



**Surrounded  
by Science**

## **Newsletter #1**

**April 2022**

**UNIVERSITY  
OF TWENTE.**



**NUCLIO**



**theLisborcouncil**  
think tank for the 21<sup>st</sup> century

מכון ויצמן למדע  
WEIZMANN INSTITUTE OF SCIENCE

**NTNU**



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# Editorial

## Welcome to our inaugural newsletter!

Surrounded by Science is an H2020 EU project that aims to design and develop a systematic evaluation methodology that will shed new light on the impact of out-of-school science learning activities.

Our newsletter, published on a quarterly basis, will keep you informed about the project's progress and results. It will also provide you with the latest news from the world of science education, and engagement with science beyond the classroom. Our special section 'SciPerspectives' will bring together articles, interviews, and opinion pieces from leading researchers, science educators and communicators, as well as policymakers across Europe and beyond.

In this first issue:

- Our Project Coordinator, Dr. Tessa Eysink, shares the background, vision and ambitious objectives of Surrounded by Science;
- Meet our partners and national contacts;
- SciPerspectives features an interview with Dr. Sherman Rosenfeld on the importance of bridging the gap between formal and informal science learning;
- Check out our latest news and calendar of upcoming events.

We hope that you will find our newsletter both informative and enjoyable and look forward to having you as part of our exciting journey! And don't forget to subscribe to our newsletter and follow us on Surrounded by Science social media by visiting our brand new [website!](#)



Sara Anjos & Alice Iordache  
Newsletter Co-editors

# Welcome from the Project Coordinator



We live in a world that is full of science. Young people go to school where they learn about science, but this is just a small part of their science education. They watch science-related videos on the internet; they visit the library and zoos and museums; if they go to the beach and search for shells, they will see sea life and learn about it; they might visit science clubs or summer camps, and so on. By engaging in all these activities, young people create their own science journey. During this journey, their interest in science is aroused, they think and talk about science and they might learn about scientific phenomena, maybe even without knowing that it is science. Engaging in these activities helps people to understand the world we live in to give meaning to information and to evaluate it critically and contribute to problem-solving; scientific skills that are becoming increasingly important in today's daily life.

Within the 'Science with and for Society'-programme, the European Union called for more understanding of how science education outside the classroom influences today's citizens. As a reaction to this call, the Surrounded by Science project was initiated, a three-year project that started in October 2021 and of which I have the honour to coordinate.

The aim of the project is to bridge the gap between the two worlds of out-of-school science education and formal education and to develop a connected learning ecosystem where young people may encounter a wide range of learning experiences. We will explore the nature of informal science activities and their impact on citizens and we will identify good practices. We will also develop an innovative *Digital Toolbox* to collect data from young people when participating in science-related activities to inform science organizations and to make their science journey even more fun, attractive and effective.

For this purpose, we brought together experts in science education research, science centres and museum educators, providers of outreach and informal learning activities, strong user communities

and policymakers. Eight countries (The Netherlands, Greece, France, Portugal, Italy, Belgium, Israel and Norway) combine their forces to make this project a success. Additionally, we will involve many stakeholders across Europe, as we believe that their input is crucial.

My own background and expertise lies in the field of research into formal science education. At the University of Twente, we have long been committed to develop engaging ways of science learning in the classroom. Now it is an honour for me to get the opportunity to work together with people who are experts in informal science learning and learn about their views on the topic.

This is the beginning of an exciting journey, for us as project members as well as for the young science learners and the science organisations. We hope to meet you in future activities and events, and that we can learn from each other. I wish you all a safe and inspiring journey!



**Dr. Tessa Eysink**

Associate Professor  
Department of Instructional Technology  
Faculty of Behavioural, Management and Social Sciences  
University of Twente

# Meet our partners

Surrounded by Science is coordinated by the University of Twente in the Netherlands, with the participation of seven more organisations from Greece, France, Portugal, Italy, Belgium, Israel and Norway.

## UNIVERSITY OF TWENTE.

The [University of Twente](#) (UT) is an entrepreneurial research university located in Enschede in the Netherlands. It was founded in 1961 and offers education and research in areas ranging from technological to behavioural sciences. It houses approximately 10,000 students and 3,300 staff members. The department participating in Surrounded by Science is the Department of Instructional Technology (IST) that is part of the Faculty of Behavioural, Management and Social Sciences (BMS). IST studies and designs systems or environments (human and/or machine) for the acquisition of knowledge and skills. Its members have extensive experience in the design and evaluation of ICT-based learning environments for science education. This has led to a number of products that are actually used in schools (KMQuest), often at a large (Go-Lab, Next-Lab, GO-GA), and incidental commercial scale (SimQuest applications), and also at a full commercial, world-wide scale (ZAP).

### UT's role in the project

UT will be leading the scientific and administrative coordination of the project. Moreover, it will be responsible for the design and development of the *Research Methodology* that will facilitate the identification of good science learning practices outside the classroom. UT will also be leading the technical development work of the Surrounded by Science *Digital Toolbox*. UT will implement the research activities in selected case studies in the Netherlands and will have a major role in the *Impact Assessment* as well as in the design of the *Accreditation Scheme* and the exploitation and dissemination activities.



[Ellinogermaniki Agogi](#) (EA), located in the greater area of Athens, Greece, is one of the most innovative schools in Europe. It has 2,500 students (ages 5 to 18 years old) and 250 teachers in different disciplines. EA has a very strong vision-generated interest and rich research and development activity in the fields of Inquiry Based Science Education (IBSE), Project Based Learning (PBL), and STEM education in combination with digital, online based learning environments

and tools that use virtual reality, augmented reality and story-based education. In more than 20 years of activity, EA's R&D Department has coordinated or been involved in numerous national and international collaborative projects, networks and initiatives, which have established EA as a leading pioneer in innovative approaches to learning, teaching and teacher professional development, especially in connection to science education and educational technology.

### **EA's role in the project**

EA will be leading the communication and dissemination of the project. It will also support the development of the project's *Research Methodology* by identifying exemplary science activities that will be included in the project's inventory of case studies. EA will also be involved in the conceptual design of the *Digital Toolbox*, and will implement research activities in Greece. Finally, EA will support the *Impact Assessment*, and lead the findings of this assessment that will inform the overall exploitation strategy of the project.



Created in 1968 the [European Physical Society](#) (EPS) is a not-for-profit association of physicists for physics. At that time, when European integration was more dream than reality, the establishment of the EPS was a “demonstration of the determination of scientists to make their positive contribution to the strength of European cultural unity” (from the inaugural address, G. Bernardini, EPS President, Geneva 1968). The EPS continues to play an important role in enhancing communication among physicists in Europe, and in bringing major issues in physics and science to the attention

of the general public and policy makers. The 42 EPS Member Societies (in 42 countries) represent over 130,000 physicists throughout Europe. Over 3,000 physicists participate directly in the EPS as Individual Members. European research institutions, universities and companies are represented as Associate Members.

### **EPS' role in the project**

EPS will support the research implementation on a European level, involving activities of its members in various countries. EPS will activate its entire network of national associations from around Europe, spreading and multiplying the impact of the Surrounded by Science project by supporting and guiding science organisations and encouraging them to become involved in the project's activities. Moreover, EPS will support the networking and clustering with education policy makers.



[NUCLIO](#) is a non-profit association and a NGO for development created in 2001 with the main aim of promoting the inclusion of active research as a tool for science learning in schools. NUCLIO's activities

include training teachers in the use of new technologies, innovative methodologies, promotion of real and contemporary research in classrooms where students are introduced to the scientific methods using robotic telescopes, data mining, and other advanced tools for science learning. NUCLIO has been involved in several EU projects as national coordinator for Portugal and more recently as coordinator of a few projects aiming to introduce innovative practices for science learning in formal and informal settings.

### **NUCLIO's role in the project**

NUCLIO's main task will be the identification of exemplary out-of-school science education activities and their implementation in Portugal. It will also support both the exploitation and communication activities, helping the project to reach out to its key audiences through liaison activities, conferences, workshops, newsletters and social channels.



[Fondazione IDIS-Città della Scienza](#) is a scientific pole located in Naples, Italy, and dedicated to the dissemination of scientific and technological culture, as well as to the innovation of the educational and business systems. One of the main values is to reinforce scientific citizenship in order to bring the science outside of the realm of laboratories through an open dialogue with citizens and stakeholders. Hence, following the quadruple helix model, Città della Scienza aims at creating an efficient relationship between science, innovation, and society for the economic and

social development at a regional level. It boasts a number of scientific collaborations with major museums and scientific Institutions in Europe and worldwide.

### **Città della Scienza's role in the project**

Città della Scienza will lead the Research Implementation of the project given its vast experience in the development of informal science education and outreach activities that intend to entertain but also educate teachers, students and the general public. Furthermore, Città della Scienza's rich collections and innovative activities in out-of-school science education are offering unique opportunities for implementing the *Research Methodology* and promoting the use of the *Digital Toolbox* developed in the framework of the project.





Founded in 2003 as a non-profit association, the [Lisbon Council for Economic Competitiveness and Social Renewal](#) (LC) was set up to intellectually accompany the Lisbon Agenda, Europe's original growth and jobs programme. The organisation quickly positioned itself as a "go-to-place" for unconventional, out-of-the-box thinking and research, attracting senior leaders from its very early days. Over time, a pronounced focus on innovation, innovation in the public sector, digital technologies, human capital and skills developed, all couched in the broader context of "growth and jobs". In particular, back in 2008, when most of the policymaking debate was focusing on innovation in the private sector, the Lisbon Council was one of the first to focus on innovation in the public sector, which represents in Europe half of the economy.

### **LC's role in the project**

LC will be leading the effort to prepare the exploitation of the project's results. It will, therefore, prepare a roadmap for an *Accreditation Scheme for Informal Science Organizations* by proposing opportunities for them to effectively integrate informal activities with formal science education policies and strategies. Furthermore, it will tap into its very active and dedicated network across Europe to support the dissemination of the project's activities and results.



The [Weizmann Institute of Science](#) (WIS) is one of the world's leading multidisciplinary research institutions. WIS has five faculties: Mathematics and Computer Science, Physics, Chemistry, Biochemistry, and Biology, which are divided into 17 scientific departments and a Department of Science Teaching. The Feinberg Graduate School, the Institute's university arm, develops research students pursuing graduate degrees. WIS houses the Davidson Institute of Science Education, a non-profit organization that serves as the educational arm of the Weizmann Institute. The mission of the Davidson Institute is to connect people to science; therefore, it initiates, organizes and operates a wide range of educational programs for students, parents and the general public, as well as for teachers and academics, in both government and education.

### **WIS' role in the project**

WIS will be leading the key activities for the project's *Impact Assessment* by coordinating the design and implementation of the *Impact Assessment* methodology of the *Proof-of-concept Experiments* on the target audiences. WIS has internationally recognized experts in the assessment and impact analysis of science activities in both formal and informal/non-formal learning settings. WIS will also support the design of the *Research Methodology*, ensuring a good connection to the assessment, and implement the research in selected case studies in Israel.



The [Norwegian University of Science and Technology](https://www.ntnu.no) (NTNU) is Norway's university for higher education in technology and the natural sciences. NTNU has 7 faculties and 52 departments and more than 100 laboratories, many of which are national resources used both in research and teaching. NTNU contributes high-level expertise in the fields of STEM and computer science education and learning technologies, with rich experience in organizing creative learning activities in close collaboration with communities, stakeholders and the society at large. NTNU has years of conceptual, methodological and technical knowledge and experience in conducting various field studies based on this knowledge and experience to educate and support young people to become critical citizens and have an active civic participation.

### **NTNU's role in the project**

NTNU's main task is to support the development of the *Digital Toolbox*, and specifically the *Science Chaser* app, by designing the gamification features that will make the app more appealing and interesting to use. NTNU will also support the analysis of the data collected through the *Science Chaser* app by helping to visualise the data collected during the *Impact Assessment* of the effect of selected out-of-school science activities on users' science proficiency.

# SciPerspectives

Interview with Dr. Sherman  
Rosenfeld, Science Educator,  
Weizmann Institute of  
Science, Israel



By Alice Iordache



In the 1700s Britain witnessed one of the most significant and cutting-edge historical events: the Industrial Revolution. Starting in Britain and quickly expanding to Europe and North America, one of the most significant innovations of that period was the development of assembly line manufacturing, conceptualising the idea according to which goods are produced by workers working along an assembly line. Drawing on this idea, Dr. Sherman Rosenfeld, biologist and science educator at the Weizmann Institute of Science, and partner in the Surrounded by Science project, conceptualises and compares the automated line to the “assembly line of formal education”.

“Society created an educational model alongside the industrial one”, says Dr. Rosenfeld, who has been advocating for many years to create a new educational model, by bridging formal with informal learning, with an explicit focus on STEM. This is precisely the goal of the Surrounded by Science project: to create a framework to support the creation of integrated STEM learning experiences that capitalise on the strengths of both formal and informal science learning contexts.

But why is it so important to distinguish between formal and informal education, since, in the end, the goal is the same: learning? According to Dr. Rosenfeld, “It matters a lot. There are fundamental differences between these two learning contexts across four levels: organisational, cognitive, affective, and socio-environmental level. Understanding and bridging between these differences can help create a more holistic and effective model of learning” [1].

When it comes to the expected impact of the project, Dr. Rosenfeld has no doubts: the main objective is to provide an evidence-based understanding of the key but yet under-researched role of out-of-school STEM learning activities on the 6 strands of science proficiency. Through this understanding, formal science education providers and also informal science engagement organisations can better cooperate to develop these strands, especially two that are neglected in formal settings: science engagement and science identity. As Dr. Rosenfeld points out, “A key challenge for the next generation of science teachers and educators concerns the ways through which they can help pupils and students to think of themselves as science learners and to develop a science identity that enables them to know about, use and contribute to science”.

But why now? As suggested by the project’s motto, because “We are Surrounded by Science!”. We have the tools that allow us to learn together. We have the ability, motivation and opportunity to exchange ideas and act as brokers between formal science education providers and informal science engagement organisations towards supporting the open schooling vision of the European Union, where schools in cooperation with external stakeholders share the responsibility for student learning.

More info on Dr. Rosenfeld and his work can be found on his personal [website](#).

## **References**

[1] Fallik, O., Rosenfeld, S. and Eylon, B. (2013). School and Out-of-School Science: A Model for Bridging the Gap. *Studies in Science Education*, 49:1, 69-91.

# News

## Surrounded by Science project meeting at Cascais, Portugal

On March 9th & 10th 2022, the Surrounded by Science team met in Cascais, Portugal, to discuss the progress of the project. The meeting was organised by NUCLIO and coordinated by the University of Twente. It was held in a hybrid format, with several project members present in person, while others joined the discussion online via teleconference.



Image credit: Jakob Sikken

Several considerations were made about the *Science Chaser* and the *Science Booster* apps, which are two of the flagship innovations of the project. The *Science Chaser* app will monitor users' science-related activities and will provide guidance and recommendations for future related activities. *Science Booster* will be a self-reflection and advisory tool for informal science education organisations that aim to support more effective design of out-of-school science learning activities. These two important applications will be developed

during the project and are expected to be delivered to the public from August 2023 and April 2024 respectively.

Cascais, as a coastal town, has a diverse marine ecosystem, and a rich geological structure, as the team could confirm during the visit to CIAPS (*Centro de Interpretação Ambiental da Pedra do Sal* / Pedra do Sal's Environmental Interpretation Centre). NUCLIO develops several informal education activities in this centre and regularly promotes stargazing sessions to the citizens of Cascais and its surroundings. Finally, the team did not miss the opportunity to visit important historical and cultural sites in nearby Lisbon and to eat the famous "*Pastéis de Belém*".



Image credit: Jakob Sikken

# Events

## Surrounded by Science at the 2022 ECSITE Conference



Image credit: Ecsite

The Surrounded by Science project will take part in the 2022 Ecsite conference taking place from 2nd to 4th June in Heilbronn, Germany. Our project team will organise a panel entitled "Formal and informal science education: bridging the gap" which will take place on 3rd June 2022 from 09:00 - 10:15 and will be moderated by Dr. Angelos Alexopoulos, Senior Researcher and Project Manager at Ellinogermaniki Agogi, Greece. Session speakers will include: Dr. Hannie Gijlers, Assistant Professor in Learning Sciences at the University of Twente, The Netherlands; Luigi Cerri, Project Manager at Fondazione IDIS - Città della Scienza, Italy; and Dr. Michail Giannakos, Professor at the Norwegian University of Science and Technology, Norway.

What will participants get out of this session? First, science engagement organisations will be invited to revisit their strategic priorities for utilising smart technologies in their self-assessment schemes to help their audiences develop science proficiency. In an interactive format, participants will also reflect on the importance of various strands of science proficiency and learning pathways that can inform their organisations to be more aware of their potential for boosting proficiency in science.

If you want to learn more about the event and register for this panel discussion, please visit: <https://www.ecsite.eu/conference/programme/formal-and-informal-science-education-bridging-gap>

# Events

## International Day of Light



Image credit: Stanpro

One of the legacies of UNESCO's 2016 International Year of Light is the celebration of the International Day of Light on 16 May each year, which aims to highlight the importance of light-based sciences and technologies in the lives of citizens around the world.

The date is a tribute to the first successful operation of the laser in 1960 by physicist and engineer, Theodore Maiman. In celebrating this achievement, a call has been made to strengthen scientific cooperation and harness its potential to promote peace and sustainable development.

Several events and activities are being developed in the framework of the International Day of Light to provide an opportunity to appreciate light and the fundamental role it plays in science, culture and art, education and sustainable development, but also in fields as diverse as medicine, communications, and energy. It is also a very important opportunity to create awareness about the growing problem of light pollution and its impact in our lives.

Want to join the celebration? Check out the list of activities and add your own by visiting: <https://www.lightday.org/events>

# Contact us

[www.surroundedby.science](http://www.surroundedby.science)

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[@SurroundedbyScience](https://www.instagram.com/SurroundedbyScience)

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## Our Team

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