



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

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The Youth Astronomy Apprenticeship (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 leading to competitive professional opportunities.

Collaborations

YAA is a program by the MIT Kavli Institute for Astrophysics and Space Research in collaboration with the Smithsonian Astrophysical Observatory, the Timothy Smith Network, and the Institute of Learning Innovation. Community partners that hosted YAA after-school programs over the last two years: Roxbury Multi-Service Center, Inc., Urban League of Eastern Massachusetts, Dimock Community Health Center, Tobin/Mission Hill Community Center, Upward Bound Program at the Roxbury Community College, Hispanic Office of Planning and Evaluation (HOPE), Vine Street Community Center, Inquilinos Boricuas en Acción (IBA).

Rationale and Impact

- For science learning to have a lasting impact on the life of a teen-age youth, it has to be integrated with the youth's personal development process so to be fully owned by the learner.

The main impact for YAA is to empower teens to develop new science understanding as they develop personal and interpersonal skills needed to fully participate in the life of our society.

- As we consider populations historically underrepresented in science, we understand that in order to encourage and support youth to pursue STEM learning and eventually STEM career paths, it is important to foster an environment that supports the same goals.

YAA additional impact is to engage all YAA audiences (families, other teens, members of community-based organizations) in some science learning experiences through the community outreach work presented by the youth apprentices who graduate from YAA.

- As urban teenagers, YAA participants are able to communicate to their peers - and other members of their communities - a message about the value of science literacy that is much more effective than that the traditional science outreach establishment could provide.

YAA additional impact is to foster the role of urban youth as science ambassadors and as advocates for increased opportunities for science learning among underrepresented communities.

Youth Astronomy Apprenticeship Program

By weaving together science learning and the practice of skills needed in a range of different professions, YAA aims to help youth develop a strong sense of ownership of their work and to make them attentive to and responsible for the quality of the science presentations they offer during their outreach events.

The YAA program progressively develops youth's science knowledge and 21st century employable skills through several stages:

After-School Program - Youth engage in astronomy investigations, take astronomical images using robotic telescopes they can operate via the Internet, learn to use software tools to process astronomical images, and produce reports and presentations about their investigations. The after-school sessions take place at local community-based organizations.

Summer Apprenticeship Program - Youth that complete the after-school program are eligible for a paid position with the YAA apprenticeship program that takes place at MIT. Because the summer program is an actual apprenticeship, YAA is committed to bringing to the program professionals from a variety of fields to train and work with the YAA apprentices. Youth benefits from the expertise provided by:

- Scientists and science educators from MIT and Harvard
- Members of the Underground Railway Theater - a local theater company
- Staff from Jeff Kennedy Associates - a museum exhibition design and planning company
- The director of ThinkCollaborative - a local marketing and advertising company.

With the support of many local professionals, YAA apprentices

- Write, produce and perform science/astronomy plays
- Design and facilitate activities to introduce a lay audience to the use of the telescope
- Create components for professional museum exhibits
- Create and run planetarium shows that they perform at various venues using a portable planetarium
- Create a promotional campaign for their community outreach events and to recruit new participants.

Community Outreach Events: Youth as Science Ambassadors - By the end of the summer apprenticeship, YAA youth are ready to present their science/astronomy performances at various venues in their communities across the city. In 2007-2008 YAA performances reached out to an estimated 750 people, both at local ("Astronomy in the City" at Hibernian Hall) and national events (AAAS conference).

Youth Assistant Program: Youth as Agents of Change - At the end of the summer apprenticeship some of the youth are willing to take on a major role in the YAA program itself and join MKI staff to work as youth assistants for the YAA after-school programs.

With additional training and under the mentorship of YAA staff, youth are gradually empowered to share their learning and passion for science with other youth. As they grow in their roles, youth realize the challenges involved in facilitating somebody else's learning experience. With surprise, they also find themselves being identified as role models: These young ambassadors of science can prove to their peers that – contrary to a widespread teenage urban culture - to engage in science activities - in and outside of the classroom - is actually "OK," and that it can be a rewarding and exhilarating experience.

An Example of YAA Positive Impact

Heleno is a rising senior at the Jeremiah E. Burke High School in Dorchester. His mother and 4 brothers moved to Boston from Cape Verde a few years ago. When Heleno joined YAA in 2007 he had very basic computer skills but a great interest in science. He attended the after-school program, became a YAA apprentice and then a YAA assistant. His communication and critical thinking skills improved greatly as he discovered his passion for astronomy and even joined a local amateur astronomers club. Under the mentorship of the director of YAA, Heleno worked on an astronomy project for the 2007-08 science fair: in May 2008 he won one of the MA State Science Fair first prizes, the Apollo Award awarded by the Massachusetts Space Grant and a \$20,000 scholarship for UMass Amherst. This was indeed a life changing experience for Heleno whose family would not be able to financially support him in college.

Demographics

Over three years, the YAA program recruited 178 youth (49% boys and 51% girls) with a retention rate of 54% (52% for boys and 54% for girls). In three years 71 YAA apprentices worked at MIT in the summer, and 17 became YAA assistants: 100% of the assistants returned to the YAA summer apprenticeship the following summer. Of the 178 youth that joined the program so far 95% are from populations historically underrepresented in STEM. The ethnic groups with the largest number of participants so far are: African-American (40%), Hispanic (25%), Cape Verdean (11.5%) and Somali (4%).

For more information on *Youth Astronomy Apprenticeship*, visit our web site at <http://yaa.mit.edu> or contact Dr. Irene Porro, Director, at iporro@mit.edu or 617-258-7481