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Brief History of Canadian Medical Physics

and

Medical Physics Unit

at McGill University

A seminar to mark the

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I. HISTORICAL PERSPECTIVE

Medical physics has a long and illustrious history in Canada. German Physicist **Wilhelm Röntgen** discovered X rays on November 8, 1895, and the first medical use of X rays in Canada occurred soon thereafter on February 7, 1896 at McGill University in Montreal.

Henri Becquerel discovered natural radioactivity in 1896, and **Ernest Rutherford** from New Zealand carried out his seminal work on radioactivity at McGill University during the early years of the 20th century from 1898 to 1907.

These events laid the foundation not only for modern physics but also for medical use of X rays and radioactivity in clinical and academic institutions. Two new medical specialties, diagnostic radiology and radiation therapy, appeared only a few years after these momentous discoveries. Both specialties required involvement of physicists, and this eventually led to a new applied physics specialty, now referred to as **medical physics.** This generated employment for physicists in Canadian medical centres and paved the road for eventual formation of Canadian Medical Physics organizations.

During the 1930s and 1940s many physics departments across Canada had already made significant successful efforts to ensure that the use of ionizing radiation in medicine for imaging and radiotherapy was safe and efficient. There are many examples of early contributions to medical physics from across Canada; however, none of them were as important, far-reaching, and visionary as the programs developed by Canadian physicist Harold E. Johns, first in Saskatoon and then in Toronto.

Dr. Johns completed his Ph.D. studies in Physics at the University of Toronto and in 1945 accepted a combined academic–clinical job offer in Saskatoon at the University of Saskatchewan and at the first cancer control agency in Canada, the Saskatchewan Cancer Commission. He was the first full time medical physicist in Canada and is considered the father of Canadian Medical Physics.

In 1949, Dr. Johns convinced the Saskatchewan provincial government to install the first high-energy betatron in Canada for treatment of deep-seated tumors with high-energy X rays. He also invented the cobalt-60 teletherapy machine for cancer therapy and in 1951 built the first such machine in the World for clinical use. The cobalt-60 machine represented a revolutionary advance in radiotherapy and between 1951 and 1980 many millions of cancer patients benefited from its use. It seems appropriate to characterize **the cobalt-60 machine as Canada's gift to humanity.**

In the late 1960s developed countries began to replace cobalt machines with linear accelerators also referred to as linacs. These new machines offered advanced technology, more flexibility, as well as higher energies and dose rates. However, in developing countries the cobalt machine is still heavily used today because of its relative simplicity and much lower capital and operating cost in comparison to modern linacs.

Dr. Johns was also involved in teaching of graduate students and developed a first-rate medical physics graduate program at the University of Saskatchewan in Saskatoon. This program trained many graduate students who upon graduation made important contributions to medical physics and now form the early links in Johns' medical physics dynasty, now already extending into five generations.

In 1956 Dr. Johns moved from Saskatoon to Toronto to a position of Head of the Physics Division of the Ontario Cancer Institute and Professor of Physics at the University of Toronto. He was accompanied to Toronto by some of his former graduate students and together with medical staff they built the Ontario Cancer Institute, housed in the Princess Margaret Hospital (PMH), into a pre-eminent and world-renowned center for radiotherapy and medical physics.

The research carried out by PMH staff and students was at the forefront of medical physics and Dr. Johns' book "***The Physics of Radiology***" that he co-authored with his former student and colleague Dr. Jack Cunningham, was first published in 1953. After four updated editions, the book is still considered the most authoritative and complete basic text on radiological physics. Dr. Johns had a profound influence on the practice of medical physics in Canada and its current high standards are largely attributed to his vision and dedication to the medical physics profession.

In the early 1970s most radiotherapy centers in Canada except for Quebec were already using low energy 4 MV or 6 MV linacs for treatment of deep-seated targets. For budgetary reasons Quebec was late in jumping on the linac bandwagon. However, in 1974, after the Ontario Cancer Institute in Toronto has already installed a high energy 25 MV linac, three McGill teaching hospitals (Montreal General, Royal Victoria and Jewish General), in conjunction with McGill Faculty of Medicine, got their act together, renovated their radiotherapy infrastructure, amalgamated their medical physics services into one department, and jointly purchased four low energy linacs, one medium energy 18 MV linac, and three cobalt machines for their upgraded radiotherapy departments.

This is an abridged story on the miraculous beginning of the modern era in Quebec radiotherapy. It took the other major radiotherapy centers in Quebec over a decade longer to get their infrastructure and equipment upgraded, but I am pleased to state that services in all radiotherapy clinics in Quebec of today are up to World standards.

The year 1980 was a momentous year in Canadian medical physics. Most notably:

(1) Dr. Harold Johns, the doyen of, and driving force behind, the development of Canadian Medical Physics, retired.

(2) The **Canadian College of Physicists in Medicine** (CCPM) was founded.

(3) Several **new graduate education programs in medical physics** were inaugurated, among them, our academic Medical Physics program offered in the Medical Physics Unit (MPU) in the Faculty of Medicine at McGill.

(4) The **X-ray division of the National Research Council** (NRC) in Ottawa was reorganized and its work on radiation dosimetry standards and ionizing radiation calibration was expanded.

After 1980 medical physics service, teaching, and research spread rapidly to major provincial cities across Canada. Canadian medical imaging physics also underwent a major expansion, most notably with the opening of the **Robarts Research Institute** in London, Ontario and the **Reichman Research Institute** in Toronto, both staffed with many eminent medical physicists who proved that radiotherapy physics was not the only exciting and important branch of contemporary medical physics.

Toward the end of the 1980s many senior medical physicists believed that radiotherapy physics was a completed discipline with exhausted research opportunities and that imaging physics has become the most innovative area of research in medical physics. However, the early 1990s proved that this sentiment was premature, considering the explosion in radiotherapy physics research engendered during that period by rapid advances in radiotherapy treatment planning, technology of dose delivery, and imaging for radiotherapy. The advent of the CT-simulator, intensity modulated radiotherapy, and image-guided radiotherapy has significantly increased the complexity of dose delivery in radiotherapy and highlighted the importance of medical physics in clinical imaging as well as in treatment of cancer.

II. TREATMENT TECHNOLOGY AND TECHNIQUES

Access to state-of-the-art imaging and radiotherapy equipment is of benefit not only to patients but also to medical physicists who, in addition to gaining the most up-to-date practical experience, can carry out applied research on modern and sophisticated imaging and dose delivery equipment.

For example, the installation of a third generation 25 MV clinical linac in Toronto in the early 1970s stimulated research into the basic properties of high-energy X-ray and electron beams used clinically. Another example is Manitoba Cancer Foundation in Winnipeg that, during the 1980s, gained a worldwide reputation as an important centre for portal imaging research.

Since Dr. Johns' invention of cobalt-60 teletherapy during the 1950s, Canada has maintained its position on the forefront of radiotherapy and medical physics. As a result of a strong collaboration between physicians and medical physicists in large Canadian cancer hospitals, several new imaging and treatment techniques were developed in Canada and rapidly translated into clinical use around the World.

Examples of Canadian innovations are half-body and total body photon irradiation as well as cone-beam imaging both developed in Toronto and moving radiation beam techniques, such as rotational total skin electron irradiation and dynamic stereotactic radiosurgery, developed at McGill.

III. CANADIAN MEDICAL PHYSICS ORGANIZATIONS

The first Canadian national medical physics organization was founded in 1955 as the **Division of Medical and Biological Physics** (DMBP) under the auspices of the then 10-years-old **Canadian Association of Physicists** (CAP). The DMBP developed its own constitution and objectives, obtained funding through individual CAP members who opted to join and pay dues to the division, and met annually as a component of the CAP congress at the time and location chosen by the CAP.

For many years this arrangement was satisfactory; however, with the ever-increasing growth of the DMBP membership, it became apparent that an independent organization of Canadian medical physicists would offer more flexibility and better funding opportunities.

This sentiment eventually prevailed and in 1989 lead to the formation of the **Canadian Organization of Medical Physicists** (COMP). The COMP is independent from the CAP, has its own constitution, by-laws, membership requirements, as well as head office, organizes its own annual meetings, and funds its operation through membership dues and proceeds from annual meetings and exhibits.

The COMP seamlessly continued the medical physics tradition of the original DMBP-CAP and during the past three decades grew into a very strong national medical physics organization that is well respected nationally as well as internationally and maintains strong links with (1) the **International Organization for Medical Physics** (IOMP) that incorporates about 27,000 members around the World, (2) the **American Association of Physicists in Medicine** (AAPM) with over 10,000 members as well as (3) the **CAP** with over 1800 members.

Currently, COMP has over 600 active members, resulting in a rate of **15** medical physicists per million people in Canada. Considering that the World population is about 8.1 billion, the average rate of medical physicists per million people in the World is about 3. Since many developing countries still have no medical physicists, the rate of 15 ranks Canada among highly developed countries in the medical physics domain.

An elected 11-member Board, chaired by the President, runs the COMP with support from an Executive Director and administrative staff. In addition to various standing and ad-hoc committees, the COMP has a prestigious awards program with the **COMP Gold Medal** its highest honour. The Medal is awarded annually to one outstanding recipient during the annual COMP meeting.

The COMP also bestows a **Fellowship** upon selected senior medical physicists. The current number of COMP Fellows is 60 which means that about 10 % of the COMP active membership has acquired a COMP Fellowship status, designated as FCOMP.

The COMP also endorses the **Sylvia Fedoruk Prize** in medical physics that is sponsored by the Saskatchewan Cancer Agency and recognizes the best medical physics research paper that originated in Canada in a given calendar year.

Jointly with the CAP, the COMP sponsors the **Peter Kirkby Memorial Medal** for outstanding service not only to Canadian medical physics but also to Canadian physics in general. The Medal is awarded every two years.

As part of its annual meeting the COMP also conducts a highly successful young investigators' symposium. The symposium, a highlight of annual meetings, is named in honour of **Jack Cunningham**, a highly respected and decorated Canadian medical physicist.

IV. CERTIFICATION OF MEDICAL PHYSICISTS

To deal with professional issues specific to medical physicists the **Canadian College of Physicists in Medicine** (CCPM) was formed in 1979 with a mandate to organize procedures for professional certification, continuing education, and maintenance of certification for Canadian medical physicists. The original "grand-fathers" of the CCPM were six senior medical physicists from across Canada: **Sylvia Fedoruk, Arthur Holloway, Harold E. Johns, John MacDonald, Roger Mathieu, and Margaret Young**.

These six “grandfathers” formed the inaugural Board of the CCPM, appointed Dr. Harold Johns as the first CCPM President, and started discussions on CCPM structure, membership rules, and examination procedures. It soon became apparent that the task was too big for a Board of only 6 people scattered throughout Canada, so the inaugural Board decided to enlarge the number of inaugural CCPM Fellows from the original 6 Board members with 24 new inaugural Fellows to bring the inaugural CCPM membership to 30 Fellows. The 24 new Fellows were given CCPM Fellowship based on their credentials, such as many years of clinical experience, respectable publications, proven teaching record, and relevant stelar management history.

In the early 1980 the then 30-member CCPM was legally founded under a Canadian Government Charter and was on its way to open the rigorous written and oral examination process that would lead to CCPM Fellowship for successful medical physics applicants.

Chief Examiner and Examination Committee were selected, Canadian medical physicists were notified about the upcoming certification process and interested medical physicists who met eligibility criteria were encouraged to sign up for the certification examination.

While medical physicists all agreed with the need for a Canadian Medical Physics College, many found the means used for the CCPM introduction to Canada objectionable. On the one hand, the six “grandfathers” were all close to the end of their illustrious career, so their honorary Fellowship in the new CCPM was respected and readily accepted.

On the other hand, the “grandfathering” of 24 additional CCPM Fellows without any examination and requiring everyone else, many with similar credentials, to submit to a rigorous and unnerving examination caused some consternation. In addition, lack of clarity regarding the syllabus as well as the depth and breadth of the expected knowledge. required for passing the certification examination, were also of concern.

The inaugural CCPM Board did not pay much attention to the concerns of the potential candidates and in 1980 the first batch of examinees signed up to take the written and oral exams. Of the 12 candidates, 6 passed and 6 failed. A year later, in 1981, six candidates signed up for the exams: 3 passed and 3 failed. The 1982 exam was taken by only 3 candidates and only one of them walked away with a Fellowship.

To the inaugural CCPM Board and the several hundred potential examination candidates it was becoming clear, firstly, that the introduction of the CCPM certification body was receiving an unenthusiastic reception and, secondly, that the existing examination procedure must be modified, if the CCPM was to become relevant and successful.

A new **Chief Examiner** and **Examination Committee** were appointed and within a few months a completely new approach to the certification examination process was introduced.

The new examination format was rolled out in 1984 and was based on an examination booklet written by the CCPM Examination Committee members. The booklet was available to candidates several months before the examination and served as a syllabus with short and long questions defining the pertinent subject material.

The exam paper contained several questions chosen randomly from the booklet and a candidate who diligently prepared answers to all questions in the booklet had a reasonable chance to succeed.

The new approach was deemed fair, resulted in about 70 % success rate, and is still in use today, 40 years after it was introduced. Of course, the examination booklet is reviewed and updated every few years to keep abreast with new developments in medical physics.

In 1984, together with the new examination process, the CCPM started to certify medical physicists on two levels: Membership and Fellowship. The **Membership level** is attained through a written examination aimed at establishing candidate's competence for work in medical physics and attests to clinical certification. The advanced level **Fellowship** is attained through a rigorous oral examination of candidates who hold the rank of senior medical physicist and have already passed the CCPM Membership exam.

Currently, an eight-member board chaired by the President runs the CCPM, the Chief Examiner and the Examination board run the examination process, and the COMP and CCPM examination fees provide funding for the CCPM operation.

The minimum requirements for admission to **CCPM Membership examination** are: (1) an **advanced academic degree in Physics** (M.Sc. or Ph.D., preferably in the Medical Physics specialty), (2) **completion of an accredited residency program** in one of medical physics subspecialties, and (3) **2 years of clinical experience**. A CCPM Member can apply for **CCPM Fellowship examination upon completing 7 years or more of clinical experience**.

Currently, there are **559** clinically certified Medical Physicists listed in the **CCPM Membership registry**. They are grouped into four subspecialties of Medical Physics:

(1) **501** are certified in **Therapeutic Medical Physics** that in the past was referred to as *radiotherapy physics* or *radiation oncology physics*.

(2) **28** are certified in **Diagnostic Medical Physics** that in the past was referred as *Diagnostic Radiology Physics* or *Radiological Physics.*

(3) **18** are certified in **Nuclear Medical Physics** that in the past was referred to as *Nuclear Medicine Physics*.

(4) **12** are certified in **Magnetic Resonance Medical Physics.**

The CCPM also maintains an **Official Registry of Fellows** that currently lists **233** Fellows. Most of these are also listed on the list of clinically certified Medical Physicists, if they follow the Maintenance of Certification (MOC) regulations.

The professional designation for CCPM Membership is **MCCPM** and for CCPM Fellowship is **FCCPM**.

V. ACCREDITATION OF MEDICAL PHYSICS EDUCATION PROGRAMS

To promote and ensure quality of academic and clinical training programs in medical physics the **American Association of Physicists in Medicine** (AAPM) started to offer formal accreditation of these programs in 1988.

In 1994 the responsibility for accreditation of medical physics academic and residency programs was transferred to a new independent commission, referred to as the **Commission on Accreditation of Medical Physics Education Programs** (CAMPEP).

The CAMPEP is currently sponsored by five organizations: two medical physics organizations, AAPM and COMP, and three American medical organizations: American College of Radiology (ACR), American Society of Radiation Oncology (ASTRO), and Radiological Society of North America (RSNA).

Currently, the CAMPEP accredits the following education programs in Medical Physics: **M.Sc**., **Ph.D**., **Therapeutic Medical Physics Residency**, **Diagnostic Medical Physics Residency**, and **Certification of didactic coursework** in preparation for residency.

The first two U.S. institutions with accredited academic programs in Medical Physics were the University of Wisconsin in Madison, Wisconsin and Wayne State University in Detroit, Michigan, both accredited in 1988. In 1993, the first and, for subsequent 9 years, the only Canadian institution with such an accreditation was our **graduate M.Sc. and Ph.D. program** in the MPU at McGill University.

It is also notable that the McGill's **Therapeutic Medical Physics Residency program** attained CAMPEP accreditation in the year 2000 as the first Canadian institution with such an accreditation.

Regarding accreditation, Canadian medical physics educational programs are doing well considering the population ratio of about **8.3 versus 1** between the U.S. population of 340 million and Canada's population of 41 million.

Of the 64 **graduate medical physics programs** currently accredited by the CAMPEP, **15 are in Canada and 49 in the US**. To be at Canada's level on population basis, US would need to more than double their number of accredited programs.

Of the 120 CAMPEP-accredited **Therapeutic Medical Physics Residency programs, 12 are in Canada and 108 in the US**. Based on the current population ratio between the two countries, the accreditation level is about even in both countries.

Of the 43 CAMPEP-accredited **Diagnostic Medical Physics Residency programs**, **only 2 are in Canada and 41 are in the US**. To match the US level Canada would have to increase significantly the number of accredited Diagnostic Medical Physics residency training programs.

VI. MEDICAL PHYSICS RESEARCH AND INNOVATION IN CANADA

Medical physics research and innovation have a strong tradition in Canada and had plenty of role models, most notably in Harold Johns and many of his contemporaries who were active in medical physics during the 1940s through 1970s. One of the benefits of the Canadian model of nationalized health care delivery is that it resulted in a concentration of cancer therapy in large hospitals in major Canadian cities. This, in turn, produced the formation of relatively large medical physics departments with a critical mass of medical physicists that are involved not only in service work but also with teaching and applied research.

The respectable research productivity by Canadian medical physicists is evident from the “Medical Physics” journal, the official science journal of the AAPM with co-sponsorship by the COMP and the CCPM. To every five articles in “Medical Physics” originating from U.S. institutions there is, on average, one article that originates in Canada. This ratio significantly exceeds the population ratio between the two countries,

and simply reflects better opportunities for medical physics research in a few larger medical centres of Canada in comparison with the many relatively small medical physics operations with no protected research time that are prevalent in the U.S.

VII. CANADIAN VERSUS AMERICAN MEDICAL PHYSICS

A unique characteristic of Canadian medical physics is its strong collaboration with the AAPM. The AAPM has close to 10,000 members and about 500 of these are Canadians, members of the COMP, who work in Canadian institutions. Even though the AAPM is considered a US national organization, it incorporates members from 90 countries around the World and can almost be considered an international organization.

From its formation in **1958** the AAPM accepted Canadians with full membership rights and privileges. One can find Canadian members on the AAPM Board of Directors, various councils, committees, task groups and as recipients of various AAPM honours and awards. The relationship between Canada and the U.S., as far as Medical Physics is concerned, is truly exemplary and of obvious benefit to both countries.

It is notable that, on the average, every 10 years the AAPM holds its annual meeting in Canada jointly with the COMP. These meetings are always memorable and strengthen the ties between the two organizations as well as the two countries.

While the AAPM benefits from the contribution of Canadian members, the AAPM also provides Canadians with a world-class medical physics forum; over ten times the size of the COMP. It turns out that Canadian medical physics measures up in this forum quite well.

For example, to date Canadian medical physicists won 34 % of the **Farrington Daniels awards** (13 of 38) and 24 % of the **Sylvia Sorkin-Greenfield awards** (7 of 29). The AAPM bestows the two awards annually for the best article published in "Medical Physics" journal, respectively, Farington Daniels Award on radiation dosimetry and Sylvia Sorkin-Greenfield Award on any medical physics subject outside of radiation dosimetry.

Canadian medical physicists also won **12 %** of the highest-honour award that the AAPM bestows upon one AAPM member annually, the **Coolidge Gold Medal**. Since 1973, of the 52 Coolidge Gold Medals bestowed to date, 6 medals went to Canada and one of these came to McGill.

Another source of pride for Canadian medical physics is the performance of Canadian medical physics graduate students in the **John R. Cameron Young Investigators' Symposium** held during the annual AAPM meetings.

Of the 10 students, who are admitted to the oral competition based on their abstract as well as supporting documentation and then present their talk in the competition, typically three students are from Canadian institutions and at least one of them typically finishes among the three winners of the competition.

VIII. CONTRIBUTIONS OF THE MPU TO MEDICAL PHYSICS

The McGill Medical Physics Unit (MPU) staff and students have made respectable contribution to Canadian Medical Physics and Medical Physics in general.

The MPU was founded in 1979 to provide graduate M.Sc. and Ph.D. teaching and research in Medical Physics at McGill. Its first Director was Dr. Monty Cohen who came to McGill in 1976 from a senior medical physics position in the U.K. He was very enthusiastic about teaching of Medical Physics at McGill and organized well the didactic M.Sc. level courses, schedules, and the teaching staff. His initial hard work in organizing the course program and standards laid the foundation for the MPU that is still evident and appreciated today. Dr. Cohen retired in 1991.

I succeeded Dr. Cohen as Director of the MPU and retired from the position in December 2008.

Dr. Jan Seuntjens directed the MPU from January 2009 to August 2021 when he moved to Toronto to direct the Medical Physics Division of the Ontario Cancer Institute.

As of March 2023, the Director of the MPU is Dr. Shirin Abbasi-Enger.

During its 45 years of existence the MPU graduated 287 medical physicists with an M.Sc. degree and 61 with a Ph.D. degree. Considering that the COMP membership stands at around 600 medical physicists, it is fair to conclude that, with **over 300** graduates, McGill played and continues to play an important role in educating medical physicists in Canada.

While the MPU Directors were changing every decade or two, the administrative services were quite stable. The current administrative coordinator **Ms. Margery Knewstubb** came to the MPU in 1994 and deserves much credit and praise for the smooth and efficient operation of the MPU during the past 3 decades.

I would also like to acknowledge **Ms. Tatjana Nišić**, the administrative assistant in the Medical Physics department of the Royal Victoria Hospital at the MUHC, who was providing help to the MPU in times of need since 2004.

Here are some notable performance indicators for the MPU

Order of Canada: Since its establishment in 1967 to date over 7000 **RECIPIENTS** have received Order of Canada Medals; **5 Medals** were given to Canadian Medical Physicists; **one of these to a MPU staff member.**

Canadian Organization of Medical Physicists (COMP): **PRESIDENCY**

COMP was founded 35 years ago in 1989 and was governed by **6 MPU staff members during 9 of the past 35 years**

Canadian Organization of Medical Physicists (COMP): **GOLD MEDAL**

Gold Medal is the COMP highest honor and is awarded annually. Of the **35 Gold Medals** awarded from 1989 to 2024, **5 were awarded to MPU** members.

Canadian Organization of Medical Physicists (COMP): **FELLOWSHIP**

COMP membership of about 600 currently includes **60 COMP Fellows**.

Of these, there are **20** with **MPU** connection: **9** MPU staff members and **11** former MPU students.

Canadian Org. of Med. Phys. (COMP): **SYLVIA FEDORUK AWARD RECIPIENT**

35 awards given during the past 35 years, **8** of the 35 **awards were awarded to MPU students and staff.**

Canadian College of Physicists in Medicine (CCPM): **PRESIDENCY**

CCPM was founded 44 years ago in 1980.

2 Past Presidents, one was MPU staff member, the other was former MPU Ph.D. student.

Canadian College of Physicists in Medicine (CCPM): **CHIEF EXAMINERS**

During the past 40 years, from **1984 to 2024** there were **11 Chief Examiners**.

8 of 11 Chief examiners were either MPU staff (**5**) or former MPU graduates (**3**).

Canadian College of Physicists in Medicine (CCPM): **FELLOWS**

53 of the 233 **Fellows of the CCPM** are related to the **MPU** (staff or student).

American Assoc. of Physicists in Medicine (AAPM) **COOLIDGE GOLD MEDAL**

Coolidge Gold Medals awarded annually since 1973. In 52 years since 1973

52 Gold Medals given in total, **6** of these to Canadians, **one of these to McGill**.

International Organization for Medical Physics (IOMP)

In **2013** the IOMP published a list of **50 outstanding Medical Physicists** during **50 years** from IOMP inauguration in 1963 to 2013. **Five** Canadian Medical Physicists out of 50 were on the list, **one** of the five **was from the McGill MPU**.

Canadian Association of Physicists (CAP) jointly with **Canadian Organization of Medical Physicists** (COMP): **PETER KIRKBY MEMORIAL MEDAL**

for significant service to **Canadian Physics**: 15 Kirkby Medals were awarded since 1996, three of these to Canadian Medical Physicists, one of the three was MPU staff member.

IX. CONCLUSIONS

Canada has the distinction of having been in the group of the **four inaugural countries** that in **1963** sponsored the formation of the **International Organization for Medical Physics** (IOMP).

The other three countries were the **U.K**., **Sweden**, and the **U.S**. From its modest beginnings in **1963**, the IOMP grew to over 27,000 members, residing in 84 countries around the world. Since the **United Nations Organization** incorporates **193** member states, it is notable that more than half of UN countries still do not have national organizations for Medical Physics and many of them have no medical physicists.

It took our forefathers many years during the past century to get international recognition for **Medical Physics** as a **distinct profession**. Success finally came in **2008** when the **International Labor Organization** (ILO), a United Nations (UN) agency with headquarters in Geneva, Switzerland, **finally added Medical Physics to the list of recognized professions.**

This year, as we celebrate **61 years** of the **IOMP**, Canada's medical physics remains strong, provides excellent clinical service in imaging and radiotherapy, carries out respectable research and innovation, and offers great educational opportunities for young physicists who aspire to a rewarding career in medical physics.

Main characteristics of Canadian Medical Physics can be summarized as follows:

1. High level of **professionalism**
2. **Strong** national medical physics organizations

3. **Professional certification process** run by medical physicists for medical physicists.
4. **Excellent accredited graduate and residency teaching programs** spread across Canada.
5. **Excellent research and innovation productivity,** and
6. Concentration of clinical and academic medical physics programs in relatively **large centres across Canada**, providing a critical mass of medical physicists.

One important note for our young colleagues. The term "**Medical Physics**" implies a collaboration between Physics and Medicine. **There is no medical physics without a clinic** and **there is no radiation oncology clinic without a medical doctor**. To become a successful medical physicist, a medical physicist must collaborate not only with medical physics colleagues but also with medical doctors, such as Radiation Oncologists, Diagnostic Radiologists, Nuclear Medicine Physicians, etc.

In this regard, we at the MPU, during the past four decades were fortunate that many of our medical colleagues were keen on collaborations with the Hospital Medical Physics Departments as well as with the MPU students. If possible, they contributed to our applied research and appreciated our efforts. Much of the credit for this amicable environment must be attributed to **Dr. Carolyn Freeman** who, for **over three decades**, ran the Radiation Oncology academic and clinical services at McGill.

I will conclude with a final note to graduate students:

Medical Physics is an excellent career choice for a Physics graduate student who loves Physics and has compassion for patients.