

## ESA/GTTP Teacher Training Workshop 2010 Programme

The ESA/GTTP Teacher Training Workshop 2010 will be held at the NEMO Science Centre, Amsterdam, the Netherlands, from Tuesday 7 December to Friday 10 December 2010. The programme for the workshop is given below. A description of the individual sessions can be found after the programme.

<b>Tuesday 7 December</b>	
<b>12:00-13:30</b>	<b>Arrival: 12:00 – 12:30</b> <b>Session 1:</b> Welcome by ESA & GTTP and Practical information
<b>13:30-14:30</b>	Lunch
<b>14:30–15:30</b>	<b>Session 2:</b> Keynote address by ESA scientist – The Sun <i>This presentation will provide a context and relevant background information useful during the workshop and beyond.</i>
<b>15:30–16:30</b>	<b>Session 3:</b> GTTP classroom activity - You are Galileo
<b>16:30–17:00</b>	Break
<b>17:00–18:00</b>	<b>Session 4:</b> GTTP classroom activity - Stellarium and Celestia

<b>Wednesday 8 December</b>	
<b>09:00-9:45</b>	<b>Session 5:</b> ESA science education and communication
<b>09:45-10:30</b>	<b>Session 6:</b> ESA Education resources European Space Education Resource Office
<b>10:30-11:00</b>	Break
<b>11:00-13:30</b>	<b>Session 7:</b> GTTP classroom activity - Robotic Telescopes
<b>13:30-14:30</b>	Lunch
<b>14:30–15:30</b>	<b>Session 8:</b> GTTP classroom activity - Make your own Spectroscope
<b>15:30–16:30</b>	<b>Session 9:</b> ESA Science classroom activity
<b>16:30–17:00</b>	Break
<b>17:00–18:00</b>	<b>Session 10:</b> Brainstorming /discussion
<b>18:00-20:00</b>	<b>Drinks reception</b>

<b>Thursday 9 December</b>	
<b>09:00-11:30</b>	<b>Session 11:</b> GTTP classroom activity - SalsaJ
<b>11:30-12:00</b>	Break
<b>12:00-13:30</b>	<b>Session 12:</b> Opportunity to view NEMO science demonstrations
<b>13:30-14:30</b>	Lunch
<b>14:30-16:00</b>	<b>Session 13:</b> ESA science data archives
<b>16:00-16:30</b>	Break
<b>16:30-17:30</b>	<b>Session 13:</b> ESA science data archives
<b>17:30-18:00</b>	<b>Session 14:</b> ESA science data archives – discussion

<b>Friday 10 December</b>	
<b>09:00-10:30</b>	<b>Session 15:</b> GTTP classroom activity - Sun4all
<b>10:30-11:30</b>	<b>Session 16 :</b> GTTP classroom activity - Solar Storm Watch
<b>11:30-12:00</b>	Break
<b>12:00-12:45</b>	<b>Session 17:</b> ESA science missions
<b>12:45-13:30</b>	<b>Session 18:</b> Careers at ESA
<b>13:30-14:30</b>	Lunch
<b>14:30-15:30</b>	<b>Session 19:</b> ESA Science classroom activity
<b>15:30-16:30</b>	<b>Session 20:</b> Discussion/Feedback
	End of workshop

### **Stellarium and Celestia**

Stellarium and Celestia are both exceptional tools for teaching astronomy and can be used in the classroom to demonstrate various astronomical concepts. Stellarium shows a realistic sky in 3D and can be used to demonstrate, for example; the movement of the planets and stars, the constellations, the brightness of various objects and what objects can be seen from different geographical places at different times of the year. Celestia can be used, to discover the planets and moons of the Solar System, investigate the life cycle of stars and much more. Stellarium and Celestia can also be used as part of the preparation for an observing session, by allowing the user to carefully choose the objects to observe at the right time of the night.

### **Robotic Telescopes**

Remotely operated telescopes enable students to make real observations without the problems that arise with a night out in the field. There are several remotely operated telescopes available around the world with different capabilities. The Faulkes Telescope Project for instance provides students with access to research-grade telescopes and instruments. With this session, participants will learn:

- how to use robotic telescopes
- about projects that can be accomplished with robotic telescopes.

### **SalsaJ**

SalsaJ is an image processing software that reads FITS files – a file format widely used in astronomy. With SalsaJ, one can manipulate and analyze astronomy images in a professional way. Raw astronomical images are not very useful - the information we can extract from an image is highly dependent on the operations we perform on it and on the analysis. SalsaJ has been developed to perform most of the tasks that astronomy images are subject to, including making wonderful colour images from single filter images. With this session participants will learn:

- How to get SalsaJ (it is free) and install it in their computer
- What a CCD image is
- How to look in different ways at an astronomy image
- How to perform operations with images
- How to analyze an image
- Some activities suitable for the classroom
- How to build a colour image

### **Sun4All**

The project Sun4All is based on the rich asset of over 30,000 images of the Sun that are kept at the Astronomical Observatory of the University of Coimbra (Portugal), as a result of more than 80 years of daily solar observations. Some of those images have been digitized and have been made available via internet. Sun4All offers schools the opportunity to use the database of solar images, obtained with three different filters, at this point spanning over three decades. Sun4All has prepared a set of activities that can be undertaken by middle and high-school students and that will teach them about the different phenomena known as solar activity, and the solar cycle. With this session, participants will learn:

- How to get solar images from the Astronomical Observatory of the University of Coimbra
- What information from different phenomena one has from images taken with different filters
- Some activities suitable for the classroom, like calculating the solar rotational period, the duration of the solar cycle, the dimensions of solar flares
- Using SalsaJ to accomplish some Sun4All activities
- Ideas for future projects using the solar database

### **You are Galileo**

This educational product of IYA2009 can be used with small telescopes (Galileoscope, Orbys Spica Telescope) to enable students to reproduce Galileo's observations and get a deeper understanding of the importance of his discoveries. There are worksheets prepared to help observe and understand the results of the observations for the following objects; the Sun, the Moon, Venus, Saturn, Jupiter and the Milky Way.

### **Make your Own Spectroscope**

In this session participants will learn how to make a simple spectroscope that can easily be replicated in the classroom. Constructed from everyday material the spectroscope is a very powerful tool to help students realise that different sources of light do not shine in the same way. Using a diffraction grating, a spectroscope decomposes light received into its components in a form of spectrum. With these home-made spectroscopes it is possible to observe the different spectral lines produced by different light bulbs and the amazing Fraunhofer spectrum of the Sun.

### **Solar Storm Watch**

Participants of this program are involved in real research by helping scientists study solar storms and get a deeper understanding of this area of research. Participants in the program spot and track the progress of solar storms as well as assessing the hazard they may present to Earth and spacecraft.

### **ESA science data archives**

Much of the data return by ESA's fleet of Solar System and astronomy missions is public and available to use. During this session participants will explore the wealth of the ESA science data archives, learn how use the archive tool and find out how to utilise the data in the classroom.

### **ESA science classroom activity**

During these session participants will find out and use a variety of the education resources available that relate to ESA Solar System and astronomy missions.