EDUCATION AND TRAINING IN MEDICAL PHYSICS IN ARGENTINA: THE ROLE OF ARGENTINE SOCIETY ON MEDICAL PHYSICS (SAFIM)

G. Sánchez[1], V. Venier[1], V. Sanz[1], M.J. Irazoqui[1]

[1]Argentine Society of Medical Physics (SAFIM)

Abstract—**The Argentine Society of Medical Physics (SAFIM) was founded in 1988 and has since then been involved in the organization of courses, congresses, seminars and workshop and facilitated the participation of its members in scientific meetings. This article presents the role of the Society in the education and training of medical physicists in Argentina. It also highlights the Society's role in the celebration of the International Day of Medical Physics (ICMP)**

Keywords— **Medical Physics, Education and Training, Argentina, SAFIM.**

I. INTRODUCTION

The Argentine Society of Medical Physics (SAFIM) was founded in 1988 on the occasion of the International Workshop on Medical Physics and the IV International Course in Medical Physics. This course, organized by the International Center for Theoretical Physics – Trieste - Italy (ICTP) and Comisión Nacional de Energía Atómica - Argentina (CNEA), included the participation of prestigious professors like Pedro Andreo, Pierre Dutreix and Andree Dutreix, among others. Since then, SAFIM was involved in the organization of courses, congresses, seminars and workshop and facilitated, as far as possible, the participation of its members in Scientific Meetings. Just to mention a few relevant events, the organization of the 12th Argentine Congress on Medical Physics, Buenos Aires, 2014; 13th Argentine Congress on Medical Physics, Carlos Paz, Córdoba, 2016; and the 14th Argentine Congress on Medical Physics, Bariloche, 2024 (Figure 1).

In 2023 (Organized by SAFIM Education and Training Commission) two dosimetric intercomparison workshops for well chambers were held in Rosario and Córdoba, with the participation of physicists from the Regional Reference Center with Secondary Standards for Dosimetry (CRRD) and from different institutions, both public and private. These events gave the physicists of the participating institutions the possibility of calibrating well chambers with the option of obtaining the respective certificate issued by the CRRD, satisfying a specific need of the partners.

Webinars on specific topics were held in 2023, such as "Quality Control in Mammography" and "Application of the New IAEA Code of Practice for Calibration of Well Chambers" and a Workshop on "Internal Dosimetry in Metabolic Therapies".

As a registered, publisher SAFIM issued a Clinical Training Program for Physicists Specializing in Nuclear Medicine (Figure 2) [1]. The publication of similar programs in Radiotherapy and Radiology is a project for the upcoming year.

In October 2024, the 14th Argentine Congress of Medical Physics, organized by SAFIM, was held in the city of San Carlos de Bariloche. The congress (Figure 3) brought together 212 attendees from different parts of the world, who participated in two days of talks led by international, national and student lecturers. The presentation of more than 150 scientific papers and a full day dedicated to practical courses designed to strengthen clinical and technical skills:

- Course "DCAT Technique for Lung and Liver SBRT: Optimization and Quality Control with Elekta One Planning and ThinkQA" Sponsor: ELEKTA
- Theoretical-Practical Workshop "Mastering Brainlab Tools: Elements and ExacTrac DynamiC" Sponsor: Brainlab
- Practical Workshop "Quality Control in Mammography – Simple and automated. IAEA ATIA Program"
- Clinical Experience for PSQA of SRS/SBRT using CMOS Technology Detector
- Automation & Scripting Course Sponsor: Varian
- End-to-End Testing for Commissioning and Quality Control in SRS/SRT Sponsor: PTW

The abstracts of the papers and the complete version of a special selection of papers are planned to be published subsequently.

II. ACTIVITIES ON INTERNATIONAL DAY OF MEDICAL PHYSICS 2024

On November 4 – 7, SAFIM hosted Medical Physics Week, a virtual event that included 10 selected talks on key topics such as radiotherapy, nuclear medicine, diagnostic imaging, radiation protection and education. These presentations, originally held within the framework of the 14th Argentine Congress of Medical Physics, were transmitted online to reach those colleagues and students who could not join in-person. The result was extraordinary: more than 250 attendees from more than 20 countries throughout the region participated in this space for exchange and learning. The presentations are available – in Spanish – on the Youtube channel of SAFIM https://www.youtube.com/@SAFIM-You-Tube

Figure 1: 14th Argentine Congress on Medical Physics Bariloche 2024

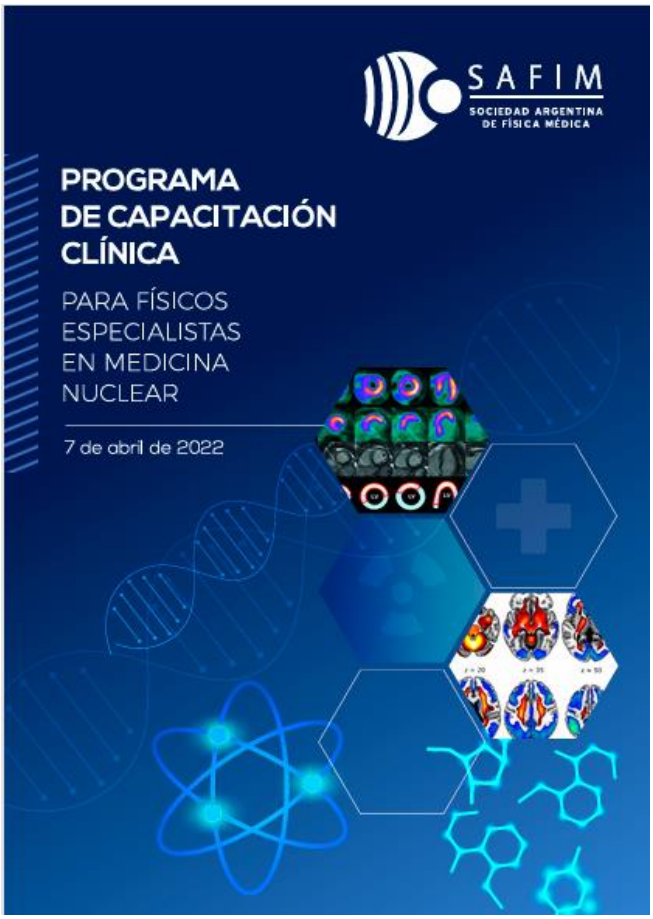

Figure 2: Published book on Nuclear Medicine

Figure 3: Scenes from the Argentine congress held in 2014

III. EDUCATION AND TRAINING PROGRAMS

There are several undergraduate degree specializations, masters' degrees and residency programmes in Argentina, in accordance with the provisions of the regulations to work as Clinical Medical Physicists. These training programs include students and professionals from several various Latin American countries.

List of medical physics education and training programs in Argentina are:

- M.Sc. in Medical Physics: 1. Instituto Balseiro (Bariloche) and Universidad Nacional de Cuyo y FUESMEN (Mendoza). 2. Universidad de Buenos Aires. Facultad de Ciencias Exactas y Naturales. Departamento de Física
- Postgraduate Specialist in Physics of Nuclear Medicine: Universidad Nacional General San Martín (UNSAM) Escuela de Ciencia y Tecnología
- Postgraduate Specialis in Physics of Radiotherapy: Universidad Nacional General San Martín (UNSAM) Instituto Dan Beninson

- Medical Physics Engineering,: Universidad Favaloro Facultad de Ingeniería y Ciencias Exactas y Naturales
- BSc. Medical Physics: 1. Universidad Nacional General San Martín (UNSAM) Escuela de Ciencia y Tecnología; 2. Universidad Nacional de la Plata Facultad de Ciencias Exactas
- Residence/Fellow in Clinical Practice for Physics in Radiotherapy and Nuclear Medicine: 1. Instituto Oncológico Ángel H Roffo – Facultad de Medicina Universidad de Buenos Aires. 2. Fundación Médica de Río Negro y Neuquén (FUNMED)

These programs are recognized by the Nuclear Regulatory Authority (ARN) as "specialized education" to grant licenses to work as a Medical Physicist in the areas of their competence (Radiotherapy and Nuclear Medicine). After completing this specialized education, applicants must carry out supervised internships in healthcare institutions.

The continuous advancement of health-related technologies, particularly those involving the use of ionizing radiation, demands highly trained professionals equipped with the necessary tools to address current challenges. This makes it necessary to update training programs based on an optimized relationship between educational and healthcare institutions.

This topic was discussed in depth during the 14th Argentine Congress of Medical Physics and triggered several lines of work and discussion at SAFIM.

By way of example, the general aspects of one of these programs (Training and Education Program for Clinical Medical Physicists According to IAEA/IOMP/ALFIM Guidelines) are summarized [2].

To comprehensively comply with regional and international recommendations and the current legal requirements of our country, this paper presents the Structured Program for Supervised Clinical Training (PEECS), developed by the INTECNUS Foundation in collaboration with the Balseiro Institute (IB - UNCu) and the National Atomic Energy Commission (CNEA), with university accreditation. This program is also based on the concept of Entrustable Professional Activities (EPAs), following the recommendations of the Ministry of Health for evaluating clinical competencies for healthcare professionals.

The program includes a two-year Clinical Medical Physics Specialization (with a focus on Radiotherapy or Nuclear Medicine and Radio-diagnostics, as applicable) and two one-year Clinical Medical Physics Diplomas (one in Radiotherapy and another in Nuclear Medicine), integrated into a Clinical Medical Physics Residency conducted at the INTECNUS Foundation. Both the Specialization and Diploma programs are university-accredited, and their curricula align with the guidelines established by IAEA, IOMP, and ALFIM for training clinically qualified medical physicists.

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Contacts of the corresponding author:

Author: Gustavo Sánchez
Institute: Argentine Society of Medical Physics (SAFIM)
Country: Argentina
Email: gudasavi@gmail.com