

G-HOU in the IYA2009

Rosa Doran¹, Roger Ferlet² & Carl Pennypacker³

¹ NUCLIO — Núcleo Interactivo de Astronomia / Global Hands-on Universe
(rosa.doran@nuclio.pt)

² Institut d'Astrophysique de Paris, CNRS/UPMC (ferlet@iap.fr)

³ University of California at Berkeley, Lawrence Hall of Sciences (cpenpacker@lbl.gov)

Abstract

The Global Hands-On Universe¹ started a few years ago with the main purpose of renewing the teaching and learning of science. It gathers teachers, educators, scientists and students in more than 20 countries around the world. Its most successful international effort is EU-HOU, the European Hands-On Universe, which was partly funded by the European Commission in a collaboration of eight European nations. More than 1500 teachers worldwide have already been trained in preliminary programmes. We plan to expand our network to at least 100 nations in seven years. Students regularly undertake science studies after being exposed to our multidisciplinary resources, heavily based on real astronomical data and new technologies. For the IYA2009, we want to begin a global programme fostering the interaction of schools around the globe. Our programme is called “Today I am Galileo — Tomorrow I am Darwin” and involves several activities: historical research, reproduction of Galileo’s observations and extrasolar planetary studies. Our main objective is to promote a deeper, evidence-based understanding of our place in the cosmos.

Introduction

The Global Hands-On Universe (Global HOU) is an international, non-profit association, devoted to Astronomy Education. Its main goal is to reawaken students’ interest for science while building a global community of educators, teachers, scientists and students.

Astronomy is the best tool to promote science culture. Students enrolled in our projects do not only discover the wonders of the Universe through hands-on activities, but also develop many important skills. Skills that will be important in any area of expertise they might follow: critical thinking, global citizenship awareness, multicultural interchange, creativity and leadership, etc. While engaging in Global HOU activities students are exposed to a broad scientific structure and build a sense of belonging to a planetary community.

¹ www.globalhou.net



Alexis Janvier

Figure 1 – Global HOU – Global Hands-on Universe is a worldwide effort of more than 20 countries and intends to be a formal association of 100 nations in 7 years.



Armella Leung / Alexis Janvier

Figure 2 – The European network started with 8 countries. Several tools and resources were made available at the www.euhou.net website.

European Hands-On Universe

The Global Hands-On Universe found its first roots at the University of California at Berkeley and now is being implemented in more than 20 countries. The first subsystem of the Hands-On Universe was created in Europe in a collaboration of eight countries in a project partially funded by the European Commission. Through this project, several resources, using astronomy as a basis to

teach science content, were created. Hundreds of teachers have already been trained in using the multiple tools developed within the scope of this programme. The training of teachers and the creation of a network of schools, nationally and internationally are at the heart of what we do.

Among the tools that have been created there is some powerful, image processing software: "SALSA J", open source software based on "Image J", which is becoming increasingly user-friendly. Other tools that are accessible to teachers enrolling in HOU activities are webcams and optical and radio robotically operated telescopes. This allows students to have a taste of scientific research during regular class hours, while learning regular curriculum content.

Science@Schools

One extra step is to engage students in actual research; with the support of scientists we promote a project we call Science@Schools, where real research is promoted in the classroom. Scientists from different areas of expertise are being invited to adopt one or more schools (at a national or international level) and help engender real scientific research with the students. This initiative is in its early stages, but has already given fruitful results and helps spread key skills acquisition. By engaging students in real scientific quests it also helps to improve their proficiency in handling information and communication tools.

Hunting Open Clusters Around "O" Stars

A scientific project, being developed in 7 Portuguese High Schools, mentored by a professional astronomer and supported by NUCCLIO Project, Initiative in Action, a professional and amateur astronomer association devoted to public outreach and education. The project has the eminent general Faúlke's Telescope, both works supported by the BSA, located in Portugal.

THE SCIENTIST
 José Fariñas is a professional astronomer working at the Observatório Astronómico de Lisboa. He has been working on open star clusters. The "O" stars, named as the stars of the main sequence, are the most massive stars in a cluster. They are the most massive stars in a cluster and they are the most massive stars in a cluster. They are the most massive stars in a cluster and they are the most massive stars in a cluster.

THE PROJECT
 This project will bring together young stars. Because of their very high masses they will have a very short lifetime. The project will be carried out in a way that will allow the students to have a taste of scientific research during regular class hours, while learning regular curriculum content.

THE THRILL OF SCIENTIFIC DISCOVERY
 Students will begin with the discovery of open star clusters. They will be able to observe the stars in a cluster and they will be able to observe the stars in a cluster. They will be able to observe the stars in a cluster and they will be able to observe the stars in a cluster.

THE TEACHER AND THE STUDENTS
 The project is supported by a professional astronomer and a professional and amateur astronomer association. The project is supported by a professional astronomer and a professional and amateur astronomer association.

ACQUIRING KEY SKILLS AND DEVELOPING CRITICAL THINKING
 The main goal of the project is to provide the acquisition of skills. The project is supported by a professional astronomer and a professional and amateur astronomer association.

OBSERVING WITH FAULKE'S TELESCOPE
 The use of the telescope will allow the students to have a taste of scientific research during regular class hours, while learning regular curriculum content.

ATTRACTING MEDIA ATTENTION
 The project is supported by a professional astronomer and a professional and amateur astronomer association. The project is supported by a professional astronomer and a professional and amateur astronomer association.

Substills Project Developed by: **NUCLIO** <http://www.nuclio.pt> With the support of: **BRITISH COUNCIL** **EU-HOU**

Figure 3 – The world of new technologies opened the possibility of a new approach in science teaching. With the help of scientists students can have a taste of real research in the classroom.

Today I am Galileo...Tomorrow I am Darwin

For IYA2009, when we celebrate 400 years of Galilei's observations and 150 years since the publication of Darwin's revolutionary book on evolution, Global HOU is developing a programme that will tackle the important role and impact that these two historical moments had on our lives. The programme is called: "Today I am Galileo...Tomorrow I am Darwin" (TGTD).

The idea is to build a collaboration between schools at a global level, creating a network of at least 50 schools per country, each working with schools in three different countries. We are expecting to have at least 20 countries involved. The main objectives of this programme are in line with IYA2009 guidelines as it will create: collaboration between schools in different countries; support scientific awareness; use of observing tools in real research activities; give participants an idea of how modern science is done, while favouring the use of ICT; reawaken the students' interest in science, but, most important of all, promote a sense of planetary citizenship and help all participants achieve a sense of how fragile life is on this planet.

These activities were designed to tackle issues such as: the stories behind science and scientists; how science is done; the importance of language and arts in science. The main goal being: to increase scientific knowledge and creativity, instigate a multicultural dialogue, give participants a sense of a planetary neighbourhood, and promote discussions on our role in planetary climate change.

Several different challenges will be proposed. Schools can engage in all of them or choose only part of it. The project was also built to be a multidisciplinary quest. Teachers of all disciplines are invited to enrol. Students can engage in different activities and assume the role of scientists, journalists or artists. The tasks for the three roles are given bellow.

Scientists

- Reproduce Galileo's observations and understand their implications for our current model of the Universe.
- Build a world map with satellite images of each participant partner school.
- Build a world map of moon images, at the same moon phase, taken around the globe.
- Build a world map with pictures of a shadow produced by a stick at noon at the equinox.
- Measure solar activity and average temperature in school.
- Monitor extrasolar planets by exploring:
 - extrasolar planet climatology;
 - habitable zones in the Universe;
 - constellations from the skies of an extrasolar planet;
 - Alien Galileo — how to find that the extrasolar planet is not at the centre of the Universe;
 - Alien Darwin — does the extrasolar planet have the necessary conditions to host life?

All science disciplines are invited to participate in this task. Amateur astronomers will be invited to assist with the observations where needed.

Journalists

Handle national and international enquiries on:

- How and when Galileo appeared.
- How and when Darwin appeared.
- How Galileo and Darwin are being celebrated in each country.
- How cosmology evolved in each culture.
- How ideas on life on Earth/in the Solar System/Universe evolved in each nation.
- The future of space exploration and the participation in each country.
- What people in your culture think about life in the Universe.
- What people in your nation think about the future of space exploration.
- What people know about our current model of the Universe:
 - Is the Earth or the Sun at the centre of the Universe?

For this task we suggest the participation of the following disciplines: history, geography, science and languages.

Artists

- Build colour images using image processing software and real astronomical images either acquired by themselves or from a database.
- Drawings of the scientists' observations.
- Alien Van Goghs — how would a starry night look like from an extrasolar planet?

ICT and arts teachers could adopt this task.

To ensure the quality and success of these tasks it is important to have as many members of the community as possible participating. Different areas of expertise are needed to guarantee the desired scope of TGTD: arts, languages, history, geography, physics, chemistry, biology, geology, mathematics, ICT, engineering, journalism etc.

Anyone interested in participating or to giving his or her opinion is welcome.