

Youth Astronomy Apprenticeship (YAA): An Initiative to Promote Science Learning Among Urban Youth and Their Communities.

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Abstract. We present an out-of-school time initiative that uses an astronomy apprenticeship model to promote science learning among urban youth and their communities.

1. Introduction

YAA is an out-of-school time initiative to foster science learning among urban teenage youth and their communities. The goal of YAA is to broaden the awareness of science learning as an effective way of promoting overall youth development and of providing competitive professional opportunities. YAA staff first develop partnerships with professionals at community-based centers to create a mutual understanding of goals and expectations for the program. They then engage high school students in an after-school astronomy training program. After the training is completed, the successful participants become astronomy apprentices who work with educators and other professionals to create astronomy outreach initiatives directed at their own communities. Through the youth's work and their presence among their communities as science ambassadors, we aim to promote involvement and support for science learning among underrepresented communities. YAA is a collaboration with MIT Kavli Institute (MKI), the Smithsonian Astrophysical Observatory (SAO), the Timothy Smith Network (TSN), and the Institute of Learning Innovation (ILI).

2. Youth Astronomy Apprenticeship

2.1. Youth Astronomy Apprenticeship: After-School Program

The YAA after-school program is a 14-week training during which youth engage in astronomy investigations based on images taken with MicroObservatory, a network of robotic telescopes that are controlled via the Internet. Youth learn to use software tools to process astronomical images, and produce reports and presentations about their investigations. In the process, youth develop important skills, including logical reasoning, inquiry, completing self-directed tasks, oral and written communication, and collaboration. At the end of this training program, a group of youth is chosen to participate in a summer apprenticeship at MIT, the core element of the YAA model.

2.1.1 Partnerships

Community-Based Organizations: After-school sites that host the program serve a significant function in both recruiting participants and ensuring effective administration. Four centers from the TSN served as partners for the first year of the program: the Roxbury Multi-Service Center, Inc., Urban League of Eastern Massachusetts, Dimock Community Health Center, and Tobin/Mission Hill Community Center.

MicroObservatory: Urban teens can make actual astronomical observations thanks to this network of four automated telescopes that can be controlled over the Internet. MicroObservatory was developed by a team in the science education department at SAO. The project is funded by NSF with support from NASA.

2.2. Youth Astronomy Apprenticeship: Summer Program

The objective of the YAA summer program is for youth apprentices to create a portfolio of astronomy outreach projects that they will present to audiences in their communities over the following school year. During the summer program apprentices are exposed to a variety of astronomy content as they also practice some of the professional skills necessary to complete an outreach project of their choice. In the summer of 2007, YAA youth were mentored by researchers from MIT and SAO, amateur astronomers, by professionals in museum exhibit development and in the performing arts. In August 2007, YAA apprentices presented to the public their first outreach event, “Party Like an Astronomer” that featured three remarkable projects.

2.2.1 Outreach Projects

Telescope Activities: Mentored by members of the Amateur Telescope Makers of Boston our apprentices created interactive activities that describe the ‘guts’ of a telescope, used lasers to show how a telescope focuses light, and explained magnification, showing that bigger is not always better. These activities will primarily be presented at star parties organized by the apprentices and amateur astronomers.

Black Hole Exhibit: Apprentices worked with museum professionals to develop prototypes for a black hole exhibit opening at the Boston Museum of Science in 2009. One component has young visitors learn that there are black holes of different mass, another helps visitors explore some of the media’s interpretations of black holes and in the third, a fun animation explains to visitors how black holes are formed.

Astronomy Theater: Apprentices worked with professionals from the performing arts to write, produce, and perform a play based on the life cycle of stars. In bringing together art and science, the astronomy content came to life for an audience of all ages, and engaged scientists and non-scientists alike. The theater group is eager to tour the greater Boston area with the play.

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