

ESERA 2019 Pre-Conference Workshop

1. Title of the workshop

RADIOLAB: an interdisciplinary project for improving awareness about radon exposure

2. Contact information:

Vera Montalbano, University of Siena and INFN Pisa (montalbano@unisi.it)

3. Requested maximum number of participants (absolute maximum of 40 persons, if not also offered as a parallel session)

40 participants

4. Short description of relevant areas of expertise for each workshop facilitator

STEM education, socio-scientific issues, interdisciplinary science education, active learning, scientific literacy of citizens

5. **Workshop abstract (for recruiting participants)**

In the workshop we will present the project RadioLab promoted by INFN (Italian National Institute for Nuclear Physics) since 2005. The RADIOactivity LABORatory born with the purpose to disseminate science in society through science education. It is a nationwide initiative and its focus is on a hands-on measurement of indoor radon contamination realized by secondary schools' students.

Radon gas is by far the most important source of ionizing radiation among those that are of natural origin. The gas emanates from rocks and soils and tends to concentrate in enclosed spaces like underground mines or houses. Since radon gas decays into radioactive particles that can get trapped in the lungs during breathing, it is a major contributor to the ionizing radiation dose received by the general population. Radon is now recognized as the second most important cause of lung cancer after smoking in the general population.

The World Health Organization first drew attention to the health effects from residential radon exposures and promoted effective strategies for reducing the health impact of radon and to raise public and political awareness about the consequences of long term exposure to radon.

RadioLab aims to increase awareness of the radon risk in the population through measures of concentration of this radionuclide. Students start with a survey on radon in the school and surroundings, follow a learning path to introduce nuclear phenomena, are introduced to measures of radon concentration by using active and passive detectors, design a series of measures and implement them.

The project activities have many interdisciplinary aspects ranging from health aspects to the risk due to exposure to ionizing radiation, from the history of the discovery of radioactive phenomena to the monitoring of natural radioactivity, from the diffusion of radon in the minerals from the subsoil up to touch technological aspects such as techniques of building construction and the materials used.

RadioLab has proven to be an excellent opportunity for professional development of science and non-scientific teachers. Physics, biology, geology, mathematics, statistics, and the history of science are the main fields in which students acquire greater and deeper awareness of the basic concepts necessary to act consciously in a complex real context. But above all the discovery that they can acquire knowledge through active practices and cooperating together getting to know and quantify even an elusive gas like radon.

6. Workshop description (*maximum 3 pages*)

a) Goal of the workshop:

international multiplier event, aimed to disseminate the projects within the research community of science education, teachers, science communicators and policy makers.

b) schedule:

9:30-9:50: Welcome and overview of the project: Flavia Groppi – Maria Gabriella Pugliese
9:50-10:45: Beyond the fear of the invisible: an interdisciplinary exploration for improving awareness about radon exposure risk: Talk by Vera Montalbano and discussion
10:45-11:00: break
11:00-11:15: Introduction to RadioLab: the common structure, the implementations in INFN divisions, role and effectiveness of national events: Talk by Josette Immé and discussion
11:15-12:15: Discussion of examples of Radiolab activities: local surveys, different types of measures, sampling and statistical data analysis.
12:15-12:30: Final discussion

c) activities of all participants: both general talks and working groups are foreseen. In the working groups, radon surveys results, passive and active radon detectors, data acquisition and statistical data analysis, and activities recently proposed in primary and middle schools will be shown in an educational active context with an emphasis on students' and teachers' reactions.

d) list of literature relevant to the workshop topic and/or format: the literature and materials can be found in the website of the project: web.infn.it/RadioLab (in Italian) or in a preliminary [English site](#)

e) materials or artefacts needed: INFN and PLS will cover the extra-costs (printing materials, gadgets, travelling cost for speakers and facilitators)