



**Cañada College
Professional Development
Long Term Project Report**

Name: Rafael Rivera Division: Science and Technology

Project Name: Radiation Health Physics Master's Degree Completion

Project Location: Oregon State University (on-line) Semester/Year: Spring 2010

Provide 3-5 page report addressing the following questions and submit document to your Division Dean no later than 30 days after completion of the project. *Attach this sheet as a cover page to your report.*

- 1 A. Purpose of your project - as stated in your objectives in your application.
- 1 B. Did you complete these objectives as stated or did you modify the objectives during the project?
If so, in what way were they changed?
2. Outline your activities during the project.
3. Provide the major points of interest and value created from this project.
4. How will students benefit from this project?
5. How useful was will this project be to you as related to your future teaching assignments and how useful will this project be to other faculty in your department and division?
6. In what ways will you be sharing the benefits of your participation in the project?
7. Enclose documentation (certificates, transcripts, etc.), if available.
8. Enclose a copy of any tangible product, if applicable.

Cañada College Professional Development Long Term Project Report

1 A. Purpose of your project - as stated in your objectives in your application.

For the past three years, I have been pursuing a master's degree in Radiation Health Physics from Oregon State University and need twenty-three more units (quarter units) to complete the degree. Current Joint Review Committee on Education in Radiologic Technology (JRCERT) regulations mandate that directors of radiological technology programs have a master's degree. JRCERT has extended the deadline for me to complete this degree, but time is becoming critical. Therefore, I am requesting release time to focus on my education and complete the course work in a timely fashion. This will allow me to remain as the director of Cañada's radiological technology program. Should I not complete the master's program, the College will be obligated to have another individual take over as director or the program will lose accreditation.

The education that I am pursuing also contributes to my current assignment because it provides me with a deeper understanding of the physics involved in radiation production, transport, shielding and effects on living organisms. With the information and knowledge gain, I will be able to better prepare our radiologic technology students in the use of radiation as a diagnostic tool. The knowledge I will gain will also be helpful to create other programs such as Radiation Therapy (Radiation Oncology), Nuclear Medicine and Ultra Sound.

How will this leave enhance your professional growth?

I believe this leave will help me in multiple ways:

- 1- To comply with new Joint Review Committee on Education in Radiologic Technology (JRCERT) regulations. As part of the new regulations, JRCERT requires all program directors to have a Masters Degree.
- 2- Improve professional competence. The field of Radiologic Technology or Imaging Technology has changed so much in the last fifteen years that it demands constant review and updating of our curriculum. As a teacher, this requires me to keep up with every new technology and development.

- 3- My interest in lifelong learning. Radiologic Technology is a field that is very broad and constantly evolving. It encompasses many subject areas, including physics, anatomy, physiology, and chemistry.

Which services that you now provide or expect to provide will be improved by your proposed leave?

Completion of my master's degree will meet the rigorous educational standards set by The American Society of Radiologic Technologist (ASRT) and the American Registry of Radiologic Technologists (ARRT). For example, Helical Computerized Tomography (CT) is among the new ARRT competency requirements; consequently, the program will have to add this information to the curriculum and address issues such as excessive radiation exposure in Helical CT scanning.

1 B. Did you complete these objectives as stated or did you modify the objectives during the project?

I was able to complete the objective with one modification.

If so, in what way were they changed?

I took one more class in the spring quarter (RHP 536). My original plan was to take this course in the summer; however, Oregon State was not going to offer the class in the summer of 2010.

2. Outline your activities during the project.

Winter Quarter 2010

A. RHP 505. Reading and Conference – Study of Patient Radiation Dose in CT Scanning

In this course under the direct guidance of my advisor and professor, I concentrated on the study of patient dose in CT scanning. I looked at issues such as: calculation of dose, excessive use of CT scanning in the United States, pediatric CT, dose record keeping and possible side effects.

B. RHP 507. Seminar in Radiation Health Physics – Overview of Cancer and Radiation.

The objective of this seminar course provided me an overview of the uses of radiation in the medical field, specifically addressing communication skills with patients, physicians, corporations, and academic audiences. During class students were expected to select an aspect of radiation use in medicine. I concentrated my studies in the study of prostate cancer and the different methods used to diagnose and treat this disease.

Spring Quarter 2010

A. Radiation Health Physics 535 – Rad. Shielding and External Dosimetry.

In RHP 535 we looked at the theoretical principles of shielding for neutron and gamma radiation; external dosimetry fundamentals for neutrons, photons, and charged particles; applications to problems of practical interest; analytical, numerical, and computer solutions emphasized.

B. Radiation Health Physics 536 – Advance Radiation Detection and Measurement.

In this class I studied the principles and mechanisms nuclear radiation detection and measurements; operation of nuclear electronic laboratory instrumentation; application of gas-filled, scintillation and semiconductor laboratory detectors for measurement of alpha, beta, gamma, and neutron radiation, liquid scintillation equipment; use of Bonner spheres for neutron energy profiles and experimental investigation of interactions of radiation with matter.

3. Provide the major points of interest and value created from this project.

1. Photon interactions in matter (i.e., photoelectric, Compton, and pair production) and the basic concepts of the linear and mass attenuation coefficients, the processes of energy transfer and energy absorption in photon interactions, and the relative importance of these different types of interactions.
2. Total attenuation and absorption coefficients are calculated for compounds or mixtures of materials, and how those coefficients are used for neutron/photon shielding and external

radiation dosimetry.

3. Basic mechanisms of charged particle interactions in matter, including electron interactions, the range of electrons and bremsstrahlung yield, stopping power, and linear energy transfer.
4. I had a chance to look at point-kernel methods and analytical/numerical integration for determination of photon/particle flux at receptor locations.
5. I became familiar with the different methods to measure quantities used to describe dose, including: imparted energy, absorbed dose, equivalent dose, effective dose, kerma, and charged particle equilibrium.
6. Assessment of dose distributions at the interface of dissimilar materials.
7. Cancer growth, treatment, and risks factors.
8. Computerized Tomography (CT) dose calculation, reduction, and risks factors.

4. How will students benefit from this project?

Students will benefit because I will help them have a better understanding of the physics of photon radiation, radiation effects, radiation protection and radiation dose calculation. In addition, I will provide them with the most current information on Computerized Tomography dose issues.

5. How useful was will this project be to you as related to your future teaching assignments and how useful will this project be to other faculty in your department and division?

Having the extended leave got me closer to complete the Master's degree that I am pursuing, once I complete the degree I could bring more flexibility in the courses we offer. I will be capable of teaching any course in the field of Radiologic Technology. To the College and District, I will be able to continue to serve as Director of the radiological technology program and will develop new programs in the field of Medical Imaging and possibly therapy.

6. In what ways will you be sharing the benefits of your participation in the project?

I will share the learned knowledge with my students in the classroom, as well as updating and/or creating new laboratories that will help them gain a good understanding of radiation and its uses in medicine.

7. Enclose documentation (certificates, transcripts, etc.), if available.

I am enclosing an unofficial transcript as proof of the courses completed. If necessary I could obtain an official transcript.

8. Enclose a copy of any tangible product, if applicable.

I completed a series of reports for the different courses I took. I have them available if the committee would like to review them.