

### Quantum Spinoff

Connecting schools with high-tech research and entrepreneurship



The Quantum Spinoff project will bring science teachers and their pupils in contact with present-day research and entrepreneurship in the high-tech sector. The aim is to encourage, educate and inspire a new generation of European citizens in cutting edge science and technology. Students will visit high-tech research labs and get into the fascinating world of modern physics and nano science. Teams of pupils, guided by their science teachers, will be challenged to create a responsible and socially relevant valorisation of a scientific paper in collaboration with actual researchers and entrepreneurs. Teams will ultimately compete for the European

Quantum Spin-Off Prize where scientific, technological insights, creativity and responsible entrepreneurship are all in the game. Quantum Spinoff offers to science teachers learning materials and national and international training that supports this inquiry learning process. See on <http://www.quantumspinoff.eu> and <http://qs-project.ea.gr>

### Inspiring Science Education

Providing access to inspirational digital resources and learning opportunities



Our mission in the Inspiring Science Education (<http://www.inspiringscience.eu>) is to provide digital resources and opportunities for teachers to help them make science education more attractive and relevant to students' lives. Through the Inspiring Science Education website and the activities organised by the partners,

teachers can help students make their own scientific discoveries, witness and understand natural and scientific phenomena and access the latest, interactive tools and digital resources from within their classrooms. Inspirational science teachers are at the heart of successful science teaching – ask any scientific Nobel prize-winner who had the greatest influence on their decision to become a scientist and invariably the answer will be – my science teacher! So what is it that makes a science teacher truly inspirational? That's one of the conundrums we aim to unravel in the Inspiring Science Education project. That's why we will be setting up workshops and exchanges, communities of practice and learning opportunities for science teachers and teacher trainers aimed at helping them find ways to make their teaching of science more inspirational.

### Open Discovery Space

A socially-powered and multilingual open learning infrastructure to boost the adoption of eLearning resources

Open Discovery Space (<http://www.opendiscoveryspace.eu>) aims to serve as an accelerator of the sharing, adoption, usage, and re-purposing of the already rich existing educational content base. It demonstrates ways to involve school communities in innovative teaching and learning practices through the effective use of eLearning resources. Moreover, it promotes community building between numerous schools of Europe and empower them to use, share and exploit unique resources from a



wealth of educational repositories, within meaningful educational activities. In addition, it demonstrates the potential of eLearning resources to meet the educational needs of these communities, supported by European Web portal: a community-oriented social platform where teachers, pupils and parents are able to discover, acquire, discuss and adapt eLearning resources on their topics of interest. Finally, it will assess the impact and document the whole process into a roadmap that will include guidelines for the design and implementation of effective resource-based educational activities that could act as a reference to be adopted by stakeholders in school education.

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## Programme

### July 12<sup>th</sup> – July 17<sup>th</sup>, 2015

### Marathon, Attica, Greece



PROGRAMME

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
	12 July 2015	13 July 2015	14 July 2015	15 July 2015	16 July 2015	17 July 2015
09:00 to 12:30	Participants' Arrivals and Registration	<p><b>Basic concepts of quantum and nanophysics I</b></p> <p>Learning Station I: Inexplicable phenomena?</p> <p>Learning Station II: What is light?</p> <p>Learning Station III: What oscillates with light?</p> <p>Renaat Frans and Erica Andreotti Limburg Catholic University College</p>	<p><b>Quantum Properties and Technology II</b></p> <p>Learning Station VIII: Tunneling and Scanning Tunneling Microscope</p> <p>Learning Station X: Atomic Force Microscope</p> <p>Learning Station VI: From photo-electric effect to digital imaging</p> <p>Learning Station VII: Semiconductors</p> <p>Nanoprojects in Switzerland</p> <p>Ferrofluids and Magic Pictures</p> <p>Miriam Herrmann Center for Science and Technology Education - FHNW</p> <p>Nanoprojects in Greece</p> <p>Angelos Lazoudis Ellinogermaniki Agogi</p>	<p><b>Visit to Ellinogermaniki Agogi school</b></p> <p>Foucault pendulum – Augmented Reality</p> <p>Manolis Chaniotakis Ellinogermaniki Agogi</p> <p><b>Nanotechnology in the National Hellenic Research Foundation</b></p> <p>Aliviadis-Constantinos Cefalas National Hellenic Research Foundation</p>	<p><b>Conceptual entrepreneurship in the classroom: working with the business model canvas</b></p> <p><b>Modern Science Education in Europe</b></p> <p>Roundtable about bringing modern science, technology and entrepreneurship in class</p> <p>Renaat Frans and Erica Andreotti Limburg Catholic University College</p>	<p>Presentations of Participants: Ideas for Learning Scenarios- Reflection - Certificates</p>
15:00 to 17:00	<p><b>Opening Session (18:00 - 20:00)</b></p> <p>Making the classroom attractive with online labs</p> <p>Prof. Ton De Jong University of Twente</p> <p><b>Developing teachers' communities</b></p> <p>Rosa Doran NUCLIO</p> <p><b>Inspiring Science Education</b></p> <p>Prof. Franz Bogner University of Bayreuth</p>	<p><b>Basic concepts of quantum and nanophysics II</b></p> <p>Learning station IV: Wave/particle duality</p> <p>Learning station V: Predicting hydrogen Emission lines</p> <p>Renaat Frans and Erica Andreotti Limburg Catholic University College</p> <p><b>Quantum Properties and Technology I</b></p> <p>Learning station XI: Micro-sized microbial fuel cells</p> <p>Nanoprojects in Estonia</p> <p>Pille Villemis University of Tartu</p> <p><b>Visit at Cape Sounio, Sanctuary of Poseidon</b></p>	<p><b>Quantum Properties and Technology III</b></p> <p>Learning Station IX: Spin and its applications</p> <p><b>Hands-On Activities</b></p> <p><b>Discrete Emission Spectra</b></p> <p>Measuring Planck's constant with LEDs</p> <p>Determine the thickness of a hair using diffraction of light</p> <p><b>Electron diffraction</b></p> <p><b>Building an organic solar cell</b></p> <p>Renaat Frans and Erica Andreotti Limburg Catholic University College</p>	<p><b>Visit to the Acropolis Museum and the Acropolis</b></p> <p><b>Dinner</b></p>	<p>Preparation of Learning Scenarios around modern science and technology</p> <p><b>Quantum Spinoff 2015 contest participants' presentations (17.15-19.00)</b></p> <p><b>Farewell Dinner</b></p>	<p><b>Closing Lecture (12.30-13.15)</b></p> <p><b>The Quantum Spinoff competition in the years to come</b></p> <p>Renaat Frans Limburg Catholic University College</p> <p><b>Participants' Departures</b></p>

EVENTS

**Visit to Cape Sounio, Sanctuary of Poseidon (July 13<sup>th</sup>, 18:45 – 23:00)**



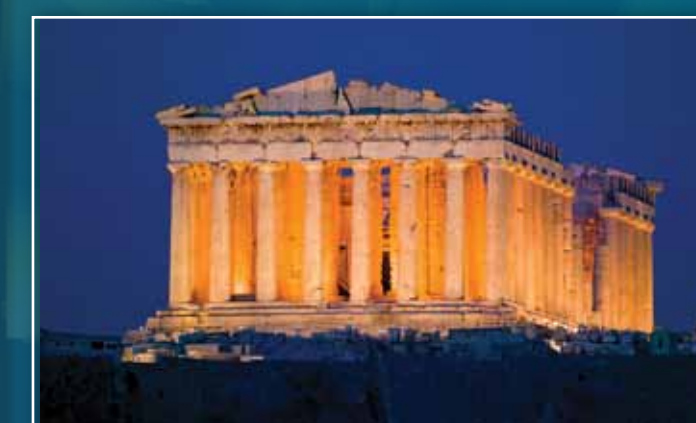
Cape Sounio is a promontory located 69 kilometres from Athens, at the southernmost tip of the Attica peninsula. According to legend, Cape Sounion is the spot where Aegeus, king of Athens, leapt to his death off the cliff, thus giving his name to the Aegean Sea. The sanctuary of Poseidon, one of the most important sanctuaries in Attica, is also located at Sounio. Archaeological finds on the site date from as early as 700 BC. Herodotus tells us that in the sixth century BC, the Athenians celebrated a quadrennial festival at Sounion, which involved Athens' leaders sailing to the cape in a sacred boat. The later temple at Sounion, whose columns still stand today, was probably constructed in 450-440 BC, over the ruins of a temple dating from the Archaic Period. Poseidon, the "God of the Sea" was considered to be a powerful god, second only to Zeus (Jupiter). The temple at Cape Sounion, was a venue where mariners, and also entire cities or states, could propitiate Poseidon, by making animal sacrifice, or leaving gifts.

**Visit to the Acropolis Museum (July 15<sup>th</sup>, 16:30 – 18:30)**



The New Acropolis Museum under the Acropolis of Athens "came to life" when at 2000, the Organization for the Construction of the New Acropolis Museum announced an invitation to a new tender, which came to fruition with the awarding of the design tender to Bernard Tschumi with Michael Photiadis and their associates and the completion of construction in 2007. The Museum has a total area of 25,000 square meters, with exhibition space of over 14,000 square meters, ten times more than that of the old museum on the Hill of the Acropolis. The new Museum offers all the amenities expected in an international museum of the 21<sup>st</sup> century. Permanent exhibitions: The Gallery of the Slopes of the Acropolis, The Archaic Gallery, The Parthenon Gallery, Propylaea-Athena Nike-Erechtheion, from 5<sup>th</sup> century BC to 5<sup>th</sup> century AC.

**Visit to the Acropolis of Athens (July 15<sup>th</sup>, 19:00 – 20:30)**



The greatest and finest sanctuary of ancient Athens, dedicated to the goddess Athena, dominates the centre of Athens from the rocky crag of the Acropolis. The most celebrated myths; religious festivals; earliest cults are all connected to this sacred precinct. These unique masterpieces of ancient architecture combine different orders and styles of Classical art in a most innovative manner and have influenced art and culture for many centuries. The Acropolis of the 5<sup>th</sup> century BC is the most accurate reflection of the splendour, power and wealth of Athens at its greatest peak, the Golden Age of Pericles. In the mid-fifth century BC, when the Acropolis became the seat of the Athenian League, Pericles initiated an ambitious building project which lasted the entire second half of the fifth century BC. The architects, Ictinos and Callicrates, began the erection of this unique monument at 447 BC and the building was substantially completed by 432 BC. The most important buildings visible on the Acropolis are the Parthenon, the Propylaea, the Erechtheion and the temple of Athena Nike.