



RESEARCH REACTOR OUTREACH PROGRAM: A COLLABORATION BETWEEN THE INTERNATIONAL ATOMIC ENERGY AGENCY, THE UNIVERSITY OF TEXAS AND JORDAN ATOMIC ENERGY COMMISSION

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Introduction

- Developing PPT E-learning outreach Research Reactor programs for the IAEA.
- PowerPoint presentations to be used by various international stakeholders for educational, training and research programs while contributing to the local, regional and country's economy.
- The subjects include planning for future nuclear energy, medical isotope production, health physics training, nuclear analytical methods primarily in neutron activation analysis, etc.

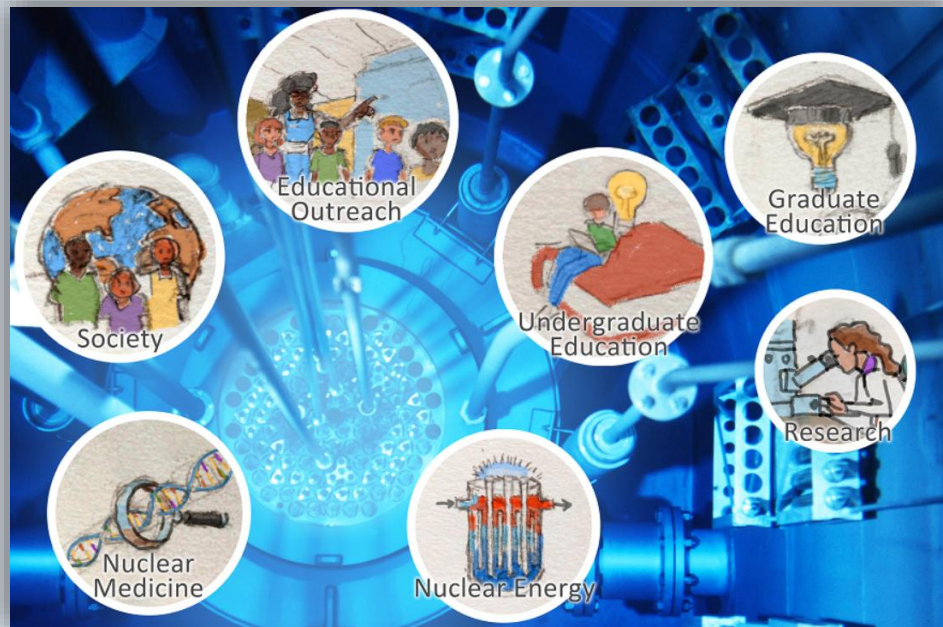
Providing education, research, problem-solving, and service in nuclear science and engineering



An Overview of the Multidisciplinary Nature of Research Reactors

There is a wide scale of power levels, various facilities, ease of accessibility and locations of research reactors.

Defining and implementing outreach programs for RR to benefit the countries' economic opportunities can be challenging.



SWOT Analysis of the Challenges for a Successful RR Outreach Program

Strengths

- Well established world-wide programs at research reactors
- Well-educated personnel
- Management team and synergy among stakeholders

Weaknesses

- Too little time to prove success
- Complex program dynamics

Societal Impact of Research Reactors

Opportunities

- Jump start new education and research programs
- Recruit a new generation of nuclear science and engineering workforce
- Attract students from a multitude of disciplines

Threats

- Failure to attract stakeholders
- Outreach program does not continue after funding

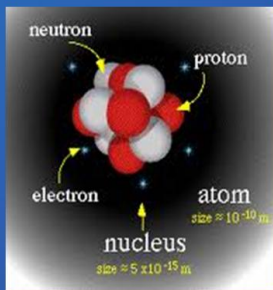
- The PPT E-learning outreach course was developed using the standard IAEA templates and to be uploaded to the dedicated directory.
- The IAEA is offers a multitude of E-learning courses and vigorously supports the applications of research reactors.
- The module is a collaboration of the IAEA with the University of Texas, an educational consultant and the Jordan Atomic Energy Commission.

Outreach presentations:

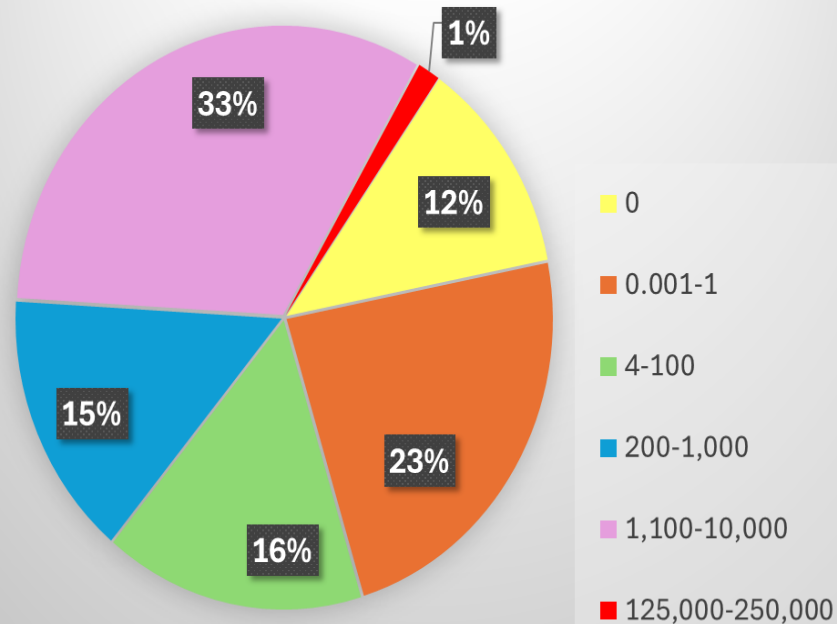
- 1. History of Nuclear Science and Impact of Nobel Prize Winners.
- 2. Outreach Program for Research Reactors:
 - The role of Outreach in Research Reactor Utilization.
 - Strategic Outreach Plan for Nuclear Research Reactors: Products and Services.
 - Strategic Outreach Plan for Nuclear Research Reactors: Research and Development.
 - Research Reactor Publications European Research Reactor Conference (RRFM) and the National Organization of Test, Research and Training Reactors (TRTR).
 - Neutron Radiography.
 - Medical Isotopes.
 - Neutron Activation Analysis (Delayed).
 - Basic Training in Support of Nuclear Energy.

History of Nuclear Science and Impact of Nobel Prize Winners

Sheldon Landsberger
Tal Egozi

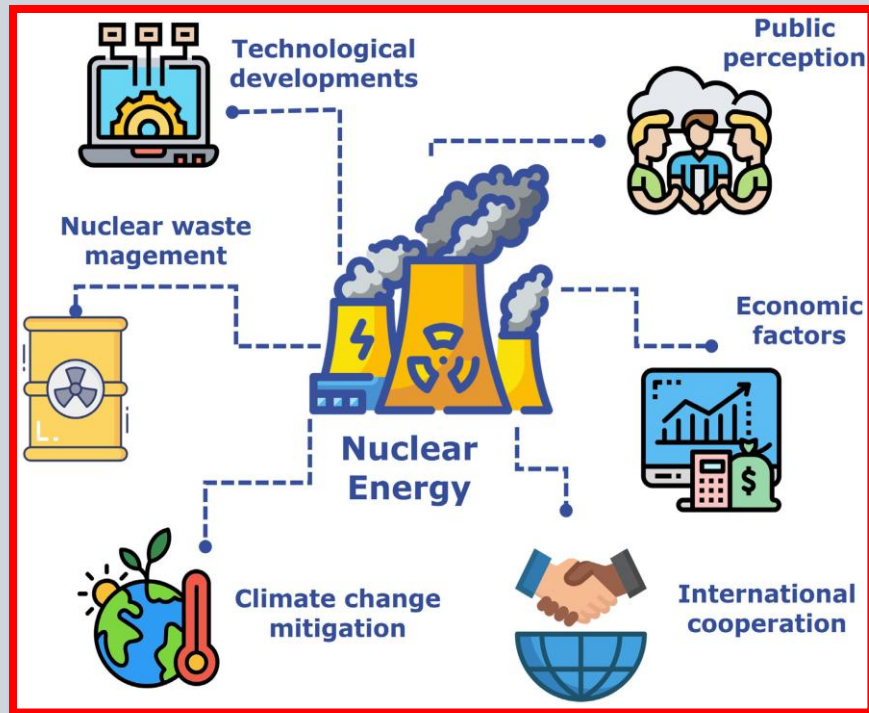


Range of Power (KW) for Research Reactors



The Role of Outreach in Research Reactor Utilization

- From public perception to stakeholder engagement.
- Outreach as a driver for sustainability and funding.
- Trends in outreach: transparency, inclusivity, innovation.



Strategic Outreach Plan for Nuclear Research Reactors: Products and Services.

- Identify and categorize key stakeholders who benefit from, regulate, or influence RR products and services.
- Understand the interests, needs, and influence of these stakeholders.
- Prioritize stakeholders based on their potential impact on the reactor's success and their level of interest.
- Develop targeted communication and engagement strategies tailored to different stakeholder groups.
- Strengthen trust, transparency, and collaboration with stakeholders, thereby supporting the reactor's sustainability, relevance, and contribution to national development.

Monitoring and
Feedback Loops

Building Alliances



Mapping the Stakeholder
Landscape

Stakeholder Analysis

Inclusive Engagement
Strategies



Strategic Outreach Plan for Nuclear Research Reactors: Research and Development.

- Objective:
- Align outreach with organizational objectives and stakeholder needs.
- Enable Research Reactor (RR) facilities to identify and reach key stakeholders.
- Provide tools to craft compelling messages and choose effective outreach methods.





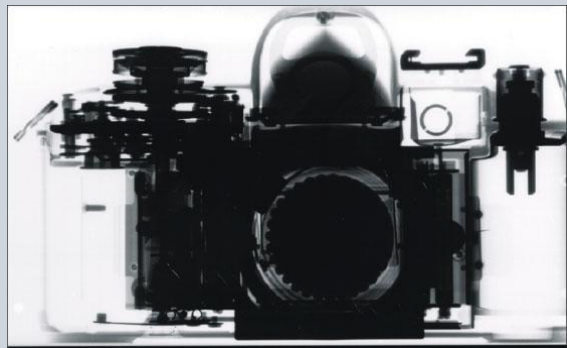
Research Reactor Publications

RRFM and TRTR

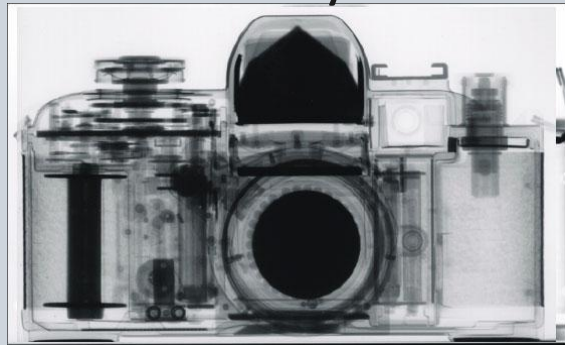
The National Organization of Test, Research and
Training Reactors (trtr.org)

Neutron Radiography

- Radiation passes through an object; transmission is material dependent.
- Differences in transmission reveal internal features.
- Nondestructive — the object stays intact.

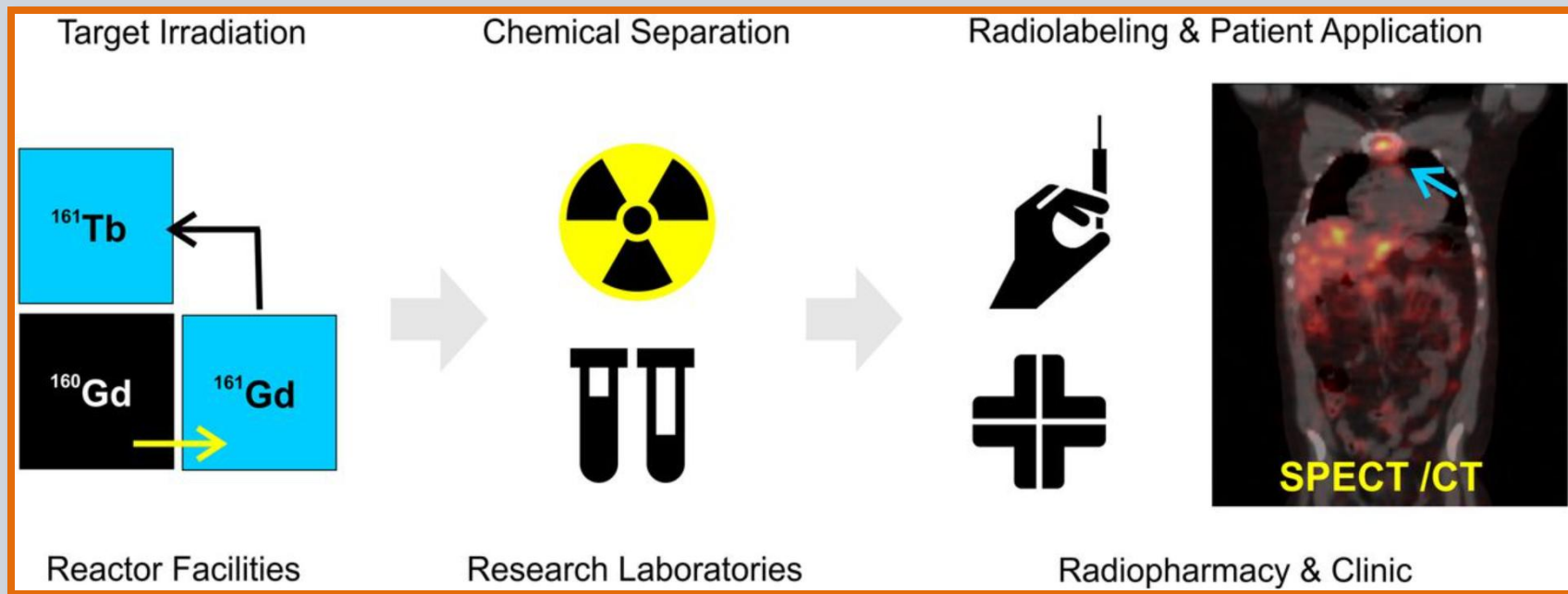


X-Ray



Neutron Radiograph

From Reactor to Remedies: Nuclear Reactor-Produced Medical Isotopes in Medicine and Theranostics

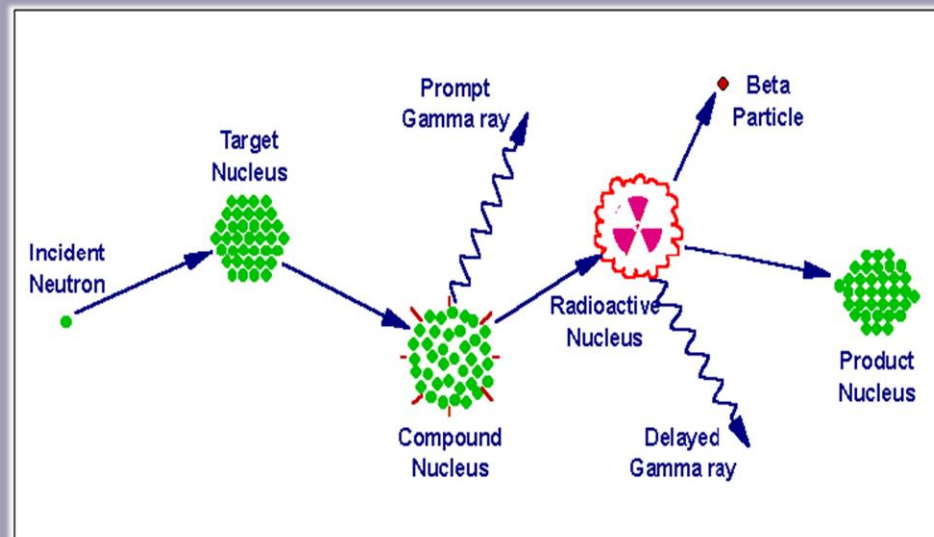


******Theranostic isotopes are radioactive elements used in both diagnostic imaging and targeted cancer therapy.

Neutron Activation Analysis (Delayed)

Neutron Activation Analysis (NAA) is an isotope-specific analytical technique for the qualitative and quantitative measurement of the chemical elements and their total masses present in a test portion of a material.

The technique is based upon the conversion of stable atomic nuclei into radioactive nuclei by irradiation with neutrons, and the subsequent measurement of the radiation emitted during the decay of these radioactive nuclei.

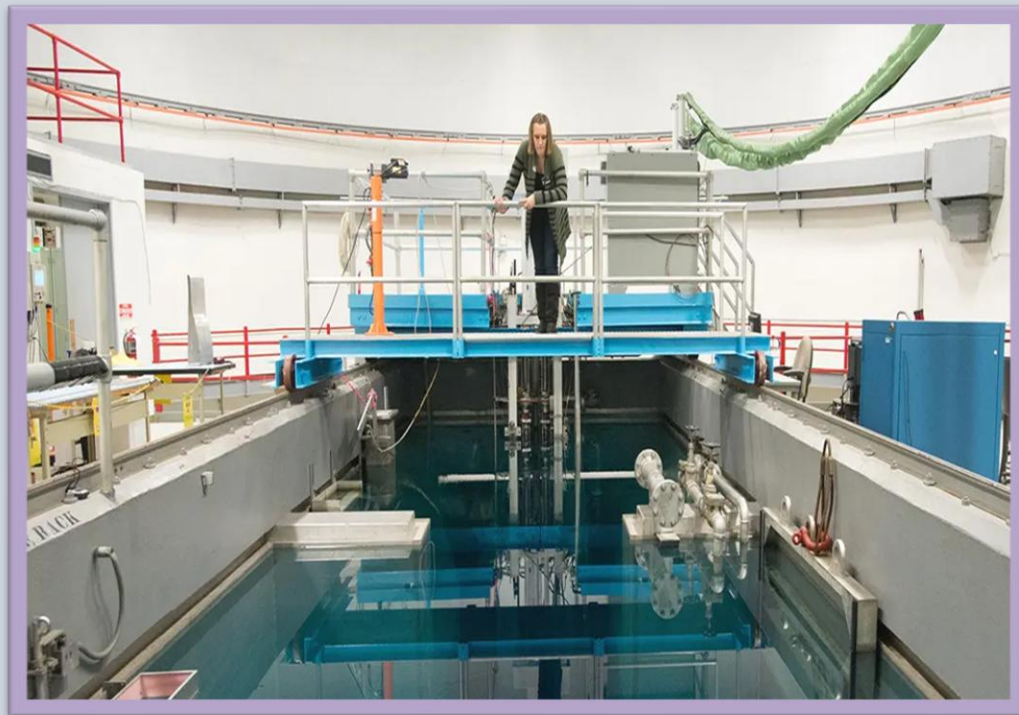


Research Reactor Training in Support of Nuclear Power

Research reactor training supports the nuclear power industry.

It provides a practical foundation in reactor operation, physics, and safety.

This is done through university programs and university-based research reactors, IAEA and other international government agencies.



Research Reactor Tours at the University of Texas at the TRIGA Research Reactor

- From 2011- 2024 (excluding 2021-2022 due to Covid) the staff at Nuclear Engineering Teaching Lab have given *311 free* tours for over *4000* visitors.
- The tours were given to K-12 students in the metropolitan Austin area, Austin Community College Texas State Departments; private industry, national labs and more.



<https://engineering.tamu.edu/news/2017/02/texas-am-ans-chapter-hosts-boy-scout-nuclear-science-merit-badge-workshop.html>

High School Workshops at the University of Texas at the TRIGA Research Reactor

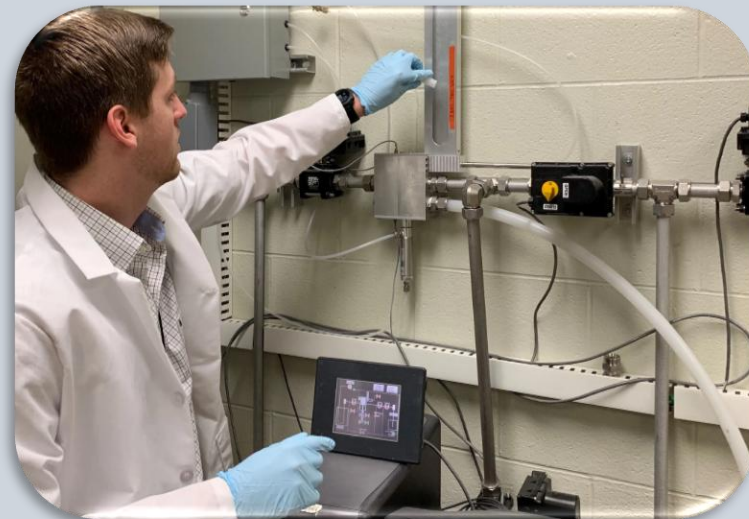
- One of the very best ways to discuss nuclear concepts in the high school level is to have high-school teachers' workshops.
- We had two very successful workshops in July 2025 where the teachers participated in experiments involving radiation statistics, half-life measurements, and simple radiation shielding.



Shaping the Future of Nuclear Energy

Internships at the at the University of Texas at the TRIGA Research Reactor

- We have a great success offering long and short terms internships:
- We supported undergraduate students from University of Dallas who came several times for short-term visits.
- A long-term summer internship to an undergraduate student at University of Purdue from Computer Science to develop gamma ray spectroscopy capabilities for neutron activation analysis.
- We also supported radiochemistry research for students from Austin Community College.



<https://www.iaea.org/topics/neutron-activation-analysis>

Conclusion

- We have developed a range of modules to help establish research reactor outreach activities.
- These modules offer the basis to expand to other directions based on the needs and expertise of the personnel at the individual research reactor.
- It is hoped that in the near future these modules will be integrated into the IAEA E-learning management system.



<https://x.com/iaeaorg/status/2024242527566450993>

References

- [1] International Atomic Energy Agency, IAEA Research Reactor Data Base (RRDB), IAEA, Vienna, last accessed February 2026
- [2] International Atomic Energy Agency, IAEA Open Learning Management System, IAEA, Vienna, last accessed February 2026, <https://elearning.iaea.org/>
- [3] International Atomic Energy Agency, IAEA Neutron Applications Portal, IAEA, Vienna, last accessed February 2026, <https://nucleus.iaea.org/sites/neutrons/>

