Art in Science Promoting Interest in Research and Exploration (ASPIRE)

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Abstract. Led by U.C. Berkeley’s Center for Science Education at the Space Sciences Laboratory in partnership with U.C. Berkeley Astronomy, the Lawrence Hall of Science, and the YMCA of the Central Bay Area, Art in Science Promoting Interest in Research and Exploration (ASPIRE) is a NASA EPOESS-funded program mainly for high school students that explores NASA science through art and highlights the need for and uses of art and visualizations in science. ASPIRE’s aim is to motivate more diverse young people (especially African Americans) to learn about Science, Technology, Engineering, and Mathematics (STEM) topics and careers, via 1) Intensive summer workshops; 2) Drop-in after school workshops; 3) Astronomy visualization-focused outreach programming at public venues including a series of free star parties where the students help run the events; and 5) A website and a number of social networking strategies that highlight our youth’s artwork.

1. Introduction

Led by U.C. Berkeley’s Center for Science Education at the Space Sciences Laboratory in partnership with U.C. Berkeley Astronomy, the Lawrence Hall of Science, and the YMCA of the Central Bay Area, Art in Science Promoting Interest in Research and Exploration (ASPIRE) is a NASA EPOESS-funded program mainly for high school students that explores NASA science through art and highlights the need for and uses of art and visualizations in science. ASPIRE’s aim is to motivate more diverse young people (especially African Americans) to learn about Science, Technology, Engineering, and Mathematics (STEM) topics and careers. This paper highlights some of our activities and accomplishments to date, including our initial evaluation and feedback.
2. **Name Changes**

The first activities that occurred during this program were a couple of name changes. First, the Center for Science Education at the U.C. Berkeley’s Space Sciences Laboratory changed their name to Multiverse.¹

After considering the initial feedback from our program participants, we noticed that our original name did not seem to gain much traction with high school students nor did it describe the purpose of the program very well. With the help of our early program participants, we settled on a new name: NASA Opportunities in Visualization, Art, and Science or NOVAS. The new NOVAS name has since done a far better job of getting youth to understand the purpose of our program.

3. **Summer Workshops**

These workshops take place each summer for six to seven hours a day, three days a week for three weeks. Our summer workshops are held at local youth centers such as the YMCA-PG&E Teen Center in Berkeley, California,² and more recently at the RYSE Youth Center in Richmond, California.³ Each workshop session focuses on one science and/or engineering design concept, and then explores that concept through art and/or multimedia projects and real-world examples of visualizations connections on the topic. There is also often a continuity of science themes throughout sessions; for example, from supernova to elements to planet formation to the search for life. Art and visualization techniques and tools used by students span a wide spectrum and include: painting, sculpture, drawing, CAD, 3D printing, green screen filming, stop motion animation, video editing, and sound recording. Students always have a chance to present their artworks and digital creations at the end of each session. Each summer workshop also includes at least two daylong field trips, and has thus far included visits to U.C. Berkeley, the Exploratorium, NASA Ames Research Center, and Chabot Space & Science Center.

4. **After School Workshops**

Each spring, NOVAS offers after school programs through partnerships with community centers and high schools. More recently we’ve been offering these workshops at REALM Charter School in Berkeley, California.⁴ These sessions are far less intensive than our summer workshop offerings, but allow us to test new program ideas. For example, in May 2014, we incorporated aspects of the Maker Movement into a project at REALM that had all students working together to launch a high altitude balloon to the edge of space. Students were assigned to three main teams for the project: building and launching, public relations and 3D mission patch design and printing, and documentary filming and video editing.

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¹[http://multiverse.ssl.berkeley.edu](http://multiverse.ssl.berkeley.edu)


³[http://www.rysecenter.org](http://www.rysecenter.org)

⁴[http://www.realmcharterschool.org](http://www.realmcharterschool.org)
5. Internship and Community Outreach

After participating in one of our workshops, students are invited to become NOVAS interns. Interns get more in-depth scientific illustration and visualization training, and assist the NOVAS team with community outreach programming, such as running star parties at local high schools. For this effort, we train our interns how to operate telescopes and run hands-on activities. Interns thus far have helped us with three star parties, a family day at the California Academy of Sciences, two “Teen Science Nights” at local science museums, and presented their artworks at two U.C. Berkeley special art and science gallery exhibitions.

6. Website

The NOVAS website is http://www.nasanovas.org. We use the NOVAS website to showcase the program and participants’ artwork and encourage our participants to contribute content mainly via Instagram. Our website is powered by RebelMouse.

7. Program Evaluation

Evaluation results of NOVAS to date (provided by the Research Group at the Lawrence Hall of Science) have been mostly positive. Overall, summer and after school workshop participants have enjoyed the workshops and field trips and have felt that their expectations for the program were met. Even participants who started the program with a strong interest and self-confidence in science and/or science visualization indicated that their knowledge, interests, and abilities increased in many ways as a result of participating in NOVAS. Interns have also largely enjoyed the internship experience, though many have asked for even more in-depth training in scientific illustration and/or visualization skills and techniques. Emerging themes from the program evaluation in general are as follows:

- Participants report that they really enjoy the art projects;
- Participants report increased positive attitudes towards science or science visualization;
- Participants report increased interest in science or science visualization;
- In general, it appears that students who may not have an affinity for science can be better engaged in science through art and have fun while learning scientific concepts; and
- Teens who disliked or struggled with science had a better attitude towards and interest in science after participating in NOVAS.

Finally, below are some selected comments from our students, their parents, and their teachers.

“[The program] surpassed my expectations as soon as I walked through the door.”
“It’s a fun program that teaches you about different aspects of astronomy. . . it made my summer.” —NOVAS youth participants.

“Just wanted to thank. . . the whole [ASPIRE team] for a fantastic program. [My son] had an amazing time, learned so much and made friends with a bunch of great kids. We, as parents, were at the receiving end of all the positive energy that you have generated these past few weeks. Thank you for this great experience. Can’t wait for more.” —Parent of a NOVAS youth participant.

“. . . I wanted to let you know that some of the students who are coming to [the workshops] have improved in their classroom grades since starting the program! I think the experience they are having is encouraging them that science and art can be fun, interesting, and educational!” —high school teacher of NOVAS after school participants.

“The whole summer session explained the whole universe more clearly to me than the average school portrayal of the solar system and milky way.” —a NOVAS youth participant.

8. Further Information

For further information, email us at nasa.novas@gmail.com, follow us on Twitter at @nasanovas, and/or join the Bay Area STEAM listserv at http://tinyurl.com/baysteam.

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