impact. For example, about 20 Hewlett Packard female engineers engaged in research discussions as part of the WIRES summit in Spain. Other industry researchers have been speakers at the WIRES summits and have engaged in the on-line research discussions.

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**Changes**

**Changes in approach and reasons for change**

We have expanded this work to a "WIRES Network" with activities that include on-line research discussions and other ways to connect potential collaborators.

**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