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Preview of Award 1241413 - Annual Project Report

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Federal Agency and Organization Element to Which Report is Submitted:	4900
Federal Grant or Other Identifying Number Assigned by Agency:	1241413
Project Title:	CRPA: Antarctic Quest: Racing to Understand a Changing Ocean
PD/PI Name:	Oscar Schofield, Principal Investigator Dena K Seidel, Co-Principal Investigator
Recipient Organization:	Rutgers University New Brunswick
Project/Grant Period:	10/15/2012 - 03/31/2015
Reporting Period:	10/01/2013 - 09/30/2014
Submitting Official (if other than PD\PI):	Oscar Schofield Principal Investigator
Submission Date:	11/11/2014
Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	Oscar Schofield

Accomplishments

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

Antarctic Quest: Racing to Understand a Changing Ocean is a multiplatform participatory documentary project based at Rutgers University and told from the perspective of a dynamic inter-disciplinary research team during their scientific exploration as part of NSF's Long Term Ecological Research Project at Palmer Station (Pal-LTER) in the West Antarctic Peninsula. This story of science adventure will effectively communicate the complexity and immediacy of climate change in a dramatic and visceral way making it extremely suitable for the Informal Science Education (ISE) project category of Connecting Researchers and Public Audiences (CRPA). Using marine scientists as well as innovative new ocean technologies, scientific exploration in extreme environments will be shown to be driven by hypotheses, technological innovation, data collection, analysis and team-work. Public audiences, especially those in grades 6 and up, will be engaged in informal science education through deliverables created by this project: (i) a PBS television hour, (ii) an innovative and interactive online Antarctic Quest community, (iii) three 5 min educational videos for PBS LearningMedia website including links to online bi-directional interactive community and (iv) a digital media library created for a new participatory educational model within NSF's Ocean Observatories Initiative

In order to improve understanding between researchers and those outside academia this project includes training the next generation of science documentary filmmakers. This proposed project combines the innovative science of the Pal-LTER with the educational innovations being developed by the Rutgers Center for Digital Filmmaking. *Antarctic Quest*'s documentary production is based upon a unique educational model in which a diverse group of undergraduate film students are connected to dynamic and important NSF-funded research initiatives through the Rutgers Film Center's Certificate in Digital Filmmaking. In addition to working

on *Antarctic Quest* long form narrative, the 20 undergraduate film students working on the *Antarctic Quest* project will develop a large library of short digital videos illustrating natural processes that will support and enhance the NSF-funded Education and Publication Engagement online software tools designed for Earth science educators within the NSF OOI program. Several aspects of the scientific expedition will be shared via bi-directional online media (social networks, blogs, live questions/answers) throughout this project. This innovative model, joining researchers and filmmaking programs, is designed to be applicable for future scientific story-telling collaborations.

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

Major Activities:

This CRPA proposal, *Antarctica: Beyond the Ice,* had three main overarching goals: (i) to promote STEM knowledge about the world's oceans and climate change, (ii) to communicate the team-work, excitement and challenges of scientific exploration in extreme environments to general audiences using documentary story-telling and (iii) to develop an innovative undergraduate digital film certificate program dedicated to communicating science stories through documentary film-making. Too often science narratives do not illustrate the excitement, challenges and passion required for research. Using character driven storytelling that includes each scientist's personal path to becoming a scientist, NSF researchers will be seen as compassionate, real people on a journey of exploration. The Rutgers Film Bureau takes the time to develop relationships of trust with world-renowned scientists searching for answers to large problems relevant to all peoples. By developing this trust, the Rutgers Film Bureau gains intimate access to the scientific process, not simply in the form of facts and data but as a mode of experimentation, discovery and understanding. Rutgers storytelling approach provides an opportunity for ISE to leverage its considerable investment in the NSF funded Pal-LTER science project with the goal to advance the public's environmental literacy.

The main informal science **educational goal** of this project is to communicate and raise awareness of the changes being observed in the world's oceans by illustrating how small changes in the physical conditions of the West Antarctic Peninsula (WAP) can have profound impact on marine ecosystems and potentially the entire ocean system. The final film project highlight the importance of innovative new technologies that are revolutionizing research methods. Additionally, our film successfully documents the importance of scientific collaboration to understand a complex interdisciplinary problem and the challenges of working in extreme ocean environments demonstrating how science requires teamwork, passion and creativity. The film's narrative provide a compelling story to help the general public understand that environmental changes in the world's oceans present fundamental challenges for the next generation. The film's inclusion of personal motivations, excitement and adventure is deliberate and intended to inspire younger audiences to pursue careers in science and engineering. By highlighting a diverse group of scientists and the excitement of working in the field our film subverts the stereotypical image of an aging male scientist in the lab (Laursen, 2011; Finson, 2002) The story of NSF's Long-term Research Project at Palmer (Pal-LTER) accomplished these goals by emphasizing the following scientific themes:

Specific Objectives:

a) Develop a compelling feature length about the science of the LTER to introduce general public to the concepts of climate change

b) Engage Film and Art students in the issues assoociated with the climate change by providing the science basis to aprovide them a basis for helping develop the narrative associated with short and feature length films

c) Assess the effectiveness of this education model to engage non-STEM students in the understanding the science method-science findings. The goal is to motivate them to become engaged in these issues

d) Develop short length video clips that can be effectively used by instructors

Significant Results:

From late December 2012-February 2013, director Dena Seidel and cinematographer Chris Linder travelled as a 2 person documentary crew with Oscar Schofield to Antarctica as part of the Pal- LTER team.

Using state-of-the-art, high definition video cameras with full 35 mm sensors, underwater housing and multiple flash memory drives and external hard drives to store the hundreds of anticipated hours of video and audio captured, both Seidel and Linder videotaped and interviewed the interdisciplinary research team for 2 months during the Antarctic expedition. Upon returning to Rutgers Film Bureau in February of 2013, Dena Seidel brought the footage immediately into the classroom to begin the post-production of *Antarctica: Beyond the Ice.* Fourteen undergraduates were selected to work on *Antarctica: Beyond the Ice* transcribing and assembling the media shot in Antarctica. http://beyondtheice.rutgers.edu/film-students/

As part of grant, professor Oscar Schofield came to RCDF four times to lecture film students on climate science and the Antarctic. All *Antarctica: Beyond the Ice* film students contributed to a blog describing what they learned while working on this feature length climate change story including their lectures with Schofield go to http://beyondtheice.rutgers.edu/blog/.

The short videos and full length film has been developed, and currently is being bid to a company that will be planning a theatrical release for Spring 2015.

The short (3-5 minutes) videos has been used in undergraduate teaching of oceanography students by Dr. Schofield. The video clips has been used to illustrate key ocean technologies. The video clips have been used in the Rutgers Oceanography House (freshmen introductory course) as well as Ocean Methods and Data Analysis.

Key outcomes or Other achievements:

1. We successfully produced a 73 minute feature length science-in-action documentary film that articulated the research of the Pal LTER's quest to understand the impact of climate change on the marine ecosystems of the WAP while involving university students in the filmmaking process.

3. We delivered Three 5 minute educational videos constructed from *Antarctic Quest* material to PBS LearningMedia

4. Created an ***Antarctica: Beyond the Ice*** website featuring students' responses to working with scientists and documentary footage. Each student created a blog entry describing what they learned. Students were also videotaped explaining how they learned science through filmmaking. http://beyondtheice.rutgers.edu

5. We trained film students as science communicators and inspired film students to learn science through filmmaking and direct engagement with scientists.

7. We gathering important research data on the ability for a film center to be an informal science education platform for art student previously disinterested in science.

8. We provided detailed formation in a story form about climate change research in Antarctica that will reach a national audience.

9. An NSF news article *"NSF-Supported Antarctic Science Documentary is Also a Teaching Tool for Aspiring Film Students"* is at: **http://www.nsf.gov/news/news_summ.jsp?cntn_id=128123**

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

We assessed the success of how the data on how non-science students learn science through direct engagement. The internal evaluator, Dr.Mary Nucci, assistant research professor in the Department of Human Ecology, interviewed all 12 students working on the *Antarctica* documentary as well as seven other undergraduates who had worked on other science documentaries in the Rutgers Film Bureau (19 students total). All students but one said that working on science documentaries had sparked their interest in science by showing them that everything relates to science; they can see themselves as possible scientists and through the creation of documentaries featuring scientists, the film students are now able to understand how scientists see the world. Many students interviewed commented that prior to working on science documentaries in the Rutgers Film Bureau they were scared of science and didn't think they were "smart" enough to be scientists. The experience of hands-on filmmaking and meeting scientists showed them that science was accessible and interesting and that one didn't have to be a scientist to be engaged and interested in science. They found that scientists were "normal" people like themselves; that they were funny and passionate and creative and that "science [was] much cooler than I thought." The experience of *Antarctica: Beyond the Ice* encouraged students to see science in a new way—as a cooperative, passionate, people-driven experience, and that communicating science and teaching science should provide connections to everyday life. See videotaped interviews of undergrads describing what they learned working with scientists to make science documentaries here:

*** How have the results been disseminated to communities of interest? If so, please provide details.**

Completed videos has been delivered and used by undergraduate teachers as well as being delivered to PBS learning media and was highlighted by the NSF article.

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

In the coming year we are going to theatrically release the feature film. We also plan to continue to develop the short videos to form a basis of library that will be made available to the teaching community. The distribution will be faciltated by the web-based resources available through the Center of Ocean Observing Leadership (COOL).

Products

Books

Book Chapters

Inventions

Journals or Juried Conference Papers

Licenses

Other Conference Presentations / Papers
O. Schofield (2013). *Hot days along the West Antarctic Peninsula*. Texas A&M Corpus Christi, Distinguished Lecture Series. Texas. Status = OTHER; Acknowledgement of Federal Support = No

O. Schofield (2012). *Hot days in West Antarctic Peninsula and its impact on the marine ecosystem*. Rutgers Ecology and Evolution Seminar Series. Rutgers University. Status = OTHER; Acknowledgement of Federal Support = Yes

O. Schofield (2014). *Hot days in the Southern Ocean*. Seminar at MBARI. Monterey, California. Status = OTHER; Acknowledgement of Federal Support = Yes

Other Products

Other Publications

Patent Applications

Technologies or Techniques

Thesis/Dissertations

Websites or Other Internet Sites
Antarctica: Beyond the Ice
http://beyondtheice.rutgers.edu

Home website for the porject

Participants/Organizations

What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Schofield, Oscar	PD/PI	1
Seidel, Dena	Co PD/PI	6
Nucci, Mary	Co-Investigator	2
Kinder, Chris	Other Professional	1
Holloway, Steve	Technician	6

Full details of individuals who have worked on the project:

Oscar Schofield
Email: oscar@marine.rutgers.edu
Most Senior Project Role: PD/PI
Nearest Person Month Worked: 1

Contribution to the Project: Science teacher to the art students Narration of the feature film Featured scientist in the film

Funding Support: NSF, NOAA, State of New Jersey

International Collaboration: No
International Travel: Yes, New Zealand - 0 years, 0 months, 3 days; Korea, Democratic People's Republic Of - 0 years, 0 months, 3 days

Dena K Seidel
Email: denaseidel@masongross.rutgers.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 6

Contribution to the Project: The Film instructor Developer of the feature film

Funding Support: NSF, State of New Jersey

International Collaboration: No
International Travel: No

Mary Nucci
Email: mnucci@rci.rutgers.edu
Most Senior Project Role: Co-Investigator
Nearest Person Month Worked: 2

Contribution to the Project: She is conducting the evaluation of the education effort for this project

Funding Support: This project and Rutgers University

International Collaboration: No
International Travel: No

Chris Kinder
Email: chris@chrislinder.com

Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Chris was part of the film crew that took part in the field expedition in Antarctica

Funding Support: This project

International Collaboration: No
International Travel: No

Steve Holloway
Email: holloways4@gmail.com
Most Senior Project Role: Technician
Nearest Person Month Worked: 6

Contribution to the Project: He is the Film Editor

Funding Support: this project

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?

YES

Impacts

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

There have been several impacts and benefits from this project:

A) The pedalogical model of having scientist provide a STEM foundation to Art and Film students that then allows them to develop materials/film that prmotes understanding of the sciences is unique. We assessed the success of how the data on how non-science students learn science through direct engagement. The internal evaluator, Dr.Mary Nucci, assistant research professor in the Department of Human Ecology, interviewed all 12 students working on the *Antarctica* documentary as well as seven other undergraduates who had worked on other science documentaries in the Rutgers Film Bureau (19 students total). All students

but one said that working on science documentaries had sparked their interest in science by showing them that everything relates to science; they can see themselves as possible scientists and through the creation of documentaries featuring scientists, the film students are now able to understand how scientists see the world. Many students interviewed commented that prior to working on science documentaries in the Rutgers Film Bureau they were scared of science and didn't think they were "smart" enough to be scientists. The experience of hands-on filmmaking and meeting scientists showed them that science was accessible and interesting and that one didn't have to be a scientist to be engaged and interested in science. They found that scientists were "normal" people like themselves; that they were funny and passionate and creative and that "science [was] much cooler than I thought." The experience of *Antarctica: Beyond the Ice* encouraged students to see science in a new way—as a cooperative, passionate, people-driven experience, and that communicating science and teaching science should provide connections to everyday life.

B) For science faculty, this provides a learning opportunity for the faculty. Working through the creation of the video products with the Film developers, effectively provides narrative training for the faculty. Too often, scientists have difficulty in makig the complex science issues accessible to general public. This model provides training opportunity that directly supports the faculty science mission. It is rare for faculty to take the time for the training given the many constraints on their time, As a lead scientist, Dr. Schofield has definitely benefitted from this process. This benefit has been noticed by other faculty who hope to also follow this model.

What is the impact on other disciplines?

The unique partnership between marine scientists and artists in the Film studies program has been valuable by facutly in other Departments. This model is now being used with sceince faculty (Departments of Ecology and Evolution, Environmental Sciences, and Food Science) and Mason Gross School of Art. We expect this interest to increase dramatically when the Antarctic feature film is released.

What is the impact on the development of human resources?

All scientists involved in the development of the film and video tasks were provided hands-on training in narration working with the staff from the Msson Gross School of Arts.

A second important impact is the training of young science filmmaker who represent the future of the science communication through direct engagement with scienitsts. We successfully recruited undergraduate students from under-represented groups to work on this porject. Students learn valuable new skills including digital filmmaking communication of complex scientific concepts. Training former student Steve Holloway, co-producer of Antarcitca Beyond the ICe so that he ready to buldiing infrastructure of science filmmaking program and training of Karina Daves in NSF grant management.

What is the impact on physical resources that form infrastructure?
Nothing to report.

What is the impact on institutional resources that form infrastructure?

This program has been critical in developing a formal relatationsip building between Art and Science schools and data from the work is being used to build the nations first undergraduate science filmmaking program.

What is the impact on information resources that form infrastructure?

Collaboration between Art and Science schools with the major research programs within the university is providing a model to developing sustainable model for training next generation of science communicators.

What is the impact on technology transfer?

Students were trained in long form documentary film editing and storytelling and advanced their technical proficiency to shape science based research digital narratives.

What is the impact on society beyond science and technology?

This program will be critcal assessing the potential in Building a degree program – connecting art and science. The successes of the project so far we argue will enable develop new pedagogies.

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.

Special Requirements

Responses to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.
Nothing to report.