



## SUMMARY

Science communication encompasses all aspects of communicating scientific work and scientific outcomes, both within science and in the interaction between science and the general public. Science communication is no longer a “nice to have”, nowadays it is a “must have”. While traditional one-way communication in science can sometimes be perceived as an exercise in science public relations, current trends in science communication point towards a two-way process: a dialogue between the different target groups and the research community.

## POLICY BRIEF

This policy brief explains what science communication encompasses and why it is important to encourage scientists and research organisations to communicate, and to encourage citizens to engage in science matters.

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# WHY DO WE NEED SCIENCE COMMUNICATION?

Science communication is a tool that can bridge the gap between science and society. Efficient science communication reaches out to different social spheres and various generations of the population. Public understanding of science is crucial for the further development of society. When the public understands why it is important to set up new measures in various life areas, it is more willing to support them and carry them out. The knowledge for these new measures is very often generated by research.

We experience this in our daily life: a newspaper article revealing that a high intake of sugar harms our health has much more influence than a word of advice from a friend or even from a family member. Public scientific education raises the public's awareness, helps to understand and modify the behavioural patterns and so improve people's lives.

Science communication is also understood to be a social responsibility. Scientific results should catch the attention of those who have the power to act on them and who can enforce their implementation, i.e. science-based decision making by politicians and decision makers. Their decisions are based on the proper understanding of scientists' messages and therefore an effective means of communicating them is required. Indeed, there are strategies that help scientists to attract attention and communicate effectively with policymakers (1).

Science communication is the use of appropriate skills, media, activities and dialogue to improve individuals' awareness, involvement, engagement, interest, or understanding of science.

The word communication comes from the Latin word *communicare* which means - to share. Communication can be divided in three different parts: one-way communication, two way communication and dialogue (Figure Nr. 1).

1 nature.com: "[Communicating science to policy makers](#)"

## Communication - Commūnicāre - "to share"

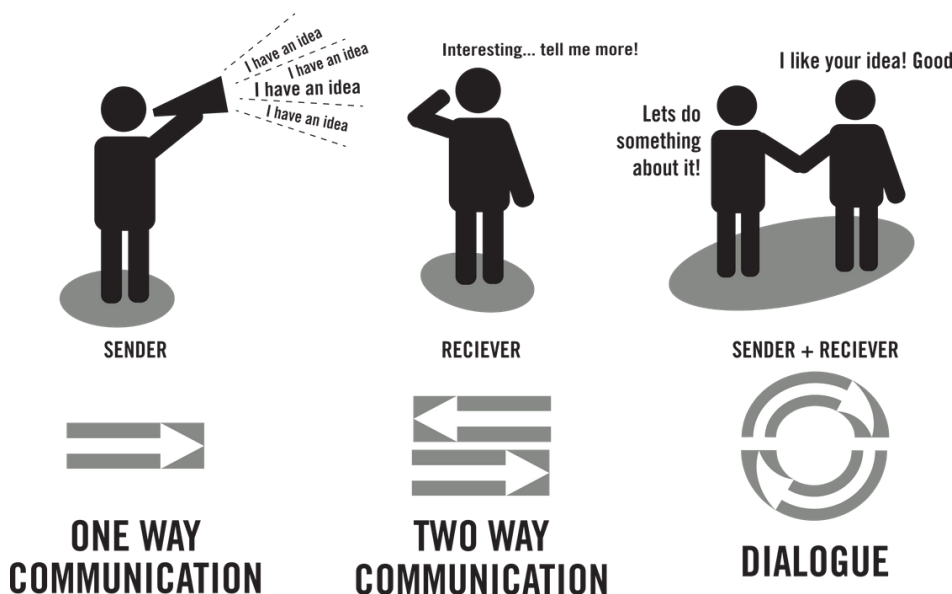


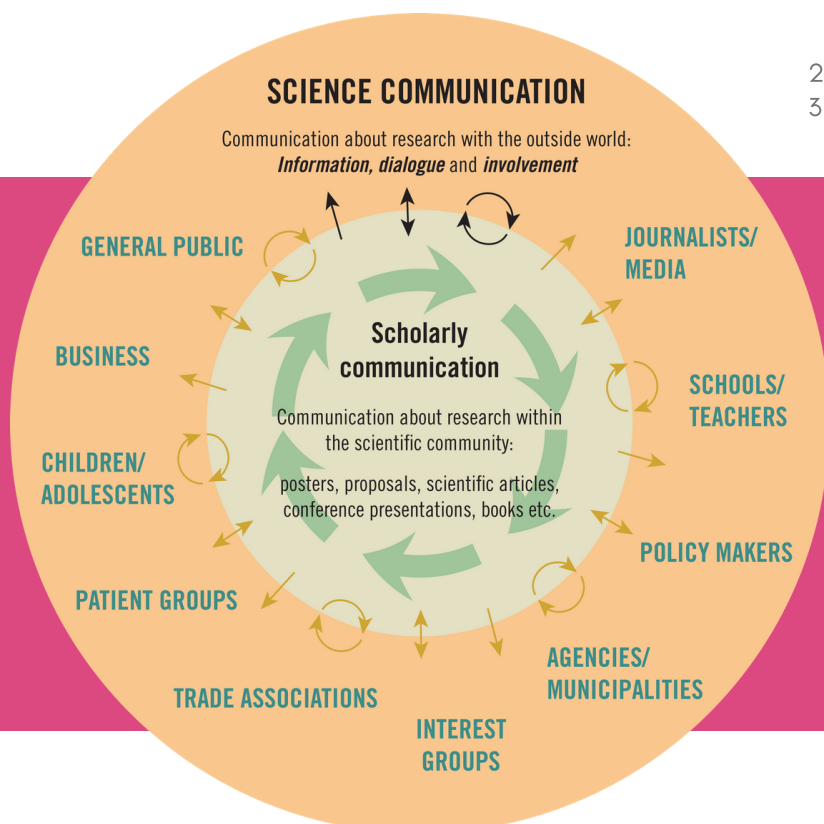
Figure Nr. 1: Communication directions. (Illustration by Lotta Tomasson, Vetenskap & Allmänhet / VA [CC BY-NC 2.0](#))

# WHAT IS SCIENCE COMMUNICATION?

Science communication includes a range of activities that successfully share, present and explain science-related topics to a wider audience, including non-scientists. There are two types of defined science communication. The first one is led by professional scientists and addressed to non-expert audiences and is called science outreach as it includes information, dialogue and involvement with the stakeholders. The second way is expert-to-expert communication from similar or different scientific backgrounds and is called science inreach or scholarly communication (2).

Communicating science may be carried out through formal science education (e.g. in classroom lessons), through informal education (e.g. in a museum) or through other means of outreach such as non-formal education (e.g. science writing, documentaries, popular science TV-shows, arts, podcasts, social media). The media and other influential intermediaries play a crucial role in reaching all audiences (3).

There are several types of audiences. On the one hand, there are the policy makers, industry, media as well as the national and international scientific community. On the other hand, there is the general public. The general (or lay) public consists of many different groups and every group needs a different approach.



2 Wikipedia: [Science communication](#)

3 [CERN's communications strategy](#), for 2017-2020

There are the teachers, students, interest groups and citizens. Each target audience requires different key messages and a different communication medium. Knowing the target audience is the key to communicating successfully about scientific topics. The illustration indicates the broad variety of target groups in science communication (Figure Nr. 2).

Figure Nr. 2: Target groups in science communication. (Illustration by Lotta Tomasson, Vetenskap & Allmänhet / VA [CC BY-NC 2.0](#))

## NEW FORMAT FOR SCIENCE COMMUNICATION ON THE HORIZON (EUROPE)

Science has been traditionally communicated by disseminating and popularizing it in the media, where it is mostly the task of the journalists to “translate” the science for society to digest. The trend nowadays is towards two-way communication, dialogue, active participation and involvement with the different target groups (*Figure Nr. 3*).

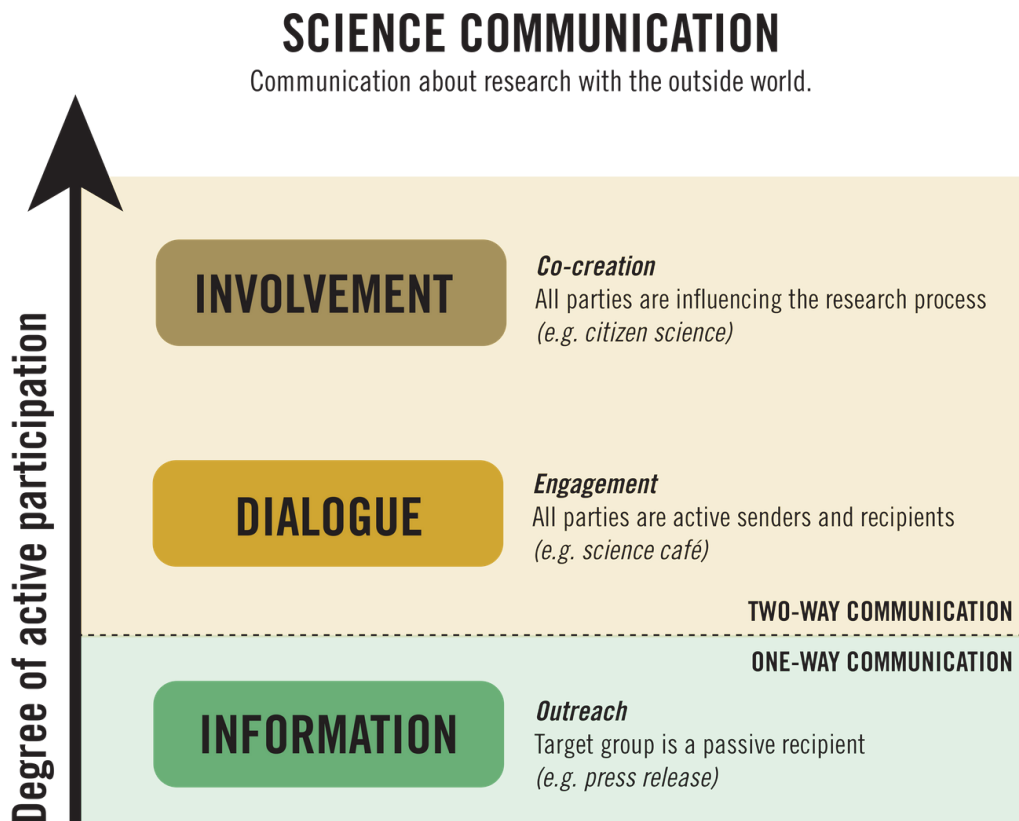


Figure Nr. 3: Degrees of active participation. (Illustration by Lotta Tomasson, Vetenskap & Allmänhet / [VA CC BY-NC 2.0](#))

In September 2019 the European Research Council (ERC) established a new award for public engagement in science communication. This ERC Public Engagement with Research Award goes to ERC grantees who have demonstrated excellence in public engagement and outreach. Here, public engagement is understood to mean the many ways that the public can be involved in the design, conduct or dissemination of the research process.

Researchers nominated for ERC Public Engagement Award choose to engage with the public for:

- **Communication:** to inform and inspire the public about research.
- **Consultation:** for projects that have engaged in two-way conversations about research and listened to public views.
- **Collaboration:** for research projects that have involved collaborating with the public, including the co-creation/co-production of knowledge and citizen science.

Furthermore in recent years, new and alternative ways of enhancing communication between science and society have been developed. These forms already include a two-way exchange of communication – from the researcher to the citizen but also from the citizen to the researcher.

Public engagement, involvement of end-users and citizen science are all different ways of communicating, engaging and involving stakeholders in science:

**Public engagement** is a two-way process where researchers and others engage and listen to their different target groups. Thus involving them in shaping the research outcome to become a mutual benefit. Through **citizen science**, the public directly collaborates with scientists in research (4).

**Science shops** are another example – places where citizens can formulate their questions for researchers. Science shops serve researchers and civil society as inspiring places to work collaboratively to create new knowledge, or address problems and concerns of civil society with the help of science and research. **Science cafés** offer direct interaction and dialogue between researchers and the audience.

The detailed overview of current communication ways is in the table at page 7 "Methods and forms of science communication".

The Wellcome Trust's public engagement onion shows the different methods and degrees of involving the different stakeholders in engagement (Figure Nr. 4).

4 For more information see: [Policy Brief on Citizen Science – towards issues of concern to citizens](#), SiS.net2

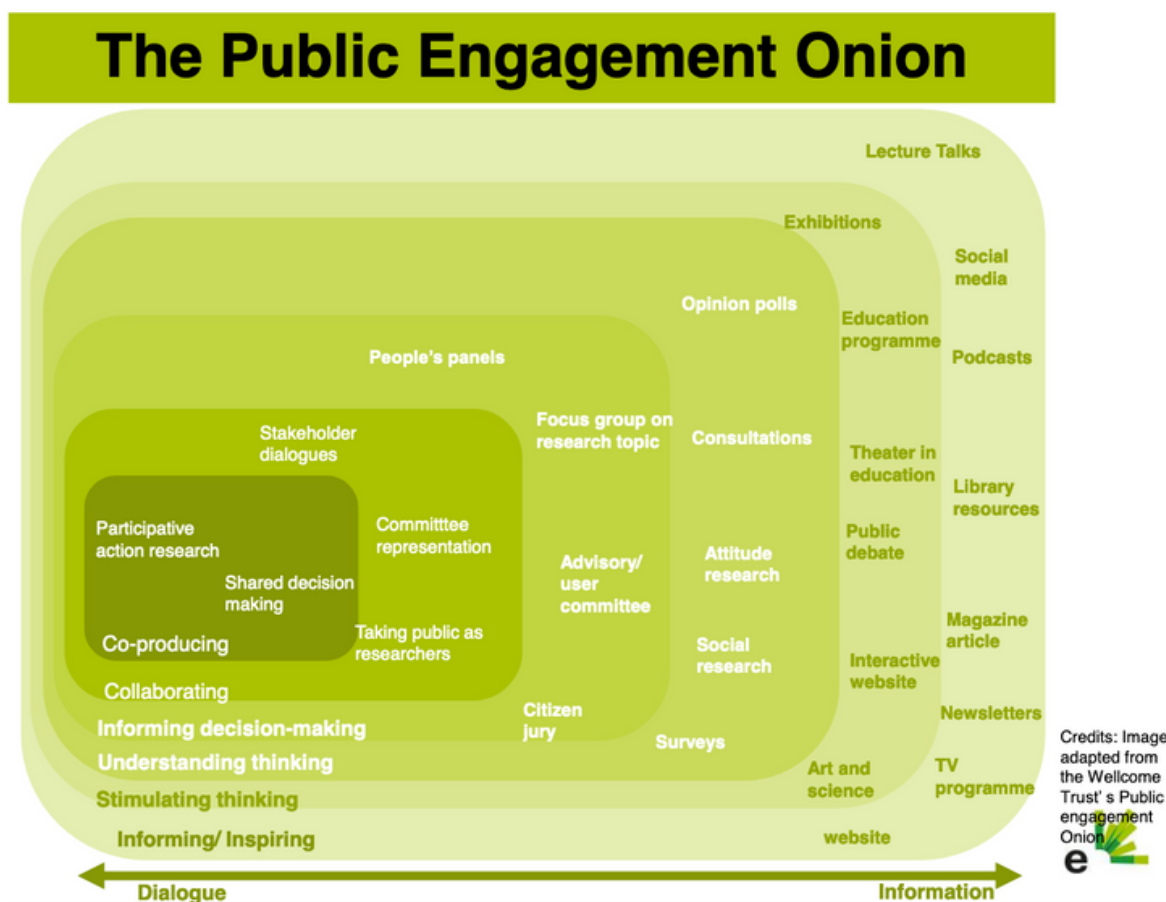


Figure Nr. 4: The public engagement onion. (Infographics by Wellcome Trust's presented by Ecsite at [SwafS Knowledge Day & Brokerage Event](#) in Warsaw 2019)

# HOW TO PROVIDE SCIENCE COMMUNICATION?

Choosing the appropriate medium for science communication is crucial. Researchers have many possible ways of presenting their daily work – from conservative presentations to amazing shows. They can choose how to share their enthusiasm for science. Awakening a curiosity and thirst for knowledge also attracts new talents to science.

The more traditional way of presenting science has been through paper brochures, presentations, public lectures, open days in research institutes, etc. New forms include social media (Twitter, Facebook, blogs, videos, etc.) and more creative methods (science slams, science buster shows, etc.). Other presentation possibilities include debates, science cafés and festivals or researcher's nights.

Researchers should explain their research using language that is easily understood. Science communicators are often trained in communication skills and, when delivering their message, help their cause by being entertaining, using metaphors and storytelling. “Edutainment” is the modern form of educating through entertainment and is used in classrooms as well as in academia (*Box Nr. 5: Recommendation*).

5 Recommendations from [Animedia Science](#), a counselling company which helps scientists, engineers, and teachers to explain science by using accurate visuals.



## RECOMMENDATION

Good science communication uses visuals. Using visual forms for communicating science helps the audience to understand the message easier and quicker. As we are visual creatures by nature, a picture helps very much to explain a scientific concept.

Different types of visuals that can be used to present science include scientific illustrations, infographics, conceptual diagrams, maps, tables and figures, animations and video clips (5).

## METHODS AND FORMS OF SCIENCE COMMUNICATION

An overview of ways in which scientists communicate the results of their scientific research to the public:

SCIENCE JOURNALISM	Traditional journalistic methods: It is one-way communication, with no dialogue with the public: Internet, newspapers, magazines, TV and radio.
SCIENCE MUSEUMS AND SCIENCE CENTRES	Science-exhibitions, with hands-on exhibits; open labs; public lectures; science shows.
POPULAR SCIENCE BOOKS	Popularisation of science; mobilise citizens to take action or change behaviour.
LIVE OR FACE-TO-FACE EVENTS	Allow a two-way dialogue, scientists interact with the public.
CITIZEN SCIENCE	Citizen scientists are not only listeners: they build and add to the project.
SCIENCE SHOPS	Science Shops can be an effective model for developing mutually beneficial relationships between academia and society. By working together to find solutions to societal issues, students/researchers get to work on real-life problems and civil society organisations get access to research expertise and new knowledge.
SCIENCE CAFÉS	Dialogues in an informal setting such as a coffee shop. Scientists, teachers, policy/regional decision-makers and interested persons come together to discuss interesting and current issues about science. The discussion is moderated by a science journalist.
SCIENCE FESTIVALS	For example the <u>European Researchers' Night</u> , a public event dedicated to bring researchers closer to the public, implemented in cities across Europe and beyond. They showcase the diversity of research and highlight the impact of research on our daily lives. Another example of a science festival is the UK-based " <u>Pint of Science</u> ".
CHILDREN'S UNIVERSITIES	<u>Children's universities</u> are also an example of how to attract the attention of the youngest generation. Typically, Children's university programmes include science-related lectures, workshops, hands-on tutorials or similar activities, which take place as summer programmes, after-school activities or at weekends.
ONLINE INTERACTION	Allows both one-way and two-way communication: websites, blogs, wikis and other social media, including Twitter and Facebook. An example of an online activity that attempts to talk science with schoolchildren is in the initiative <u>I'm a Scientist, Get Me Out of Here!</u> – a competition between scientists, where the students are the judges.

# WHY IS IT IMPORTANT TO YOU AS AN NCP?

National contact points should actively raise awareness of, and emphasize the importance of, science communication. They can contribute by recommending effective science communication skills and methods on how to involve and engage the different stakeholder groups. The European Executive Agency for Small and Medium-sized Enterprises (EASME) provides some recommendations on how to communicate a project (*Figure Nr. 6*).

Sometimes science is still perceived as the exclusive domain of researchers. However, there is a need for the public to have a voice in order to raise questions so that they can improve their understanding and air their

concerns, and thus give science a new impetus in the public eye.

As an NCP, it is advisable to raise awareness of projects that deal with citizen science and other ways of engaging citizens in science.

Another challenge of science communication today is making clear the relevance of the latest scientific knowledge to people's everyday lives. How can scientific information be transmitted to the public to influence their everyday choices? Science communication may offer insights into how people can influence large-scale issues, such as climate change, through the decisions they make in their daily routine. "The citizens' engagement should not be only on an abstract informational level but in everyday practices, such as commuting, cooking, heating or gardening (6)."

6 European Science Foundation paper [Science in Society: caring for our futures in turbulent times](#), 2013

## HOW TO COMMUNICATE YOUR PROJECT

- Think, Plan, Act strategically**
  - What do you want to achieve?
  - Communicate from day one
- You can't reach everyone**
  - Define your target audience
  - Use consortium resources, expertise and ideas
- Think Issue, not project**
  - What issue is the project addressing?
  - Link communication to hot topics in society
- Make it relevant to daily life**
  - Show the impact on society
  - Avoid technical language and jargon
- Be creative**
  - Vamp up the visual, reduce the writing
  - Use social media
- Get into the media mindset**
  - Identify relevant media people
  - Understand media language and needs
- Think global, act local**
  - Local and regional media are effective targets
  - Use the project's local connections
- Build your brand**
  - Become a trusted source and voice
  - Contribute where and when you can

Figure Nr. 6: Communication of a project. ([Infographic flyer](#) by EASME)





# RESOURCES & INFO

## ORGANISATIONS

- [Children's Universities Network](#) is a network that helps universities to increase children's curiosity in science. EUCU.NET was founded in 2008.
- The [European Citizen Science Association](#) is a European reference network of citizen science initiatives. ECSA's vision is to encourage the growth of the citizen science movement in Europe in order to enhance the participation of the general public in scientific processes, mainly by initiating and supporting citizen science projects as well as performing research on citizen science. ECSA was launched in 2013.
- [ECSITE](#) is a European network of science centres and museums active in the field of science communication. The vision and mission of ECSITE is to foster creativity and critical thinking in European society, emboldening citizens to engage with science. The network gathers more than 350 organisations in Europe and world-wide: science centres, museums, research bodies, festivals, universities, planetariums, foundations and learned societies, companies and local authorities. ECSITE was created in 1990.
- The European Research Council's ([ERC](#)) [Public Engagement with Research Award](#) aims to underline the importance of science communication and encourage those who engage with audiences outside their domain to communicate their research. One winner is selected in each of three categories: public outreach, press and media relations, online and social media. The competition was launched on 24 September 2019 and the deadline for submissions is on 10 January 2020. The winners will be announced at the EuroScience Open Forum (ESOF) in Trieste in July 2020.
- [European Researchers' Night](#) is a public event held every year dedicated to bringing researchers closer to the public. The events showcase the diversity of research and highlight the impact of research on our daily lives. The aim is also to motivate young people to embark on research careers. European Researchers' Night grants are implemented under the funding scheme of [Marie Skłodowska-Curie Actions](#) and may be awarded to any legal entity established in an EU member state or associated country.
- [European Science Communication Institute](#) is a not-for-profit organisation dedicated to addressing the challenges of science communication at European level. ESCI helps scientists to communicate effectively, supports national and international research initiatives, provides up-to-date media training and offers targeted dissemination tools. ESCI was founded in 2016.

- The European Science Engagement Association is a knowledge-sharing platform of experts involved in public engagement activities. EUSEA encourages and supports innovative formats of science-society dialogue across Europe - ranging from Researchers' Nights to Science Parliaments, from Science Cafés to Maker Faires, from public debates to local strategies uniting scientists with policy makers. EUSEA was founded in 2001.
- EuroScience is a grassroots association of researchers in Europe, established in 1997. Among other intentions, one of the EuroScience's key cornerstones is to raise awareness of important issues linking science to society, and to engage in addressing these issues through political processes and the promotion of dialogue at the European level between scientists and other stakeholders in science. The most visible and tangible outcome of the EuroScience's efforts is the foundation of the largest European conference, the EuroScience Open Forum (ESOF).
- ESOF – EuroScience Open Forum – is a biennial pan-European meeting dedicated to scientific research and innovation. At ESOF conferences leading scientists, young researchers, business people, policy makers, science communicators and the general public discuss new discoveries and debate the direction that research is taking in the sciences, humanities and social sciences. The ESOF platform was created in 2004 by EuroScience association. ESOF 2020 will be held in Trieste, Italy from 5 to 9 July.
- Living Knowledge is a formal international network of 'Science Shops' – small entities that facilitate cooperation between universities and Civil Society Organisations (CSOs) to generate research ideas, questions and agendas. Their goal is to co-create research to find solutions and therefore make a positive impact on real world problems. The Living Knowledge network was launched in 2001.
- National Coordinating Centre for Public Engagement has an international reputation for inspiring and supporting universities to engage with the public. NCCPE was established in 2008 in the UK.
- Global Science Festival “Pint of Science” was founded in 2012 in the UK. “Pint of Science” gives scientists the opportunity to discuss their latest research with the public. Every year thousands of researchers across 400 cities in 24 countries share their discoveries with the public in their local pub, bar or cafe. The festival continues to grow, helping volunteers in new countries to establish their own festival.
- Science Communication Toolbox is a Swedish initiative which aims to provide inspiration and ideas for a variety of activities to communicate research. This toolbox was developed by a Swedish science communication organisation Vetenskap & Allmänhet / VA with funding from the Swedish Research Council and the European Commission in 2005. Vetenskap & Allmänhet was founded in 2002 and works to promote dialogue and openness between researchers and the public. Their motto is based on the belief that dialogue is a cornerstone of a democratic society and the key to solving societal challenges.

- The Spanish Information and Scientific News Service (SINC) communicates the latest scientific knowledge to the (Spanish-speaking) public. The objectives of the SINC agency are to communicate results from research projects and to provide an understanding of science to the wider public. The research community participates by assisting SINC with the revision of publications to ensure they are accurate and correct.

## HORIZON 2020 PROJECTS RELATED TO SCIENCE COMMUNICATION

- CONCISE examines the role science communication plays on the origin of beliefs, perceptions and knowledge of EU citizens about scientific issues. To achieve this aim, the project will carry out five citizen consultations with the participation of a total of 500 citizens. The CONCISE project started in December 2018 and ends in November 2020.
- The QUEST project aims at defining, measuring and supporting quality in science communication. The project wants to develop tools and guidelines for improving the effectiveness of dialogue between science and the wider public. The QUEST project started in February 2019 and lasts until February 2021.
- RETHINK is another newcomer Horizon 2020 project that addresses science communication. How do you bring meaningful, long-term change in science communication and so overcome the challenges of digitalization? The mission of RETHINK is to improve the quality of interactions between science and society by providing concrete recommendations and training resources to help nurture open and reflexive science-society interfaces. The RETHINK project started in January 2019 and lasts until the end of 2021.
- SciShops.eu is a Horizon 2020 project supporting the development of new Science Shops across Europe. As part of this project, at least ten new university- and non-university-based science shops will be established in Europe by project partners. The SciShops.eu project was running from September 2017 to February 2020.
- InSPIRES is another Horizon 2020 project which brings together civil society, practitioners and other stakeholders from across and beyond Europe to co-design, jointly pilot, implement and roll out innovative models for Science Shops. The InSPIRES project started in April 2017 and lasts until March 2021.

