April 1997

CRPPH SPONSORED SURVEY OF

UNIVERSITY LEVEL

EDUCATION PROGRAMMES

IN RADIATION PROTECTION

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

- to achieve the highest sustainable economic growth and employment and a rising standard of living in Member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
- to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development; and
- to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The following countries became Members subsequently through accession at the dates indicated hereafter; Japan (28th April 1964), Finland (28th January 1969), Australia (7th June 1971), New Zealand (29th May 1973), Mexico (18th May 1994), the Czech Republic (21st December 1995), Hungary (7th May 1996), Poland (22nd November 1996) and the Republic of Korea (12th December 1996). The Commission of the European Communities takes part in the work of the OECD (Article 13 of the OECD Convention).

NUCLEAR ENERGY AGENCY

The OECD Nuclear Energy Agency (NEA) was established on 1st February 1958 under the name of OEEC European Nuclear Energy Agency. It received its present designation on 20th April 1972, when Japan became its first non-European full Member. NEA membership today consist of all OECD Member countries, except New Zealand and Poland. The Commission of the European Communities takes part in the work of the Agency.

The primary objective of NEA is to promote co-operation among the governments of its participating countries in furthering the development of nuclear power as a safe, environmentally acceptable and economic energy source.

This is achieved by:

- *encouraging harmonization of national regulatory policies and practices, with particular reference to the safety of nuclear installations, protection of man against ionising radiation and preservation of the environment, radioactive waste management, and nuclear third party liability and insurance;*
- *assessing the contribution of nuclear power to the overall energy supply by keeping under review the technical and economic aspects of nuclear power growth and forecasting demand and supply for the different phases of the nuclear fuel cycle;*
- *developing exchanges of scientific and technical information particularly through participation in common services;*
- *setting up international research and development programmes and joint undertakings.*

In these and related tasks, NEA works in close collaboration with the International Atomic Energy Agency in Vienna, with which it has concluded a Co-operation Agreement, as well as with other international organisations in the nuclear field.

TABLE OF CONTENTS

INTRODUCTION

One of the challenges which has always faced the radiation protection community is that of the adequate education and training of its personnel. This was highlighted during the January 1993 CRPPH sponsored Workshop on Radiation Protection on the Threshold of the 21st Century. Conclusion 2.3 reads as follows:

> *It was observed that the level of effort and resources devoted to radiation protection appears to be decreasing in many countries. This trend, which affects radiation protection laboratories and scientists, is seen with concern, because it could eventually have detrimental effects on the standards of protection and economic and social consequences, due to the progressive loss of needed expertise and facilities.*

One of the questions that this observation raises is that of education: how, in various countries, do radiation protection professionals receive their education in radiation protection, and how many trained personnel are produced? Some preliminary work in this area has shown that not all countries offer university degrees specifically in radiation protection, and that the exchange of students and faculty members between universities in different countries is rare. These facts will affect the number of professionals available in the future, and the scope of their perspectives.

To address this problem, and to foster broader exchange of ideas and research in radiation protection, the CRPPH agreed that it would be of value to perform a survey of its member countries to learn more about the status of the education of radiation protection professionals. The intent of this survey was to provide an information data base to be used by students (old and young) wishing to pursue an education in radiation protection, and by faculty members wishing to broaden their research perspective by spending sabbatical periods at other universities.

It is recognised that there exist many short courses, in all areas of radiation protection, which are intended as refresher courses for radiation protection professionals, or as introductory radiation protection courses for those disciplines for whom radiation protection is not a primary responsibility (engineers, job planners, equipment buyers, contract administrators, etc.). This survey was not intended to address these types of courses. This survey was intended to address the university-level programmes which produce trained radiation protection professionals.

The results of this survey are presented here, listed by country and by university. It is encouraging to note that there are currently 71 Universities listed having some sort of radiation protection degree programme. It is hoped that this document will be useful to both students and professors, and that as this document is updated, more detailed information will become available. Updates of this document will be produced approximately every three to four years.

Note that a copy of the survey form is attached as an Annex to this document. This questionnaire should be used to inform the NEA of any additions or changes suggested for subsequent modifications of this document.

It should be noted that the information concerning programmes at American universities has been compiled by the American Health Physics Society's Academic Education Committee (AEC), which has as one of it's responsibilities to maintain and periodically publish a comprehensive list of health physics academic programs. For an American programme to be listed, it must have at least one full-time faculty member serving as program director. Programs in medical physics were included only if they had a degree component and/or faculty research interest in the area of medical health physics. The program descriptions are followed by a list of undergraduate and graduate fellowships/scholarships for which health physics students may be eligible. Award amounts and application deadlines are always subject to change; students are encouraged to contact the individuals listed for application specifics.

AUSTRALIA

INDEX

University of South Australia
School of Applied Physics
University of South Australia
The Levels
Poorala, South Australia 5095

Contact:	Mr. David PAIX **Tel:** +(61) 8 343 3040
Degrees granted:	MSc in Medical and Health Physics PhD in Medical and Health Physics
Faculty:	Dr. Alun H. Beddoe, Associate Professor Mr. David Paix, Senior Lecturer Dr. John Patterson
Visiting faculty financial assistance:	No information provided
Faculty Research Areas:	• Radiation monitoring devices for uranium miners • In-vivo neutron activation analysis • Radiation therapy treatment planning
Students:	15 MSc and PhD students in the Programme (1993)

Queensland University of Technology
School of Physics
GPO Box 2434
Brisbane QLD 4001
AUSTRALIA

Contact person: Dr. T. van Doorn, Senior Lecturer, School of Physics
Tel: +617 864 2591 **Fax**: +617 864 1521 **e-mail**: t.vandoorn@out.edu.au

Degrees Granted: Master of Applied Science, Med. Pys. (~6 Diplomas granted per year)

Faculty:
Full-time teaching/research (4 members)
Part-time teaching/research (2 members)
Full-time research (1 member)
Part-time research (3 members)

note: above numbers include those working in the area of non-ionising

Research Areas:
- Radiological impact assessment of contaminated sites
- Environmental transport of radioactivity and studies related to erosion and sedimentation
- Radiological exposure due to radioactivity carrying aerosols in a mineral sands processing plant
- Use of nuclear track detectors for measurement of radon in buildings
- Development of new dosimeters for assessment of harmful UV
- Environmental UV dose modelling
- Spectroradiometry calibration of UV sources
- Effects of ozone depletion prediction
- Efficacy of shade structures
- Evaluation of gel dosimetry for clinical radiotherapy treatment planning

Students:

	full-time	part-time
undergraduate		
masters	6	3
doctorate	2	
other		

Student financial assistance:

Scholarships: National & Corporate: Contact: Research Student Office QUT, +617 864 2932

Fellowships: National Contact: Office of Research QUT, +617 864 2932

Teaching: Assistantships: Yes Contact: School of Physics QUT, +617 864 2325

Visiting faculty financial assistance:

Adjunct professor

The appointment of an adjunct professor is designed to enrich QUT's educational programme by involving distinguished and talented professionals and academics in teaching and research activities. A proforma for the nomination of adjunct professors is detailed in Appendix 11.

The number of adjunct professors appointed in any year will be determined within the context of the annual budget.

An adjunct professor is involved in activities such as:

- undergraduate and postgraduate teaching
- participation in seminars with advanced students and staff
- discussion with school staff on course, subject area, and unit structure, content and development
- participation in workshops, seminars, University lectures, continuing education programmes or conferences (through the Division of Research and Advancement) for the general public or specific outside group
- participation in school research programmes.

Adjunct professors are expected to have a marked influence on the activities of the faculty in which they serve. With this in mind, the period of residence and type of attendance are flexible. Full-time attendance for at least half a semester is suggested.

For the period of appointment, adjunct professors may be granted the following benefits and privileges:

- salary at professional level
- an appropriate return airfare for appointees
- an accommodation allowance of $300 per week
- full use of the facilities of a school including office space and telephone
- full use of QUT facilities including libraries and computing facilities
- workers' compensation insurance protection.

Appointment

An adjunct professor will be appointed by Council on the recommendation of the Vice-Chancellor advice from the appropriate dean of faculty.

Research facilities:

- UV laboratory with spectrodaiometer, radiation monochromator, badge dosimetry readers and solar simulators
- low level gamma and alpha counting laboratory
- access to whole body counting facility
- radioisotope laboratory with TLD system

CANADA

INDEX

1. McMaster University

McMaster University
Physics and Astronomy
1280 Main Street West
Hamilton, Ontario
L8S 4M1 Canada

Contact person: D.R. Chettle, Professor, Co-ordinator Health and Radiation Physics
Tel: +1 (905) 525 9140 (ext.: 27340)
Fax: +1 (905) 546 1252
e-mail: chettle@mcmaster.ca

Degrees Granted: Undergraduate (~10 per year) and Masters (~3 per year)

Undergraduate Programmes

a) Honours Medical and Health Physics, admission is to level II, following successful completion of appropriate courses from level I Natural Sciences

Level I

Physics lA06 MECHANICS, ELECTRICITY AND MODERN PHYSICS Lectures and laboratory work on mechanics, electricity, atomic and nuclear physics. Primarily intended for students proceeding in the physical sciences.

Math lA03 CALCULUS I
Differential calculus, the definite integral, techniques of integration, partial derivatives, applications, with some emphasis placed on theory.

Math 1AA3 CALCULUS II
The continuation of MATH lA03. Topics will include applications of the integral, sequences and series, power series, differential equations.

Math lB03 LINEAR ALGEBRA I
Vectors, matrices, determinants, vector spaces, complex numbers, with applications.

Biology lA06 ADAPTATION IN THE BIOLOGICAL WORLD
A course in introductory Biology which stresses the adaptation of form and function at the levels of molecules, cells, organisms and populations.

Chemistry lA06 INTRODUCTORY CHEMISTRY
First term: An introduction to inorganic chemistry; molecular structure and equilibrium. Second term: An introduction to organic chemistry and kinetics. The laboratory is designed to illustrate the lecture material and co-ordinates with it.

Computer Science 1MA3 INTRODUCTION TO COMPUTER PROGRAMMING

Organisation and characteristics of computers; introduction to packages; algorithmic development, stepwise refinement, modularisation, searching and sorting methods, problem solving; data types, arithmetic/logical expressions, looping, arrays, subprograms, input/output, style, and program testing.

Level II

Biochemistry 2E03 ELEMENTARY BIOCHEMISTRY

(or Biochem 3G03 and Biochem 3GG3 in level III)

A treatment of the basic areas of biochemistry, including physiological biochemistry. Designed for students who do not intend to pursue biochemistry.

Chemistry 2D03 INTRODUCTORY ORGANIC CHEMISTRY

(or Chem. 2006)

An introduction to the chemistry of monofunctional aliphatic and aromatic compounds.

Math 2E03 INTRODUCTION TO MODELLING

General features of modelling. Examples from chemistry, physics, biology and economics are treated by a variety of elementary methods. Computer packages are used when appropriate.

Math 2G03 INTERMEDIATE CALCULUS

Differential calculus of several variables, multiple integrals, line and surface integrals.

Math 2003 DIFFERENTIAL EQUATIONS

Ordinary differential equations with constant coefficients, series solutions, special methods; Laplace transforms, Fourier series; introduction to partial differential equations.

Physics 2B06 ELECTRICITY AND MAGNETISM

Electrostatics, D.C. and A.C. circuits, the magnetic field; Faraday's law of induction; Maxwell's equations.

Physics 2G03 MECHANICS OF A PARTICLE

Vectorial treatment of the mechanics of a particle in three dimensions. Special Relativity.

Physics 2H03 THERMAL PHYSICS

Introduction to heat and the kinetic theory of gases.

Biology 2B03 CELL BIOLOGY

Basic treatment of cell structure and function, including transport and chemical signals; adaptation of structure and function in specialised cells.

Level III

Math 3C03 MATHEMATICAL PHYSICS I

Linear algebra and eigenvalue problems; partial differential equations, orthogonal functions, Fourier series, Legendre functions, spherical harmonics.

Physics 3H04 INTERMEDIATE LABORATORY

Experiments in atomic and neutron physics, optics and spectroscopy, mechanics.

Physics 3N03 PHYSICAL OPTICS

Interference; Frauhofer and Fresnel diffraction; Maxwell's equations and the electromagnetic character of light; polarisation and double refraction; interference of polarised light; selected topics in modern optics.

Physics 3003 MODERN PHYSICS

Phenomenological basis for quantum physics, topics from atomic and photon physics; wave phenomena; Schrodinger equation for one dimensional systems.

Physics 3Q03 INTRODUCTORY QUANTUM MECHANICS

Operator algebra. The Schrodinger equation. The square well, harmonic oscillator, barriers, perturbations, transition matrix elements, and selected three dimensional problems.

Physics 3R03 COMPUTATIONAL MEDICAL PHYSICS

A problem-based introduction to the use of numerical methods in medical physics.

Physics 3T03 RADIOACTIVITY AND RADIATION INTERACTIONS

Radioactivity and radiation phenomenology; interaction of radiations with matter, dosimetry, tracer methods, radiation in medicine, biological effects, radiation levels and regulations, radiation protection.

Level IV

Biology 4U03 RADIATION BIOLOGY AND RADIATION BIOPHYSICS

The effects of radiation on biological material at the molecular, cellular, tissue and whole organism level. Applications of radiation in medicine and toxicology.

Engineering Physics 3X03 HUMAN PHYSIOLOGY

Basic introduction and working knowledge of the human body. Includes study of the cellular level of organisation.

OR

Engineering 4X03 CONCEPTS IN BIOMEDICAL ENGINEERING

Engineering and physical science approach to human physiological systems; cardiovascular system, with specific organ circulations, respiratory systems, overall integration and control.

Physics 4A03 SPECIAL TOPICS

Independent study of the scientific literature, including the preparation of seminars and reports on assigned topics.

Physics 4D06 DIGITAL LOGIC AND COMPUTER SYSTEMS

The design and use of digital logic systems and their application to data acquisition and control techniques. The project-oriented laboratory involves both hardware and software.

Physics 4E03 NUCLEAR PHYSICS

Nuclear masses and stability; radioactivity and nuclear reactions; elementary nuclear models.

Physics 4K03 SOLID STATE PHYSICS

Crystal structure and binding; lattice vibrations; electron energy bands; metals and semiconductors; magnetism.

Physics 4R03 RADIATION AND RADIOISOTOPE METHODOLOGY

Lectures and laboratory work in the techniques and theory of the measurement of radiation. Topics include radioactivity and radioactive decay, solid state dosimetry, principles of radioactive detectors, counting statistics and data reduction, advanced multidetector systems.

Physics 4T03 INTRODUCTION TO MEDICAL PHYSICS

Basic concepts in radiology, nuclear medicine, radiotherapy, physiological measurements and laser applications.

a total of 6-12 units of electives (3 units = 1 semester course) are taken during the programme

b) Honours Medical and Health Physics Co-op
This programme has the same content as Honours Medical and Health Physics except

(i) students undertake two ~ month work placements, one starts after 2½ years of the academic programme have been completed, the second starts after 3½ years of the academic programme

(ii) Physics 4A03 is replaced by Physics 3101 plus Physics 4101

(iii) The programme takes 5 years, rather than four years and the order in which some courses are taken is altered to accommodate the co-op work placements.

c) Engineering Physics - Nuclear Engineering (this is a recognised area within Engineering Physics, rather than a formal programme). The following courses are particularly relevant.

Eng Phys 3D03 PRINCIPLES OF NUCLEAR ENGINEERING

Introduction to fission and fusion energy systems. Energetics of nuclear reactions, interactions of radiation with matter, radioactivity, design and operating principles of fission and fusion reactors.

Eng Phys 4D03 NUCLEAR REACTOR ANALYSIS

Introduction to nuclear energy; nuclear physics and chain reactions; reactor statics and kinetics; multigroup analysis, core thermalhydraulics; reactor design.

Eng Phys 4L03 NUCLEAR REACTOR THERMALHYDRAULICS

Introduction to two phase flow and nuclear reactor thermalhydraulics systems. Condensation and boiling phenomena and heat transfer mechanisms. Two phase flow apparatus and diagnostics techniques. Modelling of two phase flow by homogeneous and separated flow models.

Eng Phys 4N03 PRINCIPLES OF FUSION ENERGY

Fusion phenomena and the plasma state; reaction analysis; Coulomb scattering; field effect trajectories; magnetic field configurations; particle transport; energy viability; burn cycles; inertial confinement; muon catalysed fusion.

Eng Phys 4U04 MODERN AND APPLIED PHYSICS LABORATORY

Selected advanced experiments in two areas of applied physics, chosen from among; lasers and electro-optics; solid state electronics; nuclear engineering.

Graduate Programmes

a) Health and Radiation Physics - M.Sc.

In this programme students are required to complete six courses. They then sit a written comprehensive examination. This is followed by a project which is expected to last four months. In practice, students frequently take 12-16 months to complete the programme.

The required courses are:

Biology 6U03 RADIATION BIOLOGY AND RADIATION BIOPHYSICS

The effects of radiation on biological material at the molecular, cellular, tissue and whole organism level. Applications of radiation in medicine and toxicology.

Physics 6R03 RADIATION AND RADIOISOTOPE METHODOLOGY

Lectures and laboratory work in the techniques and theory of the measurement of radiation. Topics include radioactivity and radioactive decay, solid state dosimetry, principles of radioactive detectors, counting statistics and data reduction, advanced multidetector systems.

Physics 771 ISOTOPES IN-VIVO

Discussion of how various practical aspects of the production and in-vivo use of radioactive isotopes impact upon radiation doses of people who work with radioisotopes and people to whom radioactivity is administered either by design or by accident. Discussion of the regulatory processes involved in the production and in-vivo use of radiochemicals.

Physics 772 MEDICAL HEALTH PHYSICS

Health Physics aspects of ionising and non-ionising forms of radiation commonly used in medicine. Includes ultraviolet, visible, infrared, radiofrequency/microwave, ultrasound, diagnostic x-rays, radiation therapy.

Physics 775 ADVANCED RADIATION PHYSICS

Mathematical analysis of the radiation field; interaction coefficients, survey of interactions, radiation transport, electromagnetic and hadronic cascades, exposure, dose, kerma, dose equivalent, micro-dosimetry, interface dosimetry, cavity theory, shielding theory.

Physics 776 PRINCIPLES OF RADIATION PROTECTION

Dose limitation, stochastic and non-stochastic effects, collective dose equivalent, effective dose equivalent, internal exposures, committed dose equivalent, cost-benefit analysis, sources of radiation, environmental monitoring, waste management, instrumentation, facility designs, applied health physics.

b) Physics and Astronomy (Medical Physics) M.Sc., Ph.D.

In this programme, students are required to complete a minimum of four courses for the M.Sc., plus they undertake research which they present in the form of a thesis. Students usually take about 20-24 months to complete the programme.
Three courses are required:

Biology 6U03 RADIATION BIOLOGY AND RADIATION BIOPHYSICS

The effects of radiation on biological material at the molecular, cellular, tissue and whole organism level. Applications of radiation in medicine and toxicology.

Physics 6R03 RADIATION AND RADIOISOTOPE METHODOLOGY

Lectures and laboratory work in the techniques and theory of the measurement of radiation. Topics include radioactivity and radioactive decay, solid state dosimetry, principles of radioactive detectors, counting statistics and data reduction, advanced multidetector systems.

Physics 775 ADVANCED RADIATION PHYSICS

Mathematical analysis of the radiation field; interaction coefficients, survey of interactions, radiation transport, electromagnetic and hadronic cascades, exposure, dose, kerma, dose equivalent, micro-dosimetry, interface dosimetry, cavity theory, shielding theory.

For a fourth course, students frequently choose one of Physics 771, 772, 776, listed above or

Physics 774 MEMCAL IMAGING

The theory of medical imaging is covered by a detailed examination of the principles of image formation, image reconstruction from projections and image evaluation. This is complemented by experiments in Positron Tomography, Single Photon Emission Computed Tomography, X-ray Computerised Tomography and Magnetic Resonance Imaging.

At the Ph.D. level, students are required to complete a minimum of a further four courses beyond the M.Sc. level. They have to pass an oral comprehensive examination, usually about 21 months after registering in this Ph.D. programme. Also, of course, they have to undertake research which is defended as a thesis. Completion times for Ph.D.'s are variable, but 3 to 4 years post M.Sc. is typical.

c) Engineering Physics M.Eng., Ph.D.

The following courses relate to nuclear engineering

Eng Phys 6D03 NUCLEAR REACTOR SYSTEMS ANALYSIS

Release and utilisation of energy from nuclear process; steady state and dynamics of chain reactions; neutron distributions and nuclear fuel cycle analysis; systems analysis of alternative nuclear energy concepts (e.g. hybrids, spallation breeders etc.). The McMaster University Nuclear Reactor will be used as a demonstration facility, and a field trip to a nuclear power installation will be undertaken.

Eng Phys 6L03INTRODUCTION TO REACTOR THERMOHYDRAULICS

Introduction to thermal hydraulics loops in power stations; two phase flow modelling; two-phase flow diagnostic techniques; and transient thermal fluid flows.

Eng Phys 6N03 PRINCIPLES OF FUSION ENERGY

Nuclear kinetics; reaction analysis; Coulomb scattering; field effect trajectories; magnetic field configurations; particle transport; energy viability; burn cycles; inertial confinement; muan catalysed fusion.

Eng Phys 702 ADVANCED NUCLEAR ENERGY

General matter-energy transformations and their dynamics; reaction viability and sustainability; breeding and multiplication, advanced fusion fuel cycles; fusion sustainment by magnetic, inertial, and catalytic processes; small and direct energy conversion nuclear batteries, nonlinear reaction dynamics; mathematical reactor parameterisation .

Eng Phys 711 FUSION PHYSICS

Fusion reactions and kinetics; introductory plasma physics; distribution effects; energetics and reaction chaining; magnetic field topologies; inertial confinement and nuclear hydrodynamics; fusion catalysis and aneutronic processes; non-linear nuclear reaction dynamics; fusion-fission symbiosis.

Eng Phys 712 NUCLEAR REACTOR ANALYSIS I

Neutron distributions; multigroup neutron diffusion; reactor statics and kinetics; depletion and breeding analysis.

Eng Phys 713 NUCLEAR REACTOR ANALYSIS II

Time dependent analysis of neutron multiplying media; point kinetics; space-time analysis; depletion, breeding and conversion; reactivity effects. Nuclear energy transport; characterisation of reactor thermalhydraulic processes; selected solution formulations and applications in simulation; system dynamics; component design analysis.

Eng Phys 715 ADVANCED NUCLEAR REACTOR THERMALHYDRAULICS

Advanced topics of current interest in the area of fission and fusion nuclear reactor primary heat transport system, system safety and the transitional operations.

Eng Phys 716 CANDU HEAT TRANSPORT SYSTEM DESIGN

Thermalhydraulic design and analysis of the primary heat transport of CANDU nuclear reactors, emphasising the main characteristics. System equations are developed from fundamental heat and mass transfer conservation equations.

Eng Phys 731 PARTICLE/ENERGY TRANSPORT AND DYNAMICS

Analysis of particle-photon transport and dynamics in various media; discrete/continuous transport effect; integrated classification of case specific transport formulations; reaction characterisations associated with neutral/charged particles; non-linear dynamical equations and methods of analysis.

Faculty:

Full-time teaching/research faculty (4)
Part-time teaching/research faculty (8)
Full-time research faculty (2)
Visiting faculty (1)

Research Areas:

- in vivo elemental analysis of toxic metals: Pb, Cd, A1, U
- body composition (water, protein, fat) using nuclear analytical probes
- development of radiation protection (educational) materials for electronic media
- high speed digital and analogue systems for nuclear pulse processing
- radio labelled monoclonal antibodies for diagnosis and therapy
- quantitation of functional imaging in positron emission tomography
- dosimetric models for photodynamic therapy
- quantitative fluorescence and absorption spectroscopy to characterize chemicals in vivo time resolved and frequency domain methods for optical imaging
- electron dosimetry at interfaces: computation and experiment
- study of DNA repair deficiencies using viral, cell culture and recombinant techniques
- neutron microdosimetry below 100 keV
- microdosimetry related to cellular and molecular level radiation damage
- characterisation of risk and treatment of metabolic bone disease
- imaging control systems for laser based thermal cancer therapy
- modelling reactor core physics and thermalhydraulics
- real time fault detection in reactor operation systems
- general fitness of emerging nuclear energy system in the long term

Visiting faculty financial assistance:

- hooker Distinguished Visiting Professor
- bilateral exchange programmes have been negotiated between Canada and a number of other nations
- individual faculty members at McMaster can sometimes provide partial support for visiting faculty from their research funds

Students:

	full-time	part-time
undergraduate	18	-
masters	15	1
doctorate	10	3
other[1]		150

Student financial assistance:

Scholarships: Nationally sponsored: yes
Regionally sponsored: yes
Fellowships: Nationally sponsored: yes

Scholarships and Fellowships are available to Canadian citizens and residents on a competitive basis from the: Natural Sciences & Engineering Research Council

Scholarships & Fellowships Division
350 Albert Street
Ottawa ON K1A 1H5 Canada

Scholarships are also available to residents of the province of Ontario from:

Ontario Graduate Scholarship Program
Student Affairs
Ministry of Education and Training
P.O. Box 4500
4th Floor, 189 Red River Road
Thunder Bay ON P7B 6G9 Canada

Student teaching assistantships: yes
Student research assistantships: yes

Student teaching assistantships and research assistantships are administered through McMaster University School of Graduate Studies in association with the Department of Physics and faculty research supervisors

Professional Certification:

- there is no "professional certification" in radiation protection in Canada
- our Health & Radiation Physics programme is patterned after training criteria for certification in other jurisdictions within the OECD, particularly in the comprehensive examination

[1] Non-specialist faculty, students and staff requiring training in radiation protection and radioisotope handling.

CZECH REPUBLIC

INDEX

Czech Technical University
Faculty of Nuclear Science and Physical Dosimetry
Czech Technical University
115 19 Prague 1
Brehova 7
CZECH REPUBLIC

Contact:	Dr. J. Sabol **Tel**: +42 (2) 231 51 12
Degrees Granted:	Engineering Degree (BS & MSc Equivalent) in Nuclear Engineering, specialisation in Dosimetry and Application of Ionizing Radiation PhD in Dosimetry and Application of Ionizing Radiation
Faculty:	Dr. Chchak, Department Chairman Dr. J. Sabol, Associate Professor Dr. Hamak, Associate Professor 3 Senior Assistant Professors
Faculty Research Areas:	• Mixed neutron-gamma dosimetry • Evaluation of environmental radioactivity and radiation fields • Reasurements of doses in radiology and radiotherapy • Radiation damage and high dose measurement • Radiation transport using Monte-Carlo methods • Solid state and chemical dosimetry • Nuclear instrumentation • X-ray fluorescence analysis • Evaluation and monitoring of radon in the environment and in dwellings • Mocrodosimetry and Nanodosimetry
Visiting faculty financial assistance:	no information provided
Students:	500 students in the Faculty of Nuclear Sciences and Physical Engineering (FNSPE), no specification as to number in Dosimetry Speciality
Student financial assistance programme:	no information provided
Research facilities:	no information provided

FRANCE

INDEX

Université Joseph Fourier
National Institute for Nuclear Sciences and Technology
Centre de Recherches du Service de Santé des Armées
Institute for Nuclear Safety and Protection
CHU - Unité de Concertation
BP 217
F-38043 Grenoble CEDEX 09
FRANCE

Contact person: Dr. Kolodie
Tel: 33 (16) 7628 4071 **Fax**: 33 (16) 7654 1782

OR
Contact person: M. Charles
Tel: 33 (16) 7628 4071 **Fax**: 33 (16) 7888 5101

Degrees Granted: Masters in Radiation Protection (~ 15 per year)

Curricula: Engineer,
4 years University graduates in physics, chemistry, & biology
2 years University graduates
5 years professional experience in radiological protection

Faculty: The course involves approximately fifty full-time or part-time teachers originating from various fields of expertise

Research Areas:
- Dosimetry for various types of ionizing radiation
- Biological effects: deterministic and Stochastic
- Non-ionizing radiations: physical aspects and biological effects
- Operational radiological protection: occupational aspects, public exposure, medical exposure, ALARA approach
- Safety and radiological protection
- Management of accident situations

Financial Assistance: May be sought from the International Atomic Energy Agency (IAEA) or the European Union (EU)

Students:

	full-time	part-time
undergraduate	-	-
masters	10	-
doctorate		-
other	5	-

Student financial assistance programmes: Fellowships nationally sponsored and corporately sponsored

Research
- Laboratories of CEA and IPSN, EdF and COGEMA

facilities:	• Various French hospitals

Professional Certification:

Formal “Professional Certification” is not compulsory in France

However professionals are closely associated to:

- the definition of the educational content
- the evaluation of the students level

National Institute for Nuclear Sciences and Technology
Radioprotection Department
CEA-SACLAY
F-91191 Gif-sur-Yvette Cedex
FRANCE

Contact person: NOLIBÉ, Head of Radioprotection Education Department
Tel: 33 (1) 6908 8909 **Fax**: +33 (1) 6908 5753
e-mail: tomasik@instndir.cea.fr

Degrees Granted: Undergraduate degree (25/30 Diplomas granted per year)

Curricula: Undergraduate degree
for holders of technician diploma (physics, chemistry, radiological protection)
for holders of first university degree
professionals of technical areas (Radiological protection, chemistry, physics) and standardised entry examination with a minimal acceptance result of 10/20

Faculty: Full-time teaching/research faulty (5 members)
Full-time research faculty (21 members)

Research Areas:
- Dosimetry for various types of ionizing radiation
- Biological effects: deterministric and stochastic
- Non-ionizing radiations: physical aspects and biological effects
- Operational radiological protection: occupational aspects, public exposure, medical exposure, ALARA approach
- Safety and radiological protection
- Management of accident situations

Financial Assistance: May be sought from the IAEA

Students:

	full-time	part-time
undergraduate	30	-
masters	-	-
doctorate	-	-
other	-	-

Student financial assistance programmes: Fellowships nationally sponsored and corporately sponsored

Research facilities:

- Research reactors
- Reprocessing fuel
- Waste and effluent processing
- Neutron sources
- Hot cells

For the practical training:
all laboratories of CEA, EdF, IPSN, COGEMA.

Professional Certification:

Formal "Professional Certification" is not compulsory in France

However professionals are closely associated to:

- the definition of the educational content
- the evaluation of the students level

GERMANY

INDEX

Dresden University of Technology
Physics Department
Institute of Radiation Protection Physics
Mommsenstrasse 13
D-01069 Dresden
GERMANY

Contact person: Prof Dr. Dörschel, Birgit
Tel: +49 351 463 2566 **Fax**: +49 351 463 7040

Degrees Granted: Master (MSc) (5-6 Diplomas granted per year)
Doctor (PhD) (2-3 Diplomas granted per year)

Curricula:

Master degree

Prerequisition: basic courses in general physics (2 years) with examinations
basic knowledge in nuclear physics

Courses:		
	Radiation Protection Physics I (Fundamentals)	60 hours
	Interaction of radiation with matter	60 hours
	Radiation Protection Physics II (Measuring Technique)	60 hours
	Experimental Exercises	120 hours
	Calculational Exercises	60 hours
	Special lectures (Students' choice)	30 hours

Diploma examination in Radiation Protection Physics
Diploma thesis: 1 year

Doctor degree
3 years scientific work in the Institute of Radiation Protection Physics
Doctor thesis
Doctor examination (rigorousum)

Faculty:
Full-time teaching faculty (4)
Part-time teaching faculty (2)
Full-time research faculty (4)
Part-time research faculty (6)
Visiting faculty: (2)
Other faculty (3)

Research Areas:
- Description of radiation sources and radiation fields
- Study of radionuclides in the environment and within the human body (e.g. radon and decay products)
- Study of interaction of radiation with matter, especially physical effects in detector materials, shieldings, biological tissue (e.g. thermoluminescence, formation of etched tracks etc.)
- Estimation of the radiation exposure to individuals and environment

- Physical fundamentals for the reduction of the exposure

Visiting faculty financial assistance:

Arrangements via the DAAD
(Deutscher Akademischer Austauschdienst = German Academic Exchange Service)
Address: DAAD, Kennedyallee 50, D-5300 Bonn

Financial Assistance:

May be arranged via the DAAD (Deutscher Akademischer Austauschdienst = German Academic Exchange Service)
Address: DAAD, Kennedyallee 50, D-5300 Bonn

Students:

	full-time	part-time
undergraduate	-	-
masters	17	-
doctorate	6	-
other	-	-

Student financial assistance programmes:

Scholarships: nationally sponsored all arrangements vis DAAD (see above)
Fellowships: nationally sponsored

Research facilities:

- tandem accelerator (protons, deuterons, heavy ions)
- cyclotron (neutrons, heavy ions)
- various radionuclide sources
- laboratories for evaluation of solid state detectors (e.g. image analysing systems for SSNTD's, TL readers etc.)
- laboratories for gamma spectrometry

Professional Certification:

The lectures and exercises in radiation protection physics are acknowledged, therefore the procedure to obtain the "professional certification" is shortened considerably for those who graduated in radiation protection physics at our university

GREECE

INDEX

Athens University
Department of Medical Physics
School of Medicine
Athens University
115 27 Athens
GREECE

Contact: Professor C. Proukakis, M.D., Ph.D.
Tel: +(301) 77 93 273

Faculty:
C. Proukkakis, Professor
K. Ntalles, Assistant Professor
D. Sotiriou, Assistant Professor
E. Georgiou, Assistant Professor
J. Malamitsi, Assistant Professor
A. Serefoglou, Assistant Professor
A. Louizi, Lecturer
S. Kottou, Lecturer

Degrees: MSc in Medical Physics

Research Areas:
- Theoretical Neural Models
- Non-linear Analysis in chaos
- Biomagnetic measurements using SQUID technology for determining normal and abnormal functions in CNS structures

Democrition University of Thrace
Department of Medicine
Laboratory of Medical Physics
681 00 Alexandroupolis
GREECE

Contact: Professor Photios A. Anninos
Tel: (0551) 25 292

Faculty: Professor Photios A. Anninos

Degrees: MSc in Medical Physics
PhD in Medical Physics

Students: There are currently 10 MSc and PhD students in the program.

The department was founded in 1988.

Faculty Research Areas:

- Theoretical Neural Models
- Non-linear Analysis in chaos
- Biomagnetic measurements using SQUID technology for determining normal and abnormal functions in CNS structures

University of Patras
Faculty of Health and Sciences/Medicine
Department of Medical Physics
GR-26000 Rio - Patras

Contact person: Vassilis Proimos, Professor
Tel: +30 061 997 620 **or** 997 781 **or** 997 758

Degrees Granted: - 1 Post-graduate education programme in Medical physics
Department of Medicine and Physics
supported by the Department of Computer Engineering, the Institute of Computer Technology and the University Hospital

This programme is open to 10 students holding a BS in Physics
with adequate knowledge of English, mathematics and electronics
Entrance examinations are required

The duration of the programme is four semesters leading to an MSc degree in Medical Physics and optionally to a Ph.D. degree (minimum two more semesters are required for the PhD thesis work).

The programme is financially supported by governmental funds.

Degrees Granted: - 2 Joint post-graduate programme in Medical Physics - Radiophysics

This programme leads to an MSc degree in Medical Radiation Physics and optionally to a Ph.D. with additional work of at least two more semesters degree.
The following institutions participate in this programme:
University of Athens (Department of Medical Physics)
University of Ionnina (Department of Medical Physics)
University of Thraki (Department of Medical Physics)
Greek Atomic Energy Commission (Institute of Radiation Physics)
Nuclear Research Centre "Democritos"
University of Thessaloniki (will join the programme in the near future)

The programme is financially supported by governmental funds.

The programme is scheduled to run every three years and is open to 10-20 students.
Candidates must hold a BS in Physics and are admitted after successfully passing entrance examinations in Physics, Mathematics and English.
The duration of the programme is five semesters,
two semesters of theoretical lectures and laboratory work
two semesters in service training in Hospitals and
one semester for thesis work.

Lecturers come from all participating programme institutions

Address: Medical Physics Department
School of Medicine
Mikras Asias 75
Goudi 115 27 GR

Contact person for further information:
Prof. Charalambos Proukakis, Tel: +30 01 779 3273

Graduates from both programmes or from equivalent studies abroad can get the professional licence of "Medical Radiation Physics" issued by the Ministry of Health taking successfully the relevant examination

ICELAND

Iceland does not offer University degrees specifically in radiation protection.
Most of the radiation protection professionals in Iceland have a degree in physics or related fields that includes some courses on radiation protection and on the job training.

ISRAEL

INDEX

Ben-Gurion University of the Negev
Nuclear Engineering Department
P.O. Box 653
Beer-Sheva, 84105
ISRAEL

Contact:	Professor A. Kushilevski Department Head
Faculty:	Professor A. Kushilevski, Department Head
	Other faculty not specified
Degrees:	Nuclear Engineering degrees (Some Courses in Radioprotection) Level(s) (BS MS, PhD) not specified
Students:	No information provided
Financing	No information provided
Faculty Research Areas:	No information provided

ITALY

INDEX

Universita' degli Studi di Firenze
Dip. fisiopatologia Clinica
Scuola di Specializzazione in Fisica Sanitaria
Dipartmento di Fisiopatologia Clinica
Viale Morgagni, 85
I - 50134 Firenze
ITALIA

Contact person: Salvtore Romano, Prof. Medical Physics
Tel: +39 (55) 437 6332 **Fax**: +39 (55) 437 7290
e-mail: salrom@cesit1.unifi.it

Degrees Granted: MSc degree (average of 5 per year)

Faculty: Full-time teaching/research faculty (10)

Research Areas:

- design of a calorimeter for dosimetry in radiotherapy
- heavy particles dose distribution: an experimental and Monte Carlo study on inhomogeneous systems
- FTIR spectroscopy of biological samples (normal and malignant cells and tissues)
- Photodynamic therapy of surface tumours
- laser induced pain threshold study
- normal and leukaemic lymphocytes discrimination by endogenous fluorescence
- photoplethysmography

Students:

	full-time	part-time
undergraduate	-	-
masters	15	-
doctorate	-	-
other	-	-

Student financial assistance programmes: Scholarships: nationally sponsored

Research facilities: Lab and equipment facilities available to the students are present in many independent administration structures. They are mainly:
Dept of Clinical Physiopathology (University of Florence)
Dept of Physics (University of Florence)
Health Physics Service (Hospital)
Medical departments (both university and hospital)
Institutes of applied optics and optoelectronics (INO, CNR)
Some industries (ex. EsaOte Biomedica)

Equipment:
Basic Physics (e.g. radiation detectors, transducers, radiation and ultrasound sources)
Nuclear equipment (e.g. 3 MeV linac)
Diagnostic equipment (e.g. gamma-camera, X-ray tubes, TAC NMR, ultrasound)
Therapeutic equipment (e.g. Co60, Linacs, brachitherapy, radionuclides, lasers)
Radiation monitoring equipment (e.g. TLD, photographic, ionisation chambers, ...)

Professional Certification: The lectures and exercises in radiation protection physics are acknowledged, therefore the procedure to obtain the "professional certification" is shortened considerably for those who graduated in radiation protection physics at our university

Universita' degli Studi di Genova
Departmento di Fisica
via Dodecaneso 33
16146 Genova

Contact person: S. Vitale, Professor
Tel: +39 10 353 62229 **Fax**: +39 10 313 358
e-mail: vitale@genova.infn.it

Degrees Granted: average of 4 degrees granted per year in radiation protection

Faculty: full-time teaching/research faculty: 5
full-time research faculty: 1

Research Areas:
- low activity measurement
- air, food, water analysis
- environmental contamination
- air pollution studies with PIXE analysis
- Montecarlo cal for shielding and dosimetry

Students:

	full-time	part-time
undergraduate	-	-
masters	20	-
doctorate	-	-
other	-	-

Student financial assistance programmes: None

Research facilities:
inside department:
low level spectrometers (HpGe + NaI, Si detectors)
neutron dosimetry - Rodon meas station

outside department:
20 MeV electron accelerator
TAC
NMR
whole body counter
camera SPECT

Professional Certification: no

Universita' di Bologna
Physics and Medical Faculty
Dipartimento di Fisica
Viale Berti Pichat 6/2
40127 Bologna

Contact person:
G. Maltoni, Professor of Health Physics
Tel: +39 51 630 5127 **Fax**: +39 51 247 244
e-mail:maltoni@bo.infn.it

Degrees Granted:
Undergraduate degree
Master degree (20-25, Biosistem Physics for the Physics degree)
Other: (15)

Faculty:
full-time teaching/research faculty: 6
part-time teaching/research faculty: 1

see also art. 110 commas 4/5/6 (supplemento ordinario G.V.) or the DL 17 March 1995 no. 230

Research Areas:
- new defectors for millimetric neutron dosimetry
- personal spectrometer for aerosol dosimetry
- non ionising radiation an defects at cell level
- radon concentration and air exchange
- personnel contamination in nuclear medicine
- absorbed dose in radio diagnosis and radiotherapy to workers and patients
- E.M fields and impact on population

Students:

	full-time	part-time
undergraduate	80	-
masters	60	-
doctorate	4	-
post-doctorate	1	-
other	-	-

Student financial assistance programmes:
- Scholarships: nationally sponsored 3 per year post graduate
- Fellowships: none
- Premi di Studio (study prize) by ENEA

Research facilities:
- University laboratories - research equipment
- Hospital facilities: health physics services radiology, radiotherapy and nuclear medicine facilities
- Environmental and personal monitoring research laboratories at ENEA and C.N.R.

Professional Certification:

The scuola di specializzazione in fisica sanitaria is intended to provide the preparation needed to pass the national test for "qualified expert for radiation physical protection" up to the third level. The scuola is also qualified equivalent to two years of training at special radiation laboratories required for the third level of expertise.

At present the school lasts 2 academic years, in the near future it will be modified to 4 years the school leads to the title of "specialist" for future organisations in other faculties.

(See art. 110 of the DL230, 17/3/95)

Universita' di Milano
Dipartimento di Fisica
Via Celoria, 16
20133 Milano

Contact person: Ettore Fiorimi, Full Professor
Tel: +39 2 239 2300 **Fax**: +39 2 70609512
e-mail: fiorimi@milano.jhfn.it

Degrees Granted: Scuola di Specializzazione: 14

Curricula: Laurea in Fisica or Ingegneria and qualifying examination

Faculty:
full-time teaching/research: 1
part-time teaching/research: 2
part-time research: 4
visiting: 1

Research Areas:
- Radiation Protection at Accelerators
- Radiation Protection with Radioactive Sources
- Radiation Protection in Radiotherapy
- Radiation Protection in Laser Surgery
- Radiation Protection in Radiodiagnostics

Students:

	full-time	part-time
undergraduate	-	-
masters	7	-
doctorate	-	-
other	-	-

Student financial assistance programmes: Scholarships nationally sponsored

Research facilities:
Radon measuring apparatuses
X-ray spectorscopes (HAJ and GE)
Neutron activation analysis
General dosimetry systems

Professional Certification: The Scuola di Specializza Zione give the title of "Speciallista in Fisica Sanitaria"
Attendance at the schools is considered by law equivalent to the two years of "Tirocinio" requested for the higher level degree (III) of "Exerto Qualificato"

JAPAN

INDEX

Kyoto University
Research Reactor Institute
Noda, Kumatoricho
Sen-nan-gun
Osaka Prefecture
590-04, JAPAN

Contact person: Dr. Tadashi TSUJIMOTO, Associate Professor
Tel: +81 724 52 0901, ext: 2631 **Fax**: +81 724 53 0360

Degrees Granted: Master degree
Doctorate

Faculty: Programme in the Graduate Course in the Faculty of Agriculture

The University of Tokyo
Department of Radiological Health
Faculty of Medicine
7-3-1 Hongo
Bankyo-ku
113 Tokyo
JAPAN

Contact person: Dr. Tomsko Kusama, PhD
Tel: +81 3 3812 2111, ext: 3502 **Fax**: +81 3 5684 5274
e-mail: kusama@nile.gen.u-tokyo.ac.ip

Degrees Granted:

Undergraduate	YES	(~2-4 per year)
Master	YES	(~1 per year)
Other	YES	(~1 per year)

Faculty:
Full-time teaching/research faculty: ~4 members
Part-time teaching/research faculty: ~2 members
Full-time research faculty: ~1 member

Research Areas:
- Dose estimation of medical exposure
  - the upper GI-tract X-ray examination as a mass screening
  - cardio vascular cinematograph
  - chest x-ray examination as a mass screening
- Dose estimation of radiation worker
  - radiologists and radiation technician engaged in angiography and in
  - interventional radiology
- Biological effects of embryo/foetuses from viewpoints of radiation protection
- Biological dosimetry in the case of over exposure in the skin
- Biokinetics of radionuclide in nuclear medicine
- Risk estimation of radiation-induced cancer

Financial Assistance: none

Students:

	full-time	part-time
undergraduate	6	0
masters	3	0
doctorate	4	4
other	-	0

Student financial assistance programmes:
Student teaching assistantships
Student research assistantships

Research facilities: Dose estimation system of workers and patients RANDO phantom, Tissueequivalent phantom
Whole body counter
Radiation exposure machine

Professional Certification: none

Kyushu University
Department of Nuclear Engineering
Fukuoka
812, JAPAN

Contact person: Professor Masaru MATOBA
Tel: +81 092 641 1101, ext: 5811 **Fax**: +81 092 641 7908

Degrees Granted:

Undergraduate	YES	(~40 per year)
Master	YES	(~12 per year)
Doctor	YES	(~6 per year)

Curricula: (The digit corresponds to the credit point for each curriculum)

1. Undergraduate Course, total 136 credits for graduation
   - Basis of Nuclear Physics 2
   - Nuclear Physics 2
   - Radio chemistry 2
   - Radiation Detection 2
   - Nuclear Electronics 2
   - Nuclear Electronics Engineering 2
   - Nuclear Chemical Engineering 2
   - Radiation Safety and Nuclear Instrumentation 2
   - Nuclear Engineering Experiments 4
   - Nuclear Engineering Seminars 2
   - Related curricula
2. Master Course, total 30 credits for graduation
   - Advanced Nuclear Instrumentation I, II 6
   - Advanced Radiation Detection and Protection Engineering
   - Related curricula
   - Muster Thesis
3. Doctor Course, Total 10 credits for graduation
   - Advanced Nuclear Engineering 4
   - Related curricula
   - Doctor Thesis

Faculty:

Full-time teaching/research faculty:	~12 members
Part-time teaching/research faculty:	~2 members
Full-time research faculty:	~2 members
Part-time research faculty:	~2 members
Visiting faculty:	~2 members

Research Areas:

- ^{14}C radioactivity in nature
  Dr. T. Okai and Dr. A. Nohtomi, (2 graduated students)
- Neutron dosimeters for environmental monitoring
  Dr. M. Matoba and Dr. T. Sakae, (1 foreign researcher and 1 graduated student)
- Cosmic-ray based neutron dosimetry
  Dr. T. Sakae and Dr. M. Matoba, (1 foreign researcher and 1 graduated student)
- ^{3}H radioactivity in atmosphere
  Dr. T. Okai, and 3 co-operative researchers

Financial Assistance: Mainly the supports of the ministry of educaito and culture, Japan

Students:

	full-time	part-time
undergraduate	6	34
masters	2	10
doctorate	0.5	5.5
other	1	-

Student financial assistance programmes:

Scholarships: nationally sponsored; corporately sponsored
Fellowships: nationally sponsored; corporately sponsored
Student teaching assistantships

Research facilities:

1. Radioactive Isotope Laboratory, 1,100 m^2
2. Laboratory of quantum irradiation and analysis, ^{60}Co irradiation, 100 m^2
3. Laboratory of high resolution radiation detection, 600 m^2
4. many α, β, γ counters and dosimeters
5. neutron counters and dosimeters
6. liquid scintillation counter (4 sets)
7. non-critical assembly system for neutron experiments
8. high resolution position counter system

Unfortunately, now, the financial support for the research facility from the ministry of education and culture, Japan, decreases and decreases in this field. If this situation will not change, we may not continue this type of teaching training and research in future.

Professional Certification: There are not possibilities to obtain the professional certification in radiation protection in this department. But many students succeed to pass national examination of professional certification in radiation protection, after obtaining many credits of curricula for radiation protection.

KOREA

INDEX

Seoul National University
Department of Nuclear Engineering
56-1 Shinaim-dong
Kwanak-ku
Seoul 151-742,
KOREA

Contact person: Professor Kang, Chang Sun
Tel: +82 2 880 7203 **Fax**: +82 2 889 2688
e-mail: cskang@plaza.snu

Degrees Granted: Masters in Radiation Protection (1~2 per year)
Other (~1 per year)

Faculty: Faculty Members in Radiation Protection:
1 full-time and 1 part-time Teaching/Research
1 part-time research
8 other faculties

Research Areas:
- radioisotope transport out of the radwaste disposal site
- PSA applications in radwaste disposal
- tritium transport in a PHWR plant
- sitting study of independent spent-fuel storage
- internal exposure due to H-3 intake
- derivation of designs criteria for radwaste disposal facilities
- design guidance to meet the criteria of ALARA for the next generation reactor
-

Financial Assistance: Not offered yet

Students:

	full-time	part-time
undergraduate	-	-
masters	5	-
doctorate	2	-
post-doctorate level	1	-
other	-	-

Student financial assistance programmes:
- Scholarships corporately sponsored
- Fellowships corporately sponsored

Research facilities: Van de Graaf type linear accelerator
Various radiation detection and measurement equipment including Ge (Li), scintillators, etc..

Professional Certification:
1. National Registered Professional Engineer for Radiation Protection
   State requirements:
   1 years' experience in radiation protection after bachelor's degree
2. License for Radiation Protection Supervisor
3. General license for Radiation Protection
4. Special license for Radiation Protection for medical workers

Kyung Hee University
Department of Nuclear Engineering
1 Seocheon-Ri, Kihung-Eub
Yongin-Kun Kyunggi-Do
449-701 KOREA

Contact person: Professor Won-Keun Lee
Tel: 82 2 280 2560 **Fax**: 82 2 282 1541

Degrees Granted: Msc Radiation Protection (approx 2 per year)

Faculty: 2 full-time teaching/research faculty members in radiation protection
2 members in the visiting faculty

Research Areas:

- "Theoretical calculation of dose conversion factor for photons of the extremity dosimeters",
  Professor: Won-Keun Lee
  Student: Kwang-Pyo Kim
- "Development of precise beta dosimeter response to Accident"
  Professor: Won-Keun Lee
  Student: Chun-Hyung Cho

Financial Assistance: Payment provided for classes to the Visiting Faculty

Students:

	full-time	part-time
undergraduate	-	-
masters	2	-
doctorate	-	-
other	-	-

Student financial assistance programmes: Student Teaching Assistantships
Student Research Assistantships

Research facilities:	Laboratory: 2 rooms Research reactors: AGN-201 (Aero-jet General Nculeo-nics, model 201) Amplifies general purpose: 2 EA Area radiation monitor: 1EA Multichannel analyser: 1EA Chart recorder: 1EA Complete spectrometry: 1EA Function generator: 1EA Nuclear testing kit: 2EA Oscilloscope: 5EA Logarithmic pico-ammeter: 1EA Nimbin and power supply: 2EA Potable survey meter: 10EA Wheston bridge: 3EA Scaler (counter and timer): 3EA Pocket dosimeter: 10EA Pico ampere source: 1EA Vamp area monitor: 1EA High voltage supply: 3EA G/M system (intermediate): 2EA
Professional Certification:	1. Radio Isotope General Management License Junior and Senior can take an exam for this license 2. Supervisor License for Radioisotope Management Someone who has more than one years' professional experience can take an exam for this license

Cheju National University
Department of Nuclear and Energy Engineering
1 Ara-dong, Cheju-si,
Cheju-do
690-756 KOREA

Contact person: Associate Professor Jae-Woo Park
Tel: 82 2 64 54 3645 **Fax**: 82 2 64 52 9276
e-mail: jwpark@cheju.cheju.ac.kr

Degrees Granted: Undergraduate degree in Radiation Protection (~10 per year)

Curricula:

Undergraduate degree

Introduction to Nuclear Engineering I, II
Radiation Detection
Radiation Detection Laboratory
Radioisotopes application
Nuclear Chemical Engineering

prerequisites

General entry examination

Faculty Full-time Teaching/Research Faculty (2 faculty members)

Research Areas:

- There has been virtually no research activity except education in the Department over the past three years.

Financial Assistance: There is no financial assistance provided by the University or Department. However some financial support may be arranged through application to the Korean government agencies such as Korean Science & Engineering Foundations

Students:

	full-time	part-time
undergraduate	10	-
masters	-	-
doctorate	-	-
other	-	-

Student financial assistance programmes: none

Research facilities:

Radioisotopes application centre (IAEA-funded facility)
Liquid scintillation counting system
Multi channel gamma-ray spectropy system
X-ray generator
Hang-foot monitor
G-M counters
Survey Meters (GM type, Scintillation type)

Professional Certification:

Certificate for Radioisotopes handling (ordinary license)
Certificate for Radioisotopes handling (supervisor license)
The above 2 certificates are often required by the national authority for certain jobs such as NDT's and other radioisotopes handling companies

Hanyang University
Nuclear Engineering Department
17 Hangdang, Seongdong
Seoul, Republic of KOREA

Contact person: Associate Professor Lee Jai-Ki
Tel: 82 2 290 0466 **Fax**: 82 2 290 0533

Degrees Granted: Master in Radiation Protection (~4 per year)
PhD in Radiation Protection (~0.5 per year)

Curricula: There are neither the official requirement in curriculum nor prerequisites for entry into the programme. Documents will be evaluated by the admission committee for foreign applicants.
Graduation requirements are as follows:

requirements	MS	Ph.D.
preliminary exam	oral presentation	oral presentation
qualifying exam	yes*	yes*
Thesis	required	required
papers	n/a	2 as prime authors

* problems about the fundamental courses in nuclear engineering

Faculty: Full-time teaching/research faculty (2)
Part-time teaching/research faculty (2)

Research Areas:
- Radiation protection philosophy and principles
- Implementation of the ICRP recommendations to national regulatory programme and to protection practices
- Quantitative optimisation of protection
- Shielding design and analysis of spent fuel shipping casks
- Risk assessment and perception
- Radiation field characterisation using Monte Carlo calculations
- Atmospheric dispersion and exposure pathway analysis
- Determination of response function for external exposure
- Application of fuzzy logic to radiation protection
- Simulation of detector responses using Monte Carlo techniques
- Development of dose algorithm for personnel dosimeters
- Development of internal dose algorithm
- Assessment of effectiveness of environmental monitoring programmes around nuclear facilities

Measurements of natural radiation

Financial Assistance:

University programme is not well-established.

A grant programme is available through the Korea Science and Engineering Foundation (KOSEF);

- duration: short term (a few weeks) or long term (6 ~ 12 months)
- support: air fairs and living expenses

Additional supports may be available through participation in research projects.

Students:

	full-time	part-time
undergraduate	N/A	-
masters	8	1
doctorate	2	3
other	-	-

Student financial assistance programmes:

Scholarships corporately sponsored
Fellowships corporately sponsored
Student teaching assistantships
Student research assistantships

Research facilities:

counting laboratory equipped with typical radiation counting systems
Am-Be neutron sources.
Advanced facilities (whole body counter, research reactor, irradiation facilities) are available at the national laboratories

Professional Certification:

All radiation works should be supervised by an authorised Radiation Safety Officer (RSO) elected for the organisation/operation. A certificate given by the government is required to be elected as RSO. Two types of certificates - type I and type II (higher level) - are issued to the applicants when he/she passes the written examination (in Korean) and finished the designated training course (also given in Korean). Graduate students having at least one year of experience in radiation work can apply for the examination.

ChoSun University
Nuclear Engineering Department
375 Seasuck-dong, Dong-Gu, Kwongju
501-759 KOREA

Contact person: Associate Professor Soon Kwan Chung
Tel: 82 62 230 9166 **Fax**: 82 62 232 9218
e-mail: n/a

Degrees Granted: Undergraduate degree in Radiation Protection (~50 per year)
Masters (~3 per year)

Faculty: 1 Full-time teaching/research faculty

Research Areas:
- Measurement of personal exposure dose by film badge dosimeter
- Development of Digital/Analog multi-purpose radiation protection detection monitor
- Control and instrumentation of radiation monitoring system
- Development of environmental radioactivity analysis technology

Financial Assistance: n/a

Students:

	full-time	part-time
undergraduate	50	-
masters	2	1
doctorate	-	-
other	-	-

Student financial assistance programmes: Scholarships corporately sponsored
Student teaching assistantships
Student research assistantships

Research facilities: Radiation Detection and Measurement Laboratory
Nuclear and Radio-Chemistry Laboratory
Radiation and Radioisotope Laboratory and Equipment
Multi-channel Analyser
HPGE Detector and Lead shield
Low Background and Counting System

Professional Certification: n/a

Korea Advanced Institute of Science and Technology
Department of Nuclear Engineering
373-1, Kusong-dong, Yusong-gu
Taejon 305-701 KOREA

Contact person: Assistant Professor Gyuseong Cho
Tel: +82 (42) 869 3821 **Fax**: +82 (42) 869 3810
e-mail:gscho@cais.kaist.ac.kr

Degrees Granted: / Curricula:

NE 202	Applied Nuclear Physics for Nuclear Engineering
NE 341	Nuclear Chemistry
NE 343	Health Physics
NE 431	Radiation Measurement and Instrumentation
NE 445	Radiation Protection and Shielding
NE 541	Radioactive Waste Management
NE 561	Advanced Radiation Detection
NE613	Neutron and Radiation Transport Theory
NE 641	Isotope Separation

Faculty: 4 members in the Full-time teaching/research Faculty

Research Areas:

- Theoretical studies on radiation transport
- Theoretical studies on radioisotope transport in the air and under the ground
- Studies on waste treatment in general
- Environmental radiation monitoring system design
- Design of solid state radiation detectors for X-ray gamma and charged particles

Financial Assistance: No regular support
Support for visiting scholars depending on professor's research - fund situations

Students:

	full-time	part-time
undergraduate		
masters	no information	
doctorate	provided	
other		

Student financial assistance programmes: Scholarships nationally sponsored
Fellowships corporately sponsored
Student Research Assistantships

Research facilities: Radiation detection systems (Gelli, MLA etc.)
Radiochemical handling facilities

Professional none

Certification:

LUXEMBOURG

Luxembourg offers no full University programme in any scientific domain and there is no possibility to achieve an academic degree in the field of radiation protection.

NETHERLANDS

NETHERLANDS

No University Level Degree Programme

POLAND

INDEX

Warsaw University of Technology
Faculty of Electronics
Warsaw University of Technology
ul. Nowowiejska 15/19
00-665 Warszawa
POLAND

Contact:	Professor Zdzislaw Pawlowski D.Sc. Department Head +(48) 22 25 13 63
Faculty:	Professor Zdzislaw Pawlowski D.Sc. Department Head
Degrees:	Nuclear and Medical Electronics degrees level(s) (BS, MS PhD) not specified
Students:	No information provided
Financing:	No information provided
Faculty Research Areas:	No information provided

SPAIN

INDEX

CIEMAT
(Institute of Energy Studies)
Av. Complutense, 22
28040 Madrid

Contact person: Ma Luisa Marco
Tel: +34 91 346 6292 **Fax**: +34 91 346 6005
e-mail: marco@ciemat.es

Degrees Granted:

Undergraduate degree	average 2 per year
Master degree	average 22 per year
Other	

Curricula:
Technician
University degree

Faculty:

full-time teaching/research faculty	6
part-time teaching/research faculty	30
visiting faculty	5

Research Areas:

- Master of Nuclear Energy
- Post-graduate educational course in Radiation Protection
- Characterisation of medium and low activity wastes by radiochemist, spectrometric and physique-chemist methods
- Radiation Protection Course for NPP's
- Radioactive Waste Management
- Radiation protection to operate X-rays facilities for medical diagnosis
- Experimental haematology
- Measurements of the radionuclides by gamma spectrometry
- Radiation protection to manage X-rays facilities for medical diagnosis
- Measurements of the radioactivity in environment samples
- Operators of the radioactivity facilities course
- Supervisors of the radioactivity facilities course
- Techniques in TLD dosimetry

Students:

	full-time	part-time
undergraduate	400	-
masters	20	-
doctorate	200	-
other	-	-

Student financial assistance programmes:

Scholarships	corporately sponsored
	professional society sponsored
Fellowships	corporately sponsored

Research facilities:	Radiochemist laboratories Semiconductor detectors Scintillation detectors (Alfha and Gamma) Radiation monitors X-rays equipment Flow gas counters Multichannel equipment Radioactive sources Personal computers
Professional Certification:	Qualified experts of radiation protection Post-graduate educational course in radiation protection Supervisors of radioactive installations Operators of radioactive installations

Universidad de Cantabria
Catedra fisica medica
Depto. Ciencias Medicas y Quirurgicas
Facultad Medicina
c/o Herrera Oria s/u
39011 Santander

Contact person: Jesus Soto Torres, Catedratico Fisica Medica
Tel: +34 942 20 19 74 **Fax**: +34 942 201 903
e-mail: sotoj@med.unican.es

Degrees Granted: Cursos Operadores Y supervisores de Instalaciones Radiactivas
Eventualmente de Radiodiagnostico

Faculty: Full-time teaching/research faculty 5

Research Areas:
- Estudio de radiacion y radiactividad ambientales efectos de bajas dosis de radiacion

Students:	full-time	part-time
undergraduate		
masters	no information	
doctorate	provided	
other		

Student financial assistance programmes:

Research facilities:
Laboratorio de preparacion de muestras
Monitores de radiacion cadena espectrometria gamma con Ge Hp
Contador de Flujo de Gas
Contadores de Centelleo alfa
Cadena espectrometria gamma con ina (tl)
Contadores de radon

Professional Certification:
Licenciatura en Medicina (nuevo plan estudios):
1st curso : Fisica Medica
2nd Curso : Instrumentacion en Diagnostico
4th Curso : Radioproteccion

SWEDEN

INDEX

Linköping University
Department of Radiation Physics
Faculty of Health Sciences
Linköping University
S-58185 Linköping

Contact person: Eva Lund, Assistant Professor
Tel: +46 13 223 460 **Fax**: +46 13 224 749
e-mail: eva.lund@raf.liu.se

Degrees Granted:

Faculty: Full-time teaching/research faculty (1)
Part-time teaching/research faculty (1)

Research Areas:

- Design and type testing of a dosimeter for measurement of the ambient dose equivalent
- Development of retrospective dosimetry based on ESR analysis of ??
- Optimisation of the relation between diagnostic information and radiation risks in X-ray examinations (computer modelling)
- Experimental studies of the angular dependence of the personal dose equivalent completed with Monte Carlo calculations
- Surveys of p?? absorbed doses and optimisation of x-ray techniques both for adults and children

Financial Assistance:

Research facilities: TLD - readers
ESR spectrometer (at the department of Physics and Measurements)
X-ray equipment
Cs-irradiation sources
Ge-detector and software

Students:

	full-time	part-time
undergraduate	-	-
masters	1	-
doctorate	-	1
post-doctorate	1	-
other	-	-

Student financial assistance programmes: No information provided

Research facilities: TLD - readers
TSR spectrometer (at the dept. of Physics and Measurements)
X-ray equipment
Cs-irradiation sources
Ge-defector and software

Professional

Certification:

Stockholm University
Medical Radiation Physics
Department of Medical Radiation Physics
Box 260
S-171 76 Stockholm

Contact person:
Bo Nilsson
Tel: +46 8 729 2497 **Fax**: +46 8 34 35 25
e-mail bo.nilsson@radfys.ks.se

Degrees Granted: Master in Radiation Protection (average 4 per year)

Faculty:
Radiation Physics including Radiation Potation
Full-time teaching/research faculty (1)
Part-time teaching/research faculty (1)
Full-time research faculty (3)
Part-time research faculty (5)

Research Areas:
- Research is performed in radiation physics, mainly towards the application in radiation treatment. However, in every use of radiation there is always a radiation protection consideration
- Treatment optimisation using physical and biological objective functions
- Ionisation chamber dosimetry, specially perturbation problems in photon and electron beams
- Patient and personal doses in x-ray radiology
- Development of a new circular gamma-camera for SPECT-investigations
- Stopping power calculations for use in dosimetry using Monte Carlo methods
- Neutron contamination problems in radiation treatment with high energy photons

Financial Assistance: Graduated researchers may obtain financial support through different research funds. There is however no special programme for funding visiting faculty members.

Students:*

	full-time	part-time
undergraduate	6	-
masters	6	-
doctorate	15	-
other	-	-

* in radiation physics in general including radiation protection

Student Financial Assistance Programmes:
Student Teaching Assistantships
Student Research Assistantships

Research facilities:
- Radiation treatment sources: Linear electron accelerators, ^{60}co-sources
- Ge-detectors with multichannel analysers for low level activity counting
- Proportional chamber for microdosimetric measurements
- Gamma-cameras for in vivo activity measurements

Professional Certification:

Lund University
Radiation Physics Department, Lund
Radiation Physics Department
Lund University Hospital
S-221 85 Lund

Contact person: Christer Samuelsson, Assoc. Prof.
Tel: +46 46 173 121 **Fax**: +46 46 127 249
e-mail: christer.samuelsson@radfys.lu.se

Degrees Granted:
Undergraduate degree (6per year)
Master (6 per year)
Ph.D. (1 per year)

Faculty:
Full-time teaching/research faculty (2)
Part-time teaching/research faculty (5)
Part-time research faculty (1)
Visiting faculty (1)

Research Areas:
- Retrospective radon monitoring using superficially implanted ^{210}Po
- Specific filtration of ^{137}Cs from urine as large scale "whole-body counter"
- Development of pulse-ionisation chambers for alpha spectrometry of large-are samples
- Development of fission track detection methods for low-level ^{239}Pu analysis
- Mobil gamma spectrometry for mapping of fallout and finding lost point sources
- In situ gamma spectrometry using HPGe detectors
- Bioassay analysis of low-level ^{239}Pu and ^{137}Cs activities in Chernobyl clean-up workers
- Radiopharmaceutical dosimetry research
- The use of the Monte Carlo technique to optimise and evaluate nuclear medicine imaging systems
- Optimising parameters for radionuclide therapy
- Radiobiological research on Auger electron emitters
- Radiopharmacology and tracer kinetic research
- Radiation protection research for medical employees

Financial Assistance:
Every four years there is a 6-month sabbatical option for professors

No special funding for visiting scientists is available at Lund University

Students:

	full-time	part-time
undergraduate	8	-
masters	8	-
doctorate	8	4
post-doctorate	1	-
other	-	-

Student financial assistance
Scholarships: Nationally Sponsored
Fellowships: Nationally and Regionally Sponsored

programmes:

Research facilities:

- One counting lab for temporary installations
- One counting lab with a liquid scintillation counter, a sample changer NaI(TI)-detector, and a HPGe-detector
- One permanent low-level lab with 20 alpha and two beta spectrometers
- One permanent low-level gamma spectrometry lab with 4 germanium detectors.
- One whole-body NaI(TI)-spectrometer
- One lab for radon and radon daughter measurements
- One stainless steel walk-in room for radon/aerosol exposure experiments
- One low-level radiochemistry lab
- One gamma calibration facility
- Several medical accelerators are used outside patient-hours for education purposes
- Several medical X-ray facilities are used outside patient-hours for education purposes
- HOT-lab for intermediate radioactivity work
- Laboratories for aseptic work at the Medical Radiopharmaceutical Center
- Radiation biology laboratory (Department of Oncology)

Professional Certification: none

SWITZERLAND

INDEX

Universität Bern
Abt. für Medizinische Strahlenphysik
Inselspital
CH-3010 Bern
SWITZERLAND

Contact person: Dr. R. Mini, phil. nat.
Tel: +41 31 632 24 29 **Fax**: +41 31 632 24 29

Degrees Granted: Other (1)

Faculty:
Full-time teaching/research faculty (1)
Part-time teaching/research faculty (1)
Part-time research faculty (2)

Research Areas:
- Development of a clinical information system
- Dynamic therapy with dynamic leaf-mocement of a multi-leaf collimator system
- Implementation of a Macro Monte Carlo (MMC) algorithm on a parallel computer for clinical use in radio-oncologyu
- Stereotatic radiosurgery
- Dose measurements in diagnostic radiology

Financial Assistance: None

Students:

	full-time	part-time
undergraduate	-	1
masters	-	-
doctorate	-	1
post-doctorate	-	2
other		-

Student financial assistance programmes:

Scholarships	nationally sponsored
Fellowships	nationally sponsored

Research facilities:
Betatron
3 Linearaccelerators
Counting Laboratories
X-ray facilities
Anthropomorphic Phantoms

Professional Certification: 14d course in radiation protection at PSI

University of Zurich
Institute of Medical Radiation Biology
August Forelstrasse 7
P.O.B. 424
CH-8029 Zurich
SWITZERLAND

Contact person: Dr. C. Michel, Phil. II
Tel: +41 1 385 6513 **Fax**: +41 1 385 6204
e-mail: chmichel@imr.unizh.ch

Degrees Granted: There is no education programme in radiation protection such as the one requested by this survey

Faculty: none

Research Areas:
- Experiments on the effects of low radiation doses on prenatal development in mice
- Low X-ray dose-induced mitotic recombination in Drosophila melanogaster
- Biological dosimetry at low level radiation exposure: Chromosomal aberrations (dicentrics, fragments, translocations)
- Study of single particle damages to cells by single tracks through single cells

Financial Assistance:
Swiss National Foundation
Bundesamt für Bildung und Wissenschaft (Austauschabkommen)
Paul Scherrer Institut (Villigen): Funds for guest researcher

Students:

	full-time	part-time
undergraduate		
masters		
doctorate		
other		

Student financial assistance programmes:
Scholarships — nationally sponsored; regionally sponsored
Fellowships — nationally sponsored; regionally sponsored
Student Research Assistantships

Research facilities:
Cell culture laboratories
Various sources of radiation:
X-rays, electrons, high energy photons, protons, ions at the institute in Zurich and at the Paul Scherrer Institute in Würenlingen/Villigen

Professional Certification: none

University Basel
Institut für Kernphysik
Klingelbergstr. 82
CH-4056 Basel
SWITZERLAND

Contact person: Dr. J. Jourdan
Tel: +41 61 267 3689 **Fax**: +41 61 267 3784
e-mail: jourdan@ubaclli.unibas.ch

Degrees Granted:

Faculty:

Research Areas: No research in radiation protection

The facilities available are exclusively used to train physics, chemistry, and reactor operation students in reactor-physics, measurement and analysis of experiments using radioactive substances and radiation protection.

Financial Assistance: none

Students:

	full-time	part-time
undergraduate		
masters		
doctorate	none	
other		

Student financial assistance programmes: none

Research facilities:
AGN-211-P research reactor
2 Counting laboratories equipped with various detection systems
- Geiger counters
- solid state detectors
- scintillation counters
- Ge, Si detectors

Professional Certification:
licensed reactor operator
licensed reactor operation supervisor
licensed radiation protection technician

University Basel
Radiological Physics
Abt. für Radiologlsche Physik
Departement Medizinische Radiologie
Kantonsspital Basel
CH-4031 Basel
SWITZERLAND

Contact person: Prof, Ph. D. J. Roth
Tel: +41 61 265 31 41 **Fax**: +41 61 265 3135

Degrees Granted: None

Faculty: Part-time teaching/research faculty (2)

Research Areas:
- Calculation of doses in patient during nuclear medicine procedures
- Doses in patient during radiodiagnostic procedures (e.g. chest, CT)
- Neutron and photon doses around medical accelerators
- Attenuation measurements (walls, new materials for aprons and gloves) during radiodiagnostic procedures
- comparisons of algorithms for dose calculations, comparisons of dosimeters in radiodiagnostic
- Whole body counting

Financial Assistance: None

Students:

	full-time	part-time
undergraduate	-	-
masters	-	-
doctorate	-	3
post-doctorate	-	2
other	-	-

Student financial assistance programmes: none

Research facilities: whole body counter
medical accelerators, after loading (1r-192)
X-ray apparatus
Co-60 source (only for research and training)
different types of dosimeters; TLD

Professional Certification:

UNITED KINGDOM

INDEX

University of Surrey
Department of Physics (Teaching Department)
Guildford GU2 5XH
UNITED KINGDOM

Contact person: Mrs. S. Jenner (MSc course Secretary)
Tel: +44 (1483) 259324 **Fax**: +44 (1483) 259 501
e-mail: s.jenner@surrey.ac.uk

Degrees Granted:
MSc (~20 diplomas granted per year)
BSc in Physics with Environmental Protection
Msc in Radiation and Environmental Protection
(one year full time, two years part time)
Msc in Medical Physics
PhD in Radiation Physics

Curricula: course booklet available upon request

Faculty:
Full-time teaching/research faculty (5 members)
Visiting faculty (10 members)

Professor W. Gellently, Head of Department
Dr. W. B. Gilboy, Chairman of Course Board
Dr. R. C. Barrett, Reader
Dr. W.N. Catford, Lecturer
Dr. A. S. Clough, Senior Lecturer
Dr. E. J. Morton, Lecturer
Dr. N.M. Spyrou, Reader
D. P. M. Walker, Lecturer

Research Areas:
- Miniature spectrometry systems for sophisticated personal electronic dosimetry
- Estra-sensitive LiF TLD for verification of radiation therapy planning
- Design of amorphous silicon image sensors for low dose medical and industrial radiography
- Study of room temperature semiconductor radiation detector and spectroscopy systems
- Image processing for dose reduction in medical fluroscopy
- Monte-Carlo simulation of electron transport at low energies (< 100 keV)
- X-ray tube design
- High resolution (10 µm) three dimensional tomographic imaging of small objects (< $1cm^3$

Financial Assistance: IAEA, EPSRC and British Council are all potential sources of funding for visitors

Students:		full-time	part-time
	undergraduate	-	-
	masters	36	18
	doctorate	4	2
	other	-	-

Student financial assistance programmes:
Scholarships: Nationally/Regionally/Corporately and Professional Society sponsored
Fellowships: Nationally sponsored

Research facilities:
Lead-lined room for X-ray system development
Pulsed laser and associated optical equipment for detailed study of semiconductor radiation devices
High accuracy electronics test fixtures for characterisation of semiconductor radiation detectors
Numerous X-ray tubes, including a microfocal X-ray source
Design tools for analogue and digital radiation instrumentation development

Professional Certification:
n/a

UNITED STATES

INDEX

	Program Name	Location	Degree Granted			
1.	Bloomsburg University	Pennsylvania		BS		
2.	Central Florida Community College	Florida	AS			
3.	Clemson University	South Carolina			MS	PhD
4.	Colorado State University	Colorado			MS	PhD
5.	Dickinson College	Pennsylvania		BS		
6.	Francis Marion University	South Carolina		BS		
7.	Georgetown University	Washington, DC			MS	
8.	Georgia Institute of Technology	Georgia			MS	PhD
9.	Idaho State University	Idaho		BS	MS	PhD
10.	Lakeshore Technical College	Wisconsin	AA			
11.	Louisiana State University	Louisiana			MS	
12.	Massachusetts Institute of Technology	Massachusetts			MS	PhD
13.	National Technical University				MS	
14.	N. New Mexico Comm. College	New Mexico	AA			
15.	Ohio State University	Ohio			MS	PhD
16.	Oregon State University	Oregon		BS	MS	
17.	Purdue University	Indiana		BS	MS	PhD
18.	San Diego State University	California			MS	
19.	Texas A&M University	Texas		BS	MS	PhD
20.	Texas State Technical College	Texas	AA			
21.	University of Cincinnati	Ohio			MS	PhD
22.	University of Florida (Env. Eng.)	Florida			MS	PhD
23.	University of Florida (Nuclear Eng.)	Florida		BS	MS	PhD
24.	University of Kentucky	Kentucky			MS	
25.	University of Massachusetts Lowell	Massachusetts		BS	MS	PhD
26.	University of Michigan (Public Health)	Michigan			MS	PhD
27.	University of Michigan (Nuclear Eng.)	Michigan		BS	MS	PhD
28.	University of Missouri-Columbia	Missouri			MS	PhD
29.	University of Missouri-Rolla	Missouri		BS	MS	PhD
30.	University of Nevada Las Vegas	Nevada		BS	MS	
31.	University of North Carolina	North Carolina			MS	PhD
32.	University of Pittsburgh	Pennsylvania			MS	PhD
33.	University of Tennessee	Tennessee			MS	PhD
34.	University of Texas HSC-San Antonio	Texas			MS	
35.	University of Wisconsin	Wisconsin			MS	PhD
36.	Washington State University Tri-Cities	Washington			MS	

Note: Indicates incomplete survey information as of April 9, 1997

1. BLOOMSBURG UNIVERSITY

Department of Physics
Telephone: (717) 389-4107 / Fax: (717) 389-2094

Program Director:
Dr. Jack G. Couch
Bloomsburg University
Physics Department
Bloomsburg, Pennsylvania 17815
(717) 389-4152

HP Degrees Granted:
B.S. in Health Physics

Remote Delivery of Course: None

	BS
HP Enrollment (Fall 1996):	11
HP Graduates (9/94 to 8/95):	2
HP Graduates (9/95 to 8/96):	2

Health Physics Faculty (•25% FTE toward the HP program)

Jack G. Couch, Professor of Physics and Health Physics Program Director (717-389-4152); Ph.D. Texas A&M University 1966; Nuclear instrumentation, environmental radiation measurements, applied health physics.

Other Faculty

Wilfred J. Reilly, Assistant Professor of Physics.
Christopher Bracikowski, Assistant Professor of Physics.
P. James Moser, Professor of Physics.
Gunther L. Lang, Assistant Professor of Physics.

Other Information

The B.S. degree in health physics has a strong laboratory and instrumentation orientation. An off-campus internship in health physics is required. The Physics Department in which the B.S. health physics degree is offered has a total faculty of nine individuals.

2. CENTRAL FLORIDA COMMUNITY COLLEGE

Department of Radiation Protection Technology
Telephone: (904) 237-2111, Ext. 376 / Fax: (904) 237-0510

Program Director:
Ms. Rhonda L. Rawls
Central Florida Community College
P.O. Box 1388
Ocala, Florida 34478-1388

HP Degrees Granted:
A.S. in Radiation Protection Technology

Remote Delivery of Course: Yes (Introductory Course now available)

	AS
HP Enrollment (Fall 1996):	26
HP Graduates (9/94 to 8/95):	18
HP Graduates (9/95 to 8/96):	11

Health Physics Faculty (•25% FTE toward the HP program)

Rhonda L. Rawls, Program Coordinator and Associate Professor of Radiation Protection and Environmental Sciences (352-237-2111, Ext. 376 or 352-854-2322 Ext. 376); M.A. University of South Florida 1994.

Stephen H. MacKenzie, Assistant Professor of Radiation Protection and Environmental Sciences and Program Coordinator of Environmental Sciences (352-237-2111, Ext. 376 or 352-854-2322 Ext. 376); M.A. University of South Florida 1994.

Other information
Previous college course work is evaluated and applied toward the A.S. degree, as appropriate. This can accelerate the students program of study and allow for completion in less than two years. The division also offers an A.S. degrees in Environmental Science Technology (Hazardous Materials).

Student Financial Assistance
Scholarships available (contact Program Director)

Research Facilities
Utilize the University of Florida Training Reactor (UFTR) for Co-op students.

3. CLEMSON UNIVERSITY

Department of Environmental Systems Engineering
Telephone: (864) 656-3276 / Fax: (864) 656-0672

Program Director:
Dr. Robert A. Fjeld
Rich Environmental Research Laboratory
Clemson Research Park
Clemson University
Clemson, South Carolina 29634-0919
(864) 656-1010
email: fjeld@clemson.edu
website: http://www.eng.clemson.edu/~ese

HP Degrees Granted:
M.S. in Environmental Systems Engineering
Ph.D. in Environmental Systems Engineering

Remote Delivery of Course: None

	MS	PhD
HP Enrollment (Fall 1996):	10	5
HP Graduates (9/94 to 8/95):	7	0
HP Graduates (9/95 to 8/96):	10	0

Health Physics Faculty (•25% FTE toward the HP program)

Robert A. Fjeld, Professor of Environmental Systems Engineering (864-656-1010); Ph.D. The Pennsylvania State University 1976; Environmental transport, dose and risk assessment, radioactive waste management. **[email: fjeld@clemson.edu]**

Timothy A. DeVol, Assistant Professor in Environmental Systems Engineering (864-656-1014); Ph.D. University of Michigan 1991; Radiation detection instrumentation, environmental measurements, environmental applications of nuclear techniques. **[email: tim.devol@clemson.edu]**

Thomas J. Overcamp, Professor of Environmental Systems Engineering (864-656-3276); Ph.D. Massachusetts Institute of Technology 1973; Atmospheric transport, mixed waste vitrification. **[email: tjvrc@clemson.edu]**

Other Faculty
Alan W. Elzerman, Professor and Chair of Environmental Systems Engineering.
David L. Freedman, Assistant Professor of Environmental Systems Engineering.
C. P. Leslie Grady, Jr., Professor of Environmental Systems Engineering.
Tanju Karamfil, Assistant Professor of Environmental Systems Engineering.

CLEMSON UNIVERSITY (Continued)

Cindy M. Lee, Assistant Professor of Environmental Systems Engineering.
Frank L. Parker, Eminent Scientist.

Other Information

The department offers a nuclear environmental specialty which focuses on environmental and waste management aspects of nuclear technologies and the nuclear fuel cycle. General areas of interest include environmental health physics; radioactivity measurement; hazardous, radioactive, and mixed waste treatment and disposal; risk assessment; and transport of radioactive and chemical contaminants in the environment. Currently active projects include (1) development of a technique for the rapid measurement of non-gamma emitting radionuclides in environmental samples, (2) the measurement of sorption parameters for select radionuclides in soils; (3) vitrification of mixed wastes, and (4) risk assessment. In addition, an internship program is available through which students may work on a variety of environmental restoration and waste management projects at a Department of Energy facility.

Student Financial Assistance

Fellowships, Student Research Assistantships, Student Research Assistantships, DOE Internships (limited to U.S. citizens).

Research Facilities

The Department of Environmental Systems Engineering is located in a 5-year-old, 40,000 square foot office and laboratory facility in the Clemson Research Park. The laboratory building contains a counting laboratory, a radiation detection research laboratory, a radiochemistry laboratory, and a general purpose radiation laboratory. Adjacent to the laboratory is the Clemson Environmental Technologies Laboratory consisting of two state-of-the-art analytical laboratories, two high bay laboratories for scale-up projects, and a demonstration area. These facilities are specially designed for research and treatment technologies related to hazardous, radioactive, and mixed wastes. Please visit our web site at http://www.eng.clemson.edu/~ese for more information on our department. Graduate school applications may be found at http://www.grad.clemson.edu.

4. COLORADO STATE UNIVERSITY

Department of Radiological Health Sciences
Telephone: (970) 491-5222 / Fax: (970) 491-0623

Program Director:
Dr. Thomas B. Borak
Department of Radiological Health Sciences
Colorado State University
Ft. Collins, Colorado 80523-1673
(970) 491-6450
email: tborak@vines.colostate.edu

HP Degrees Granted:
M.S. in Health Physics
M.S. in Radioecology
Ph.D. in Health Physics
Ph.D. in Radioecology

Remote Delivery of Course: Selected courses in the MS and PhD programs

	MS	PhD
HP Enrollment (Fall 1996):	12	5
HP Graduates (9/94 to 8/95):	11	2
HP Graduates (9/95 to 8/96):	6	3

Health Physics Faculty (•25% FTE toward the HP program)

Thomas B. Borak, CHP, Professor (970-491-6450); Ph.D. Vanderbilt University 1969; Radiation physics, dosimetry. **[email: tborak@vines.colostate.edu]**

Shawki A. Ibrahim, Associate Professor (970-491-1593); Ph.D. New York University 1980; Radiochemistry. **[email: jebrown@vines.colostate.edu]**

F. Ward Whicker, Professor (970-491-5343); Ph.D. Colorado State University 1965; Radioecology. **[email: wwhicker@vines.colostate.edu]**

David J. Rowan, Assistant Professor (970-491-0483); Ph.D. McGill University, 1991; Aquatic Radioecology. **[email: drowan@vines.colostate.edu]**

COLORADO STATE UNIVERSITY (Continued)

Other Faculty

Joel S. Bedford, Professor of Radiation Biology.
Mortimer M. Elkind, Professor of Radiation Biology.
Michael H. Fox, Professor of Radiation Biology.
Edward L. Gillette, Professor of Radiation Biology.

Visiting Faculty Financial Assistance

There are now standing financial assistance programs for visiting faculty. Occasionally there is support through existing research grants or international agencies such as IAEA, NATO, etc.

Student Financial Assistance

Graduate research assistantships are available through funded research programs in the Department. Availability will vary depending on funding and enrollment.

Research Facilities

Low level counting laboratory, instrumentation and dosimetry laboratory, whole body counter, radioanalytical chemistry laboratory, 6-MV electron accelerator, ^{60}Co and ^{137}Cs irradiators. The faculty have collaborative arrangements with Los Alamos National Laboratory, Lawrence Berkeley National Laboratory and the Savannah River Ecology Laboratory.

5. DICKINSON COLLEGE

Department of Physics and Astronomy
Telephone: (717) 245-1413 / Fax: (717) 245-1642

Program Director:
Dr. John Luetzelschwab
Department of Physics and Astronomy
Dickinson College
Carlisle, Pennsylvania 17013-2896
email: luetzelj@dickinson.edu
website: www.physics.dickinson.edu

HP Degrees Granted:
B.S. in Physics

Remote Delivery of Course: None

	BS
HP Enrollment (Fall 1996):	2
HP Graduates (9/94 to 8/95):	0
HP Graduates (9/95 to 8/96):	0

Health Physics Faculty (•25% FTE toward the HP program)

John Luetzelschwab, CHP, Professor of Physics (717-245-1241); Ph.D. Washington University 1968; Radon measurement. **[email: luetzelj@dickinson.edu]**

Student Financial Assistance
Regular undergraduate loans, grants, and work study.

Research Facilities
HPGe gamma spectroscopy system, Ge(Li) gamma spectroscopy system, alpha/beta counting system, neutron howitzer, radon source.

6. FRANCIS MARION UNIVERSITY

Department of Chemistry and Physics
Telephone: (803) 661-1381 / Fax: (803) 661-4616

Program Director:
Dr. L. D. Hendrick
Department of Chemistry & Physics
Francis Marion University
P.O. Box 100547
Florence, South Carolina 29501
(803) 661-1441
email: hendrick@scarolina.fmarion.edu

HP Degrees Granted:
B.S. in Health Physics (no specialty)

Remote Delivery of Course: None

BS (Junior/Senior)

HP Enrollment (Fall 1996):	6
HP Graduates (9/94 to 8/95):	5
HP Graduates (9/95 to 8/96):	4

Health Physics Faculty (•25% FTE toward the HP program)

David M. Peterson., Professor of Physics (803-661-1445); Ph.D. North Carolina State University 1975; Nuclear physics, instrumentation.
[email: peterson@scarolina.fmarion.edu]

R. Seth Smith, Associate Professor of Physics (803-661-1453); Ph.D. Louisiana State University 1986; Lasers, electronics. **[email: smith@scarolina.fmarion.edu]**

Christopher G. Fasano, Assistant Professor of Physics (803-661-1452); Ph.D. University of Chicago 1988; Nuclear theory. **[email: fasano@scarolina.fmarion.edu]**

Lynn D. Hendrick, Professor of Physics (803-661-1441); Ph.D. University of South Carolina 1966; Atomic/nuclear physics, general health physics.
[email: hendrick@scarolina.fmarion.edu]

Roger J. Loucks, Assistant Professor of Physics (803-661-1444); Ph.D. University of Illinois 1996; Nuclear theory. **[email: loucks@scarolina.fmarion.edu]**

Student Financial Assistance
Undergraduate scholarship

6. FRANCIS MARION UNIVERSITY (cont.)

Research Facilities

Counting laboratory - 4 stations with computerized MCAs with electronics and detectors, neutron howitzer (^{252}Cf source), TLD system.

Professional Certification

Graduates of our program have been very successful in passing the American Board of Health Physics Certification Exam.

7. GEORGETOWN UNIVERSITY

Health Physics Program
Department of Radiation Medicine
Telephone: (202) 687-2212 / Fax: (202) 784-3323

Program Director (Interim):
Dr. Marko Moscovitch
Health Physics Program
The Research Building, #W201
Georgetown University Medical Center
3800 Reservoir Road, NW
Washington, DC 20007-2197
202-687-8993
202-687-2221 (fax)
email: moscovim@medlib.georgetown.edu
website: http://www.dml.georgetown.edu/depts/radiation/hphysics/HealthPhys.html

HP Degrees Granted:
M.S. in Radiation Science

Remote Delivery of Course: None

	MS
HP Enrollment (Fall 1996):	23
HP Graduates (9/94 to 8/95):	5
HP Graduates (9/95 to 8/96):	2

Health Physics Faculty (•25% FTE toward the HP program)

Allen Brodsky, CHP, Adjunct Professor for Radiation Science (410-208-1015); Sc.D. University of Pittsburgh 1966; Operational health physics, regulatory policy.

Timothy J. Jorgensen, Assistant Professor of Radiation Medicine (202-687-1810); Ph.D. Johns Hopkins University 1984; Radiation biology.
[email: jorgensent@odrge.odr.georgetown.edu]

Usha Kasid, Associate Professor of Radiation Medicine (202-687-2226); Ph.D. University of Punjab 1978; Radiation biology, molecular carcinogenetics.
[email: kasidu@gunet.georgetown.edu]

Marko Moscovitch, Interim Director and Associate Professor of Radiation Medicine, (202-687-8993); Ph.D. Ben Gurion University of the Negev (Israel) 1985; Thermoluminescent dosimetry (TLD), environmental monitoring, space radiation detection. **[email: moscovim@medlib.georgetown.edu]**

GEORGETOWN UNIVERSITY (Continued)

James E. Rodgers, Associate Professor of Radiation Science (202-687-2212); Ph.D. University of California, Riverside 1972; Radiation dosimetry, Monte Carlo simulation, radiation shielding. **[email: jr@gamma.rip.georgetown.edu]**

Charlie Willis, CHP, Adjunct Instructor (301-415-1091); M.S. Northwestern Louisiana; Environmental health physics, regulatory policy.

Other Faculty

Francis Atkins, Ph.D.
Jonathan Jackson, Ph.D.
Mira Jung, Ph.D.
Stephen A. McGuire, Ph.D.
Donald A. McRae, Ph.D.
Seong K. Mun, Ph.D.
Azam Niroomand-Rad, Ph.D.
Vicente Notario, Ph.D.
Sarada Prasad, Ph.D.
David A. Schauer, Ph.D.
Peter Thraves, Ph.D.
Barry Wessels, Ph.D.

Other Information

The Health Physics program offers a Master of Science degree with an option to specialize in Health Physics or Environmental Health Physics. For students who select the environmental option, the focus of the internships and the thesis will be directed more towards environmental radiation protection. The program has been designed to provide students with the necessary theoretical and practical knowledge to become competent health physicists. Students in the program will have the opportunity to gain valuable experience in various areas associated with health physics, such as basic radiation physics, radiation detection and dosimetry, environmental radiation protection, and radiation biology. Applicants to the Master's program are selected on a competitive basis by a faculty committee which evaluates the application, letters of recommendation, and academic record. For full-time students, it is expected that the Master's program can be completed in two years. Part-time students taking two courses per semester would be expected to complete the program in approximately three years. The program offers evening courses to enable working part-time students to participate.

Visiting Faculty Financial Assistance

Both visiting faculty and postdoctoral fellowships are occasionally available.

GEORGETOWN UNIVERSITY (Continued)

Student Financial Assistance Program

Georgetown University has an extensive student financial assistance program. In addition, the program is funded by external grants from NASA and the DOE Health Physics Faculty Research Award Program. Occasionally student fellowships are available.

Research Facilities

The program is located on the campus of Georgetown University in a new research building with spacious laboratories and state-of-the-art equipment, including thermoluminescence dosimetry (TLD), and radiation detection and spectroscopy systems. In addition, we have a computer laboratory equipped with the latest models silicon graphics workstation (Indigo^2 Solid Impact R-10000) and a variety of Pentium and Macintosh workstations.

8. GEORGIA INSTITUTE OF TECHNOLOGY

Health Physics Program
George W. Woodruff School of Mechanical Engineering
Telephone: (404) 894-3204 / Fax: (404) 894-8336

Program Director:
Dr. Ward O. Winer
George W. Woodruff School of Mechanical Engineering
Georgia Institute of Technology
Atlanta, GA 30332-0405
(404) 894-3200
Fax: 404-894-1658
email: ward.winer@me.gatech.edu

HP Degrees Granted:
M.S. in Health Physics
Ph.D. in Nuclear Engineering (Health Physics Option)

Remote Delivery of Course: Entire M.S. curriculum
Selected courses from the Ph.D. program

	MS	PhD
HP Enrollment (Fall 1996):	44	14
HP Graduates (9/94 to 8/95):	21	1
HP Graduates (9/95 to 8/96):	14	4

Health Physics Faculty (•25% FTE toward the HP program)

Nolan E. Hertel, Associate Professor, Nuclear Engineering and Health Physics (404-894-3717; Fax: 404-894-3733); Ph.D. University of Illinois 1979; Radiation shielding, high-energy neutron/particle interactions, radiation dosimetry and phantoms, radiological assessment, waste management. **[email: nolan.hertel@me.gatech.edu]**

Rodney Ice, CHP, Principal Research Scientist, Neely Nuclear Research Center (404-894-3621, Fax: 404-853-9325); Ph.D. Purdue University 1967; Radiopharmaceuticals, radioprotectants, boron neutron capture theory.
[email: rodney.ice@nnrc.gatech.edu]

Bernd Kahn, Professor Emeritus, Nuclear Engineering and Health Physics, and Director, Environmental Resource Center (404-894-3766, Fax: 404-894-3733); Ph.D. Massachusetts Institute of Technology 1960; Analytical radiochemistry, radiological surveillance at nuclear power facilities, measurement of radionuclides at environmental levels. **[email: bernd.kahn@me.gatech.edu]**

GEORGIA INSTITUTE OF TECHNOLOGY (Continued)

C-K Chris Wang, Assistant Professor, Nuclear Engineering and Health Physics (404-894-3727, Fax: 404-894-3733); Ph.D. Ohio State University 1989; Neutron capture therapy, radiation detection and radiation dosimetry.
[email: chris.wang@me.gatech.edu]

Show H. Fong, Assistant Professor, Nuclear Engineering and Health Physics (404-894-3718, Fax: 404-894-3733); Ph.D. Northwestern University 1990; Health physics, risk assessment, environmental restoration.

Other Faculty

S. I. Abdel-Khalik, Southern Nuclear Professor, Nuclear Engineering and Health Physics.
Sue B. Clark, Adjunct Assistant Professor, Environmental Chemistry.
Kenneth W. Crase, Adjunct Professor, Radiation Protection Policy.
S. James Cullom, Adjunct Assistant Professor, Nuclear Medicine Imaging.
Geoffrey G. Eichholz, Regents' Professor Emeritus, Nuclear Engineering and Health Physics.
Don S. Harmer, Professor of Physics.
Ratib A. Karam, Professor, Nuclear Engineering and Health Physics.
James A. Mulholland, Assistant Professor of Civil Engineering and Environmental Engineering.
Farzad Rahnema, Associate Professor, Nuclear Engineering and Health Physics.
Michael T. Ryan, Adjunct Professor, Low-level Radioactive Waste
Weston M. Stacey, Callaway and Regents' Professor, Nuclear Engineering and Health Physics.
Jon H. Trueblood, Adjunct Professor, Digital Imaging
F. Ward Whicker, Adjunct Professor, Radioecology
Ward O. Winer, Regents Professor and Chair, School of Mechanical Engineering.
William J. Wepfer, Professor and Director for Graduate Programs, School of Mechanical Engineering.
Edward K. Yeargers, Associate Professor of Biology.

Other Information
The video M.S. health physics program has been expanded to include live two-way video classes to the Medical College of Georgia. This distance learning program serves the Central Savannah River Region.

Visiting Faculty Financial Assistance
No formal program at present.

GEORGIA INSTITUTE OF TECHNOLOGY (Continued)

Student Financial Assistance

Research and teaching assistantships, fellowships, and tuition waivers are available to graduate students. Graduate assistantships carry a twelve-month stipend ranging from $13,000 to $16,000 and include a waiver of out-of-state tuition. President's Fellowships and Woodruff Fellowships of up to $5000 which supplement graduate assistantships, are available to qualified students wishing to pursue the Ph.D. Federal, industrial, and private fellowships are also available. International students must guarantee their first-year support but are eligible to compete for awards on a quarterly basis.

Research Facilities

5-MW nuclear research reactor, subcritical assembly, 300,000 curie ^{60}Co sources, hot cells. Extensive laboratories in radiochemistry, materials preparations, nuclear spectroscopy, plasma diagnostics, and radiobiology. Nuclear Research Center, Fusion Research Center, Environmental Resources Center. Only a few hours away are the Savannah River Plant, known for its research in material behavior, and the Oak Ridge National Laboratory, one of the world's largest research establishments.

9. IDAHO STATE UNIVERSITY

Department of Physics
Telephone: (208) 236-2350 / Fax: (208) 236-4649

Program Director:
Dr. Richard Brey
Department of Physics
Campus Box 8106
Idaho State University
Pocatello, Idaho 83209
email: brey@physics.isu.edu

HP Degrees Granted:
B.S. in Physics (Health Physics Emphasis)
M.S. in Physics (Health Physics Emphasis)
Ph.D. in Nuclear Science and Engineering (Health Physics Emphasis)

Remote Delivery of Course: Selected courses in the BS, MS, and PhD programs are offered to remote locations within the state of Idaho in real-time via microwave video communication.

	BS	MS	PhD
HP Enrollment (Fall 1996):	25	28	2
HP Graduates (9/94 to 8/95):	9	1	
HP Graduates (9/95 to 8/96):	5	4	

Health Physics Faculty (•25% FTE toward the HP program)

Richard R. Brey, Assistant Professor of Health Physics (208) 236-2667; Ph.D. Purdue University 1994; Applied health physics, Environmental health physics.
[email: brey@physics.isu.edu]

Thomas F. Gesell, Professor of Health Physics (208-236-3669); Ph.D. University of Tennessee 1971; Dosimetry, environmental health physics.
[email: gesell@physics.isu.edu]

Other Faculty

Douglas P. Wells, Associate Professor of Health Physics
Michael Abbott, Adjunct Professor of Health Physics
Donald Alexander, Adjunct Professor of Health Physics
Rick Cummings, Adjunct Professor of Health Physics
Bernard Graham, Adjunct Professor of Health Physics
Yale Harker, Adjunct Professor of Health Physics

IDAHO STATE UNIVERSITY (Continued)

John Horan, Adjunct Professor of Health Physics
Mark Otis, Adjunct Professor of Health Physics
Art Rood, Adjunct Professor of Health Physics
Bill Serrano, Adjunct Professor of Health Physics
Klaus Buzzi, Affiliate Professor of Health Physics
Mark Davidson, Affiliate Professor of Health Physics
Karen Langley, Affiliate Professor of Health Physics
Todd Lewis, Affiliate Professor of Health Physics
Steve Oberg, Affiliate Professor of Health Physics
James O'Rear, Affiliate Professor of Health Physics
Rudy Varesco, Affiliate Professor of Health Physics

Other Information

The nearby Idaho National Engineering Laboratory offers opportunities for students to gain practical experience and to conduct thesis research in a DOE environment. Idaho State University operates two separate environmental radioactivity monitoring and assessment laboratories. The Idaho State University Department of Physics operates the Idaho Small Accelerator Facility which currently operates several accelerators including two Van de Graaff accelerators, three electron LINAC accelerators, and a radiofrequency quadrapole accelerator. This facility will be increasing the number of available accelerators in the near future. Additionally Idaho State University operates an AGN-201 research and training reactor.

10. LAKESHORE TECHNICAL COLLEGE

Department of Health Physics
Telephone: (414) 684-4408 / Fax: (414) 693-3564

Program Director:
Dr. Douglas G. Gossen
Department of Health Physics
Lakeshore Technical College
1290 North Avenue
Cleveland, Wisconsin 53015

HP Degrees Granted in Health Physics:
A.A. in Health Physics

Remote Delivery of Courses: Selected courses in the A.A. curriculum; entire curriculum by the Fall of 1998.

	AA
HP Enrollment (Fall 1996):	7
HP Graduates (9/94 to 8/95):	15
HP Graduates (9/95 to 8/96):	12

Health Physics Faculty (•25% FTE toward the HP program)

Douglas G. Gossen, Coordinator of Health Physics Department (414-684-4408, ext. 221); Ph.D. LaSalle University 1996; Applied health physics, radiochemistry.

Daniel J. Shannon, Health Physics Instructor, M.S. Georgia Tech. 1995; Radiological emergencies, applied health physics.

Other Information
Annually, the program offers 40 hours of refresher courses and the NRRPT examination.

11. LOUISIANA STATE UNIVERSITY AND A&M COLLEGE

Nuclear Science Center
Telephone: (504) 388-2163 / Fax: (504) 388-2094

Program Director:
Dr. Edward N. Lambremont
Director and Professor
Nuclear Science Center
Louisiana State University and A&M College
Baton Rouge, Louisiana 70803-5820
(504) 388-2744
email: nssec@lsumvs.sncc.lsu.edu
website: http://www.leeric.lsu.edu/nsc

HP Degrees Granted:
M.S. in Nuclear Science and Engineering [Areas of Specialization: Health Physics, Medical Radiation Sciences (Physics), Nuclear Engineering, Basic and Applied Research]

Remote Delivery of Course: None

MS

HP Enrollment (Fall 1996):	10
HP Graduates (9/94 to 8/95):	2
HP Graduates (9/95 to 8/96):	3

Health Physics Faculty (•25% FTE toward the HP program)

Edward N. Lambremont, Director and Professor of Nuclear Science (504-388-2744); Ph.D. Ohio State University 1958; Radiation effects on biological systems, radiation safety, US Council for Energy Awareness spokesman on nuclear power.

John C. Courtney, CHP, Professor of Nuclear Engineering (504-388-2740; D.Engr. Catholic University of America 1965; Radiation shielding, health physics, radiation measurement, safety analysis of nuclear facilities, training program development.

Erno Sajo, Professor of Nuclear Engineering (504-388-2762); Ph.D. Lowell University 1989; Reactor engineering, computer and mathematical modeling of radionuclide transport, fluid mechanics, dynamics and thermal analysis of reactor systems.

L. Max Scott, CHP, Associate Professor of Nuclear Science (504-388-2747); Ph.D. Purdue University 1961; Radiation Safety Officer (LSU System and Baton Rouge Campus); Radiation safety, health physics.

Mark L. Williams, Professor of Nuclear Engineering (504-388-2745); Ph.D. University of Tennessee 1979; Nuclear reactor physics, radiation transport theory, perturbation theory, numerical methods for reactor analysis.

Other Faculty

Oscar Hidalgo-Salvatierra, Adjunct Assistant Professor of Nuclear Science.
Sheldon A. Johnson, Adjunct Assistant Professor of Nuclear Science.

Student Financial Assistance
Research assistantships

Research Facilities
Facilities for both biological and physics science and engineering research utilizing isotopes and radiation sources are located in the NSC. Radiation measurement equipment includes low-background, high-sensitivity liquid and solid scintillation detectors, and a gas-flow proportional counter. Gamma spectroscopy and dosimetry systems are used in a variety of investigations. A mass spectrometer laboratory is maintained to support stable tracer research. The Center maintains an extensive inventory of radiation monitoring instruments and calibrated standard sources. Radiation sources include two kilocurie cobalt irradiation facilities, neutron sources, and a natural subcritical assembly. The Perkins Cancer Center has extensive facilities and equipment for radiation dosimetry, treatment planning, teletherapy, brachytherapy, and other instruments used in treatment of human neoplastic disease and related disorders.

12. MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Department of Nuclear Engineering
Telephone: (617) 253-3801 / Fax: (617) 258-7437

Program Director:
Dr. Jacquelyn C. Yanch
Department of Nuclear Engineering
E25-330
Massachusetts Institute of Technology
Cambridge, Massachusetts 02139-4307
email: jcy@webiel.mit.edu

HP Degrees Granted:
M.S. in Nuclear Engineering (health physics option)
Ph.D. or Sc.D. in Nuclear Engineering (health physics option)

Remote Delivery of Course: None

	MS	PhD
HP Enrollment (Fall 1996):	6	4
HP Graduates (9/94 to 8/95):	0	1
HP Graduates (9/95 to 8/96):	0	2

Health Physics Faculty (•25% FTE toward the HP program)

Jacquelyn C. Yanch, Associate Professor of Nuclear Engineering (617-258-6999); Ph.D. University of London 1988; Nuclear medical imaging, computational modeling in both therapy and image restoration, radiation health physics, neutron dosimetry. **[email: jcy@webiel.mit.edu]**

Kenneth Czerwinski, Assistant Professor of Nuclear Engineering (617-253-3843); Ph.D. University of California, Berkeley, 1992; Actinide spectroscopy, actinide thermodynamics, environmental chemistry of actinide elements, radiation health physics, geochemical modeling. **[email: kczer@mit.edu]**

Xia-Lin Zhou, Assistant Professor of Nuclear Engineering (617-258-7430); Ph.D. Massachusetts Institute of Technology 1993; Neutron reflection and scattering spectroscopies, neutron source engineering, neutron capture therapy. **[email xlzhou@mit.edu]**

Otto K. Harling, Professor of Nuclear Engineering (615-253-4201); Ph.D. Penn State 1962; Research reactor applications, experimental materials research, neutron research. **[email: oharling@mit.edu]**

MASSACHUSETTS INSTITUTE OF TECHNOLOGY (Continued)

Sow-Hsin Chen, Professor of Nuclear Engineering (615-253-3810); Ph.D. McMaster University, Canada 1964; Applied neutron physics and spectroscopy, applications of laser light scattering to biological problems. **[email: sowhsin@mit.edu]**

Sidney Yip, Professor of Nuclear Engineering (615-253-3809); Ph.D. University of Michigan 1962; Atomistic simulations, condensed matter sciences, statistical mechanics, neutron scattering. **[email: syip@mit.edu]**

Other Faculty

Mujid S. Kazimi, Professor of Nuclear Engineering.
Fred W. McWilliams, Head of Radiation Protection, MIT Reactor.
Francis X. Massé, CHP, Radiation Protection Officer for MIT.

Student Financial Assistance
Fellowships, teaching assistantships, research assistantships

Research Facilities
5-MW MIT Research Reactor plus associated laboratories, 4.1-MeV high current particle accelerator for biomedical research, scanning electron facility, an RFQ proton generator for neutron tomography and non-destructive testing, a waste encapsulation laboratory, neutron activation analysis laboratory, NMR laboratory, medical imaging laboratory, and other.

13. NATIONAL TECHNICAL UNIVERSITY

Department of Health Physics
Telephone: (970) 495-6400 / Fax: (970) 484-0668

Program Director:
Dr. Thomas B. Borak
Department of Radiological Health Sciences
Colorado State University
Ft. Collins, Colorado 80523
(970) 491-6450
Fax: (970) 491-0623
email: tborak@vines.colostate.edu

HP Degrees Granted:
M.S. in Health Physics

Remote Delivery of Course: Entire MS curriculum

	MS
HP Enrollment (Fall 1996):	14
HP Graduates (9/94 to 8/95):	4
HP Graduates (9/95 to 8/96):	3

Health Physics Advisory Committee

Thomas B. Borak, Department of Radiological Health Sciences (970-491-5222, Fax: 970-491-0623); Colorado State University. **[email: tborak@vines.colostate.edu]**

David Hintenlang, 202 Nuclear Sciences Ctr., University of Florida, Gainesville (352-392-8112, Fax: 352-392-3380). **[email: dhinten@nervm.nerdc.ufl.edu]**

Robert R. Landolt, School of Health Sciences, Purdue University (317-494-1440, Fax: 317-496-1377). **[email: landoltr@purdue.edu]**

Nolan E. Hertel, Woodruff School of Mechanical Engineering, Health Physics Program, Georgia Institute of Technology (404-894-3717, Fax: 404-894-3733).
[email: nolan.hertel@me.gatech.edu]

Participating Universities
Colorado State University, University of Florida, Georgia Institute of Technology, University of Illinois, and Purdue University. In addition to required courses at these institutions, elective courses can be selected from over 40 participating universities.

NATIONAL TECHNICAL UNIVERSITY (Continued)

Other Information

National Technical University offers a M.S. degree in Health Physics. The curriculum consists of courses from participating universities with recognized graduate programs in radiation protection. NTU students enroll in university courses as they are being delivered to residents on campus. However, they view these lectures by satellite transmission at subscribing institutions such as government laboratories or companies. Courses have been selected to provide the basics of health physics required for professional development and certification by the American Board of Health Physics. Thirty-two semester credits are required in radiation physics, radiation detection, radiochemistry, radiation biology, principles of health physics, environmental health physics, and public health. Students must also take two laboratory courses that are scheduled at participating universities for two weeks during the summer term. The final course is the preparation of a formal paper involving a special topic approved by the academic advisor. This is usually directly related to and can be completed at the student's place of employment.

14. NORTHERN NEW MEXICO COMMUNITY COLLEGE

Department of Radiation Science
Telephone: (505) 747-2218 / Fax: (505) 747-2180

Program Director:
Ms. Donna Foster
Director, Radiation Sciences
Northern New Mexico Community College
1002 North Onate St.
Espanola, New Mexico 87532

HP Degrees Granted:
A.A.S. in Radiation Protection
A.S.S. in Environmental Restoration and Waste Management Science

Remote Delivery of Course: Selected courses are sent to Los Alamos National Laboratory

	AA
HP Enrollment (Fall 1996):	16
HP Graduates (9/94 to 8/95):	3
HP Graduates (9/95 to 8/96):	2

Health Physics Faculty (•25% FTE toward the HP program)

Michael Duran, M.S. Colorado State University 1993.
Anthea Stamelatos, B.S. College of St. Francis, Joliet.
Lawrence Scott Walker, B.A. University of Northern Colorado 1973.

15. THE OHIO STATE UNIVERSITY

Department of Nuclear Engineering
Telephone: (614) 292-8519 / Fax: (614) 292-3163

Program Director:
Dr. Thomas E. Blue
Health Physics Program Director
2091 Robinson Laboratory
206 West 18th Avenue
Columbus, Ohio 43210-1107
(614) 292-0629
email: tblue@melanoma.eng.ohio-state.edu
website: http://rclsgi.eng.ohio-state.edu/nuclear/

HP Degrees Granted:
M.S. in Nuclear Engineering (Health Physics Option)
Ph.D. in Nuclear Engineering (Health Physics Option)

Remote Delivery of Course: Selected courses in the MS and PhD programs

	MS	PhD
HP Enrollment (Fall 1996):	7	5
HP Graduates (9/94 to 8/95):	4	0
HP Graduates (9/95 to 8/96):	5	0

Health Physics Faculty (•25% FTE toward the HP program)

Don W. Miller, Professor and Chairman of Nuclear Engineering (614-292-7979); Ph.D. The Ohio State University 1971; Reactor instrumentation, reactor dynamics and control, nuclear medical instrumentation, artificial intelligence applied to plant operations, digital x-ray radiography. **[email: miller.68@osu.edu]**

Thomas E. Blue, Professor of Nuclear Engineering (614-292-0629); Ph.D. University of Michigan 1978; Radiation protection, boron neutron capture therapy, accelerator neutron source design, radiation dosimetry, solid state nuclear track detectors. [email: tblue@melanoma.eng.ohio-state.edu]

Audeen W. Fentimen, Associate Professor of Engineering Graphics and Nuclear Engineering (614-292-7930); Ph.D. The Ohio State University 1982; Nuclear waste management, fuel management, criticality safety. **[email: fentiman.1@osu.edu]**

THE OHIO STATE UNIVERSITY (Continued)

Other Faculty

Tunc Aldemir, Professor of Nuclear Engineering.
Walter E. Carey, CHP, Emeritus Associate Professor of Nuclear Engineering and Zoology and Past Director, Office of Radiation Safety.
Richard N. Christensen, Professor of Nuclear and Mechanical Engineering
Nilendu Gupta, Professor of Nuclear Engineering.
Mardi Hastings, Associate Professor of Mechanical and Nuclear Engineering.

Other Information
Approved institution for the DOE Applied Health Physics Fellowships. Typically receive annually one Institute for Nuclear Power Operations Health Physics Fellowship.

Student Financial Assistance
Financial assistance to graduate students in Nuclear Engineering is available. After a consideration of academic experience and pertinent industrial experience, graduate students may be designated research associates or teaching associates, or may qualify for fellowships. Fellowships are available through the University, DOE, INPO, NRC and NSF. Stipends are competitive within OSU and with Graduate Programs at other schools; in addition, tuition and fees which range from $7,236.00 to $17,256.00 per year are waived. The deadline for fellowship applications is January 1.

Application for all forms of financial assistance administered by the department as well as the Graduate School may be made by completing the appropriate portion of the application form for admission to the Graduate School. Application materials may be obtained by writing to:

Admissions Office, The Ohio State University, 1800 Cannon Drive,
Columbus, OH 43210-1200 USA
------or-------
Chair, Nuclear Engineering Program, The Ohio State University, 206 West
18th Avenue, Columbus, OH 43210-1107 USA

16. OREGON STATE UNIVERSITY

Department of Nuclear Engineering
Telephone: (541) 737-2343 / Fax: (541) 737-0480

Program Director:
Dr. Jack F. Higginbotham
Department of Nuclear Engineering
Oregon State University
Radiation Center C116
Corvallis, Oregon 97331-5902
(541) 737-7046
email: higginjf@rc.orst.edu

HP Degrees Granted:
B.S. in Radiation Health Physics
M.S. in Radiation Health Physics
Ph.D. in Radiation Health Physics

Remote Delivery of Course: None

	BS	MS
HP Enrollment (Fall 1996):	26	13
HP Graduates (9/94 to 8/95):	3	3
HP Graduates (9/95 to 8/96):	4	8

Health Physics Faculty (•25% FTE toward the HP program)

Stephen E. Binney, Professor of Nuclear Engineering (541-737-7068); Ph.D. University of California, Berkeley 1970; Applications of nuclear instrumentation and techniques, production of medical radioisotopes, boron neutron capture therapy, transmutation of radionuclides, nuclear radiation shielding.
[email: binneys@ne.orst.edu]

Brian Dodd, Director, Radiation Center and Professor of Nuclear Engineering (541-737-2344); Ph.D. University of London 1973; Health physics, radioactive materials transportation, emergency response, research reactor management.
[email: doddb@rc.orst.edu]

Jack F. Higginbotham, PE, CHP, Associate Professor of Nuclear Engineering (541-737-7046); Ph.D. Kansas State University 1987; Radiation protection, activation analysis, gamma-ray and beta-particle spectroscopy, nuclear instrumentation.
[email: higginjf@rc.orst.edu]

OREGON STATE UNIVERSITY (Continued)

Kathryn A. Higley, CHP, Assistant Professor of Nuclear Engineering, (541-737-0675); PhD Colorado State University 1992; Human and ecological risk assessment, environmental pathway analysis, environmental radiation monitoring, radionuclide and hazardous chemical transport, radiochemistry, neutron activation analysis and environmental regulation. **[email: higleyk@ne.orst.edu]**

Other Faculty

Arthur G. Johnson, Professor Emeritus of Nuclear Engineering
Andrew C. Klein, Graduate Administrator and Associate Professor of Nuclear Engineering.
Todd S. Palmer, Assistant Professor of Nuclear Engineering.
José N. Reyes Jr., Associate Professor of Nuclear Engineering.
John C. Ringle, Associate Dean of the Graduate School and Professor of Nuclear Engineering

Other Information

Vacant position in the program (currently recruiting). Program is housed in the OSU Radiation Center which has a 1.1 MW TRIGA reactor, ^{60}Co irradiator, instrument calibration facilities as well as full analytical and laboratory capabilities. The Department of Nuclear Engineering at Oregon State University also offers B.S., M.S., and Ph.D. degrees in nuclear engineering.

17. PURDUE UNIVERSITY

School of Health Sciences
Telephone: (765) 494-1419 / Fax: (765) 496-1377

Program Director:
Dr. Paul Ziemer
School of Health Sciences
Purdue University
1338 Civil Engineering Building
West Lafayette, Indiana 47907-1338

HP Degrees Granted:
B.S. in Health Physics
M.S. in Health Physics
Ph.D. in Health Physics

Remote Delivery of Course: Selected courses in the MS program as part of the MS health physics degree from National Technological University.

	BS	MS	PhD
HP Enrollment (Fall 1996):	16	4	2
HP Graduates (9/94 to 8/95):	9	4	1
HP Graduates (9/95 to 8/96):	11	1	0

Health Physics Faculty (•25% FTE toward the HP program)

Robert Landolt, Professor of Health Sciences (765-494-2699); Ph.D. Purdue University 1968; Radioactive waste management, health physics aspects of decommissioning. **[email: landoltr@purdue.edu]**

Paul L. Ziemer, CHP, Professor and Head, School of Health Sciences (765-494-1435); Ph.D. Purdue University 1962; Solid state dosimetry, radon transport through soil and other materials. **[email: ziemer@purdue.edu]**

John D. Zimbrick, Professor of Health Sciences (765-494-1408); Ph.D. University of Kansas 1967; Molecular radiobiology, radiation dosimetry.
[email: zimbrick@purdue.edu]

Other Faculty
Stanley Shaw, Professor of Nuclear Pharmacy.
James Schweitzer, Assistant Professor of Health Sciences and Radiation Safety Officer.
Frank Rosenthal, Associate Professor of Occupational and Environmental Health Sciences.
Neil Zimmerman, Associate Professor of Occupational Safety and Health.

19. SAN DIEGO STATE UNIVERSITY

Department of Physics
Telephone: (619) 594-6240 / Fax: (619) 594-5485

Program Director:
Dr. Patrick J. Papin
Department of Physics
San Diego State University
San Diego, California 92182-1233
email: patrick.papin@sdsu.edu

HP Degrees Granted:
M.S. in Radiological Health Physics

Remote Delivery of Course: None

	MS
HP Enrollment (Fall 1996):	15
HP Graduates (9/94 to 8/95):	6
HP Graduates (9/95 to 8/96):	6

Health Physics Faculty (•25% FTE toward the HP program)

Patrick J. Papin, Professor of Physics (619-594-6240); Ph.D. University of California 1985, Computational methods in dosimetry, shielding, and medical imaging, Neutron-gamma mixed field dosimetry. **[email: patrick.papin@sdsu.edu]**

Gordon Shckelford, Lecturer in Radiological Health Physics (619-594-6240); M.S. San Diego State University 1974, Nuclear instrumentation and methods.
[email: gshackelford@sciences.sdsu.edu]

Eric Goldin, CHP, Lecturer in Radiological Health Physics and Radiation Biology, ABHP Certified Health Physicist (Comprehensive and Power Reactor Health Physics), Health Physics Engineer, Southern California Edison (619-594-6240); Ph.D. University of Texas 1976, Nuclear power reactor health physics.

Ralph Cerbone, Lecturer in Radiological Health Physics (619-594-6240); Ph.D. Rensselaer Polytechnic Institute 1967, Computational methods in shielding, nuclear engineering.

SAN DIEGO STATE UNIVERSITY (Continued)

Other Faculty

Steven J. Goetsch, Lecturer in Radiological Health Physics.
Michael Russell, Lecturer in Radiological Health Physics.
Sharon Thompson, Lecturer in Radiological Health Physics.

Other Information
Our Health Physics Program is a participating university in the Department of Energy Applied Health Physics Fellowship program. We also have students who are supported by the Nuclear Regulatory Commission Graduate Fellowship program. Health Physics curriculum includes applied health physics courses in areas of nuclear power reactor health physics (in cooperation with San Onofre Nuclear Generating Station) and medical health physics (in cooperation with the Naval Hospital, San Diego).

Student Financial Assistance
The department currently supports students as both teaching and research assistantships. Students also have numerous opportunities for scholarships and fellows.

Research Facilities
On campus facilities include: Nuclear counting laboratories with radioisotope preparation capabilities, neutron generator facility, x-ray laboratory, whole-body counter, instrument calibration facility (including gamma and neutron sources), computational radiological physics laboratory (with high-speed supercomputer access). Off campus facilities: Through elective courses and special study students have access to equipment and facilities at San Onofre Nuclear Generating Station, various hospitals (with nuclear medicine, diagnostic and radiation therapy facilities), and biotech laboratories.

Professional Certification
Graduates of our program have been very successful in passing the American Board of Health Physics Certification Exam.

19. TEXAS A&M UNIVERSITY

Department of Nuclear Engineering
Telephone: (409) 845-4161 / Fax: (409) 845-6443

Program Director:
Dr. John W. Poston, Sr.
129 Zachry Engineering Center
Department of Nuclear Engineering
Texas A&M University
College Station, Texas 77843-3133
email: jwp8890@zeus.tamu.edu

HP Degrees Granted:
B.S. in Radiological Health Engineering
M.S. in Health Physics
Ph.D. in Nuclear Engineering (Health Physics Option)

Remote Delivery of Courses: None

	BS	MS	PhD
HP Enrollment (Fall 1996):	15	19	12
HP Graduates (9/94 to 8/95):	3	16	4
HP Graduates (9/95 to 8/96):	8	8	3

Health Physics Faculty (•25% FTE toward the HP program)

John W. Poston, Sr., Department Head and Professor of Nuclear Engineering (409-845-4161); Ph.D. Georgia Institute of Technology 1971, External and internal dosimetry, applied health physics. **[email: jwp8890@zeus.tamu.edu]**

Leslie A. Braby, Research Professor (409-862-1798); Ph.D. Oregon State University 1972; Microdosimetry, radiation biology, space radiation, radiation detection.
[email: labraby@unix.tamu.edu]

Ian S. Hamilton, Lecturer (409-845-8101); Ph.D. Texas A&M University 1995; Radiation detection, external dosimetry, radiation biology.
[email: ish6197@acs.tamu.edu]

Milton E. McLain, Jr., CHP, Professor Emeritus of Nuclear Engineering (409-845-4107); Ph.D. Georgia Institute of Technology 1972; Health physics in power plant research and industrial applications, radon measurements, radioactivity measurements, dosimetry of fission product gases.

TEXAS A&M UNIVERSITY (Continued)

W. Wilson Pitt, Jr., PE, Adjunct Professor of Nuclear Engineering and Assistant Department Head (409-845-4166); Ph.D. University of Tennessee at Knoxville 1969; Waste management, fuel reprocessing, environmental fate and transport.
[email: wwpitt@tamu.edu]

W. Dan Reece, Associate Professor of Nuclear Engineering and Director, Nuclear Science Center (409-847-8946); Ph.D. Georgia Institute of Technology 1988; Radiation transport, location of breach of clad, assessment of effective dose equivalent from external sources, hot particles. **[email: w-reece@tamu.edu]**

Other Faculty

William H. Marlow, Associate Professor of Nuclear Engineering.
James C. Rock, PE, CIH, Associate Professor of Industrial Hygiene.
Stuart L. Shalat, Associate Professor of Industrial Hygiene.
John P. Wagner, Associate Professor of Safety Engineering.

Other Information
The Department of Nuclear Engineering also offers M.S. degrees in both Industrial Hygiene and Safety Engineering. Current plans are to merge HP, IH, and SE programs at the PhD level into a combined degree program in Health Protection Engineering. Texas A&M is an approved site for the DOE Applied Health Physics Fellowship, the DOE Nuclear Engineering & Health Physics Fellowship, and the INPO Health Physics Fellowship.

Visiting Faculty Financial Assistance
Faculty wishing to spend sabbatical leave at Texas A&M are welcome. Financial arrangements are negotiated on an individual basis but may encompass half-time to full support for the academic year. The Department has a long history of such arrangements with several national laboratories as well as some foreign institutions.

Student Financial Assistance
Scholarships, fellowships, and assistantships are available through the Department, the College, and the University. All applications for our graduate program are automatically considered for financial aid. The Department is an approved site for the DOE Applied Health Physics Fellowships, the DOE Nuclear Engineering and Health Physics Fellowships, and the INPO Health Physics Fellowship.

Research Facilities
1 MW TRIGA research reactor, 5 W AGN-201M training reactor, 5 accelerators, Nuclear counting laboratory, Radon laboratory, Thermoluminescence Dosimetry Laboratory, Etched-track Detection Laboratory, Nuclear spectroscopy laboratory, Liquid scintillation counting laboratory, Radiochemistry Laboratory

TEXAS A&M UNIVERSITY (Continued)

Professional Certification

The M.S. and Ph.D. programs in health physics prepare the student for Part I of the certification examination administered by the American Board of Health Physics. Eligibility of Part II of examination is based on professional experience.

20. TEXAS STATE TECHNICAL COLLEGE WACO

Radiation Protection Technology
Telephone: (817) 867-4877 / Fax: (817) 867-2300

Program Director:
David Day
Radiation Protection Technology Department
3801 Campus Drive
Waco, Texas 76705
(817) 867-4841

HP Degrees Granted:
Associate of Applied Science in Radiation Protection Technology

Remote Delivery of Course: None

	AAS
HP Enrollment (Fall 1996):	16
HP Graduates (9/94 to 8/95):	13
HP Graduates (9/95 to 8/96):	6

Health Physics Faculty (>25% FTE toward the HP program)

Linda K. Morris, Radiation Safety Officer and Instructor (817-867-2952); M.S. Biophysics (Health Physics) Texas A&M University 1971. **[email: lmorris@tstc.edu]**

Gary Nordwig, Instructor (817-867-2992); M.S. University of Texas School of Public Health at Houston 1986. **[email: gnordwig@tstc.edu]**

Other Information
Radiation Protection Technology (RPT) is clustered with the Occupational Safety and Health (OSH) and Hazardous Materials Management Technology (HMM) Departments. Students receive basic training from all three (RPT, OSH, and HHM) departments and then specialize in one area.

21. UNIVERSITY OF CINCINNATI

Department of Mechanical, Industrial & Nuclear Engineering
Telephone: (513) 556-2739 / Fax: (513) 556-3390

Program Director:
Henry B. Spitz
University of Cincinnati
Department of Mechanical, Industrial & Nuclear Engineering
598 Rhodes Hall
P. O. Box 210072
Cincinnati, Ohio 45221-0072
(513) 556-2003
email: henry.spitz@uc.edu

HP Degrees Granted:
M. S. in Health Physics
M. S. & Ph. D. in Nuclear Engineering
Ph. D. in Radiological Engineering
Ph. D. in Medical Physics

Remote Delivery of Course: None

	MS	PhD
HP Enrollment (Fall 1996):	28	16
HP Graduates (9/94 to 8/95):	7	1
HP Graduates (9/95 to 8/96):	7	3

Health Physics Faculty (• 25% FTE toward HP Program)

Leroy Eckart, Professor & Associate Dean (513-556-2739); Ph. D., University of Cincinnati, 1971: Radiological Engineering, risk assessment, pathway analysis, nuclear waste management. **[email: roy.eckart@uc.edu]**

Henry Spitz, Associate Professor & Program Director (513-556-2003): Ph. D., New York University, 1978: Internal radiation dosimetry, in vivo whole body counting, tissue substitute materials, bioassay, radiation detection & measurement, environmental radioactivity, epidemiology. **[email: henry.spitz@uc.edu]**

John Valentine, Assistant Professor (513-556-2482); Ph. D., University of Michigan, 1993: Radiation measurements, scintillator detector research, radiological characterization, medical imaging, Monte Carlo simulation.
[email: john.valentine@uc.edu]

UNIVERSITY OF CINCINNATI (continued)

Alvin Shapiro, Professor (513-556-2014); Ph. D., University of Cincinnati, 1968: Radiation shielding, reactor computations, radiation dosimetry, neutron transport, criticality. [**email**: alvin.shapiro@uc.edu]

Other Faculty

James Neton, Ph. D., CHP, Adjunct Assistant Professor
Linda Bauer, Ph. D., Adjunct Assistant Professor
Paul Feller, Ph. D., Adjunct Professor
James Anno, Ph. D., Professor Emeritus
Raymond Wood, Ph. D., Adjunct Assistant Professor

Other Information

The Health Physics Program is part of a comprehensive academic program in Nuclear and Radiological Engineering in the College of Engineering at the University of Cincinnati. Although Nuclear and Radiological Engineering is located in the Department of Mechanical, Industrial, and Nuclear Engineering, collaborations in academic and research activities with the Department of Environmental Health in the College of Medicine and Civil and Environmental Engineering in the College of Engineering are typically arranged to provide students with the broadest possible range of experience. The Ph. D. program in Medical Physics is conducted in collaboration with the Radiology Department of the University of Cincinnati Medical College. The Health Physics Program actively participates in the Health and Environmental Risk Institute which involves multi-disciplinary research in risk assessment, risk communication, environmental analysis, exposure assessment, and risk management and incorporates the Colleges of Engineering, Medicine, Arts & Science, and Law.

Visiting Faculty Financial Assistance

Arrangements for visiting faculty working on collaborative research and academic programs are arranged on an individual basis depending upon available funds.

Student Financial Assistance

Many types of financial assistance are available to full-time students enrolled in the Nuclear Engineering Program. Qualifying graduate students in the College of Engineering may receive a University Graduate Scholarship (UGS) which covers tuition for the academic year and the summer quarters. There are less no service obligations associated with the UGS. A few University Graduate Assistantships (UGA) are available each year which, in addition to tuition and fees (approximately $800/yr), provide the student with a stipend during the regular academic year. In return for the stipend, the UGA requires approximately 15 to 20 hours of service per week in the Nuclear Engineering academic and/or research program. Research Assistantships (RA) are often available for the student to participate on externally-funded research projects which may serves thesis or project research topics. The

UNIVERSITY OF CINCINNATI (continued)

Nuclear Engineering Program also has a few fellowships that are restricted to students having U.S. citizenship. Graduate awards supported by University funds are subject to specific guidelines and requirements. Any student who has been accepted for entrance into the graduate program can be considered for financial assistance. Initial decision on such assistance are made by the Nuclear Engineering Faculty, usually in March of each year. Academic excellence is the major criterion for these awards, but additional information submitted with the application, such as reports or publications, and reference letters are also considered.

Research Facilities

The Nuclear Engineering Program at the University of Cincinnati has an elaborate arrangement of research and academic facilities, including laboratories for radiochemistry, radiation detection instrumentation, alpha and gamma spectroscopy, and sample preparation. In addition, two whole body counters and a ^{60}Co pool irradiator are available as well as several computer facilities for performing Monte Carlo analysis. The Nuclear Engineering Program is also a participant in the Health and Environmental Risk Institute, a multidisciplinary research institute involved with environmental analysis, exposure assessment, human health risk assessment, risk communication, and risk management.

22. UNIVERSITY OF FLORIDA

Department of Environmental Engineering Sciences
Telephone: (352) 392-0836 / Fax: (352) 392-3076

Program Director:
Dr. W. Emmett Bolch, Jr.
Department of Environmental Engineering Science
P.O. Box 116450
University of Florida
Gainesville, Florida 32611
(352) 392-5074
email: ebolch@nervm.nerdc.ufl.edu

HP Degrees Granted:
M.S. / M.E. in Environmental Engineering Sciences (Health Physics)
Ph.D. in Environmental Engineering Sciences (Health Physics)

Remote Delivery of Course: None

	MS/ME	PhD
HP Enrollment (Fall 1996):	6	3
HP Graduates (9/94 to 8/95):	6	1
HP Graduates (9/95 to 8/96):	5	1

Health Physics Faculty (•25% FTE toward the HP program)

W. Emmett Bolch, Jr., PE, Professor and Associate Chairman of Environmental Engineering (352-392-5074); Ph.D. University of California at Berkeley 1967, Environmental surveillance for radioactivity, radioactive waste treatment, radiochemistry, analysis of radioactivity, remedial actions, radon.
[email: ebolch@nervm.nerdc.ufl.edu]

Wesley E. Bolch, PE, CHP, Associate Professor of Nuclear and Radiological Engineering, (352-846-1361); PhD University of Florida 1988, External and internal radiation dosimetry, medical health physics, nuclear medicine dosimetry, NMR imaging / dosimetry of bone and bone marrow, microdosimetry, radiation effects to DNA, virtual radiation detection instrumentation development via LabVIEW programming. **[email: wesley-bolch@ufl.edu]**

David E. Hintenlang, Associate Professor of Nuclear and Radiological Engineering (352-392-8112); Ph.D. Brown University 1985, Medical health physics, radiolytic decomposition of mixed waste, real-time dosimetry and phantom development, indoor radon transport and computer modeling, and non-ionizing radiation health physics. **[email: dhinten@nervm.nerdc.ufl.edu]**

UNIVERSITY OF FLORIDA (Environmental Engineering) (Continued)

William S. Properzio, Associate Professor of Environmental Engineering, Director of Environmental Health & Safety Division (352-392-1591); Ph.D. University of Florida 1975; Health physics, medical health physics, environmental hazards, and industrial safety.

Charles E. Roessler, CHP, Professor Emeritus of Environmental Engineering (507-362-8958); Ph.D. University of Florida 1967; Environmental health physics, radon. Available for limited student committees and advising on research projects.

Other Faculty

Eric R. Allen, Professor of Environmental Engineering (Air Pollution).
W. Lamar Miller, Professor of Environmental Engineering (Hazardous Waste).

Other Information

The Health Physics Program at the University of Florida is a cooperative effort of the Departments of Environmental Engineering Sciences (EES) and Nuclear Engineering Sciences (NES). The core coursework is essentially the same, however, departmental requirements and options are different. EES requires additional chemistry, environmental toxicology, and an environmental engineering course. EES students can emphasize electives in hazardous wastes, industrial hygiene, or air pollution control. Current research areas in the EES Department include risk assessment, remediation survey techniques, GIS application in health physics, environmental surveillance, radon mitigation at the development stage, and radiation risk reduction in pediatric diagnostic radiology.

23. UNIVERSITY OF FLORIDA

Department of Nuclear and Radiological Engineering
Telephone: (352) 392-1401 / Fax: (352) 392-3380

Program Director:
Dr. David E. Hintenlang
Department of Nuclear and Radiological Engineering
202 Nuclear Sciences Center
University of Florida
Gainesville, Florida 32611
email: dhinten@nervm.nerdc.ufl.edu

HP Degree Granted:
B.S. in Nuclear Engineering Sciences (Radiation Protection)
M.S. / M.E. in Health Physics (Nuclear Power Option)
M.S. / M.E. in Health Physics (Medical Health Physics Option)
M.S. / M.E. in Health Physics (Waste Management Option)
Ph.D. in Nuclear Engineering Sciences (Health Physics)

Remote Delivery of Course: Selected courses in the MS program as part of the MS in Health Physics degree offered by National Technical University

	BS	MS/ME	PhD
HP Enrollment (Fall 1996):	6	20	8
HP Graduates (9/94 to 8/95):	3	8	1
HP Graduates (9/95 to 8/96):	3	14	1

Health Physics Faculty (•25% FTE toward the HP program)

Samim Anghaie, Professor of Nuclear and Radiological Engineering, (352-392-1421); PhD Pennsylvannia State University 1982; Nuclear reactor design, nuclear reactor thermal hydraulics, single- and multi-phase flow and heat transfer, radiation spectroscopy, applied particle transport. **[email: anghaie@inspiserver.inspi.ufl.edu]**

Wesley E. Bolch, PE, CHP, Associate Professor of Nuclear and Radiological Engineering, (352-846-1361); PhD University of Florida 1988; External and internal radiation dosimetry, medical health physics, nuclear medicine dosimetry, NMR imaging / dosimetry of bone and bone marrow, microdosimetry, radiation effects to DNA, virtual radiation detection instrumentation development via LabVIEW programming. **[email: wesley-bolch@ufl.edu]**

UNIVERSITY OF FLORIDA (Nuclear and Radiological Engineering) (Continued)

W. Emmett Bolch, Jr., PE, Professor and Associate Chairman of Environmental Engineering (352-392-5074); Ph.D. University of California at Berkeley 1967; Environmental surveillance for radioactivity, radioactive waste treatment, radiochemistry, analysis of radioactivity, remedial actions, radon.
[email: ebolch@nervm.nerdc.ufl.edu]

Frank J. Bova, Professor of Radiation Oncology (352-395-0287); Ph.D. University of Florida 1977; Applications of medical physics in radiation oncology, stereotactic radioneurosurgery. **[email: bova.radonc@shands.ufl.edu]**

Jeffrey R. Fitzsimmons, Professor of Radiology (352-395-0291); Ph.D. University of Florida 1979; Magnetic resonance imaging and spectroscopy, radiofrequency probe development, biomedical instrumentation, computer applications to medicine.
[email: jeff@ufnmr.health.ufl.edu]

David E. Hintenlang, Associate Professor of Nuclear Engineering Sciences (352-392-8112); Ph.D. Brown University 1985, Medical health physics, radiolytic decomposition of mixed waste, real-time dosimetry and phantom development, indoor radon transport and computer modeling, and non-ionizing radiation health physics. **[email: dhinten@nervm.nerdc.ufl.edu]**

Alan M. Jacobs, Professor of Nuclear and Radiological Engineering (352-392-2549); PhD Pennsylvannia State University 1963; Mathematical analysis and diagnostic applications of radiation transport in matter, especially in nuclear reactor systems, medical and industrial radiographic imaging.

Zuofeng Li, Assistant Professor of Radiation Oncology (352-395-0287); D. Sc. Washington University 1989; Development of graphics-based 3D computer treatment planning systems for brachytherapy, dosimetry of radioactive stents for treatment of restenosis, remote-afterloading of low-dose rate and high-dose rate brachytherapy sources, brachytherapy dose calculation algorithms.
[email: zuofeng@nervm.nerdc.ufl.edu]

Chihray Liu, Assistant Professor of Radiation Oncology (352-395-0287); Ph.D. University of Nebraska-Lincoln 1988; 3D treatment planning and treatment evaluation in radiation therapy, brachytherapy treatment planning for stereotactic brain, interstitial, intracavitory, and permanent implants, clinical hyperthermia.
[email: liucr.radonc@shands.ufl.edu]

Jatinder R. Palta, Professor of Radiation Oncology, Chief of Physics, UF Cancer Center (352-395-0287); Ph.D. University of Missouri 1981; Three-dimensional treatment planning, techniques and displays, radiation dosimetry and beam characterization. **[email: paltajr.radonc@shands.ufl.edu]**

UNIVERSITY OF FLORIDA (Nuclear and Radiological Engineering) (Continued)

William S. Properzio, Associate Professor of Environmental Engineering, Director of Environmental Health & Safety Division (352-392-1591); Ph.D. University of Florida 1975; Health physics, medical health physics, environmental hazards, and industrial safety. **[email: bill@pliny.ehs.ufl.edu]**

Katherine N. Scott, Professor of Radiology (352-395-0291); Ph.D. University of Florida 1966; Nuclear magnetic resonance spectroscopy, NMR in vivo spectroscopy, biomedical applications of NMR. **[email: scottk@xray.ufl.edu]**

Shailendra S. Shukla, Assistant Professor of Radiology (352-395-0291); Ph.D. Ohio University 1981; Nuclear medicine, instrumentation and SPECT, bone densitometry, ultrasound physics. **[email: liucr.radonc@shands.ufl.edu]**

William G. Vernetson, Associate Engineering, Director of Nuclear Facilities (352-392-1408); Ph.D. University of Florida 1979; Reactor safety and risk assessment, technology and design, reactor operations and training in the nuclear industry, heat and mass transfer in reactor systems, radiation safety, neutron activation analysis and health physics.

Timothy Zhu, Assistant Professor of Radiation Oncology (352-395-0287); Ph.D. Brown University 1991; 2D and 3D radiation therapy treatment planning of external photon and electron beams. **[email: timzhu@nervm.nerdc.ufl.edu]**

Other Faculty

G. Ronald Dalton, Professor of Nuclear and Radiological Engineering
Nils J. Diaz, Professor Emeritus of Nuclear and Radiological Engineering
Edward T. Dugan, Associate Professor of Nuclear and Radiological Engineering
William H. Ellis, Associate Professor Emeritus of Nuclear and Radiological Engineering
James S. Tulenko, Professor and Chairman of Nuclear and Radiological Engineering
Dale A. Lundgren, Professor of Environmental Engineering
Nancy P. Mendenhall, Professor and Chair of Radiation Oncology
W. Lamar Miller, Professor of Environmental Engineering
Charles E. Roessler, CHP, Professor Emeritus of Environmental Engineering
Genevieve S. Roessler, Associate Professor Emeritus of Nuclear and Radiological Engineering
Glen J. Schoessow, Professor Emeritus of Nuclear and Radiological Engineering
Edward V. Staab, Professor and Chair of Radiology

UNIVERSITY OF FLORIDA (Nuclear and Radiological Engineering) (Continued)

Other Information

The Health Physics Program at the University of Florida is a cooperative effort of the Departments of Nuclear Engineering Sciences (NES) and Environmental Engineering Sciences (EES). Students enrolled in the Health Physics Program within NES may choose to concentrate their Master's studies in one of three areas: (1) power generation health physics, (2) radioactive waste management, or (3) medical health physics. The department also offers graduate degrees in nuclear engineering, engineering physics, and medical physics. Beginning in the Fall of 1997, the department will begin a 5th graduate degree program in Biomedical Engineering. The University of Florida is an approved site for U.S. Department of Energy fellowships and Nuclear Regulatory Commission fellowships. In addition, the department awards at least one National Academy of Nuclear Training fellowship in health physics per year.

Visiting Faculty Financial Assistance

The department occasionally hosts sabbatical leave for visiting faculty. Financial arrangements are negotiated on an individual basis.

Student Financial Assistance

Scholarships, fellowships, and assistantships are available through the Department, the College, and the University. The Department is an approved site for the DOE Applied Health Physics Fellowships, the DOE Nuclear Engineering and Health Physics Fellowships, and the INPO Health Physics Fellowship.

Research Facilities

Facilities associated with the NRE Department: University Florida Training Reactor, Neutron Activation Analysis Laboratory, Nuclear Detection Teaching Laboratory with four LabVIEW detection workstations, Digital Computation Facility, Hot Cell Facility, TLD Processing Laboratory, Robotics and Virtual Reality Laboratory, Dosimetry Phantom Development Laboratory, Non-Destructive Testing Facility, X-Ray Exposure Facility, Land-Mine Detection Facility, Innovative Space Nuclear Power Institute, Neutron Howitzer. Other on-campus facilities include: Shands Cancer Center, Shands Teaching Hospital, Radioneurosurgery Facility, UF Brain Institute, VA Hospital, Center for Structural Biology (NMR imaging and electron microscopy).

Professional Certification

The M.S. and Ph.D. programs in health physics prepare the student for Part I of the certification examination administered by the American Board of Health Physics. Eligibility of Part II of examination is based on professional experience.

24. UNIVERSITY OF KENTUCKY

Program in Radiation Sciences, Division of Radiation Sciences,
Department of Clinical Sciences
Telephone: (606) 323-1100 ext. 248 / Fax: (606) 257-1816

Program Director:
Dr. Ralph C. Christensen
Room 207 CAHP Building
University of Kentucky Medical Center
Lexington, Kentucky 40536-0003
(606)-323-1100 ext. 248
email: rcchri1@pop.uky.edu

HP Degrees Granted:
M.S. in Health Physics (medical health physics emphasis)
M.S. in Radiological Medical Physics (therapy medical physics emphasis)

Remote Delivery of Course: None

	MS
HP Enrollment (Fall 1996):	9
HP Graduates (9/94 to 8/95):	1
HP Graduates (9/95 to 8/96):	2

Health Physics Faculty (•25% FTE toward the Radiation Science program)

Ralph Christensen, Associate Professor and Director, Division of Radiation Sciences (606-323-1100 ext. 248); Ph.D. University of California at Berkeley 1971; (radiation biophysics); Dosimetry, manpower issues, education and training quality.

Other Faculty

Goeffrey Ibbott, Assistant Professor of Radiation Medicine.
Ali Soleimani-Meigooni, Assistant Professor of Radiation Medicine.
Guy Simmons, Professor of Nuclear Medical Physics.

Other Information

We offer a program in Radiation Science with two possible degree options: one in Health Physics and one in Radiological Medical Physics. M.S. in Health Physics: specialization areas are medical health physics and general health physics. M.S. in Radiological Medical Physics: Specialization area is therapy medical physics.

25. UNIVERSITY OF MASSACHUSETTS LOWELL

Physics Department/Radiological Sciences Program
Telephone: (508) 934-3286 / Fax: (508) 441-0934

Program Director:
Dr. Clayton S. French
Radiological Sciences Program
University of Massachusetts Lowell
1 University Avenue
Lowell, Massachusetts 01854

HP Degrees Granted:
B.S. in Physics /Radiological Health Physics Option
M.S. in Radiological Sciences and Protection
Ph.D. in Physics/Radiological Sciences Option

Remote Delivery of Course: None

	BS	MS	PhD
HP Enrollment (Fall 1996):	15	19	15
HP Graduates (9/94 to 8/95):	9	15	1
HP Graduates (9/95 to 8/96):	5	11	1

Health Physics Faculty (•25% FTE toward the HP program)

George E. Chabot, CHP, Professor of Radiological Sciences (508-934-3288); Ph.D. University of Lowell 1985; Shielding, dosimetry, radiochemistry.
[email: chabotg@woods.uml.edu]

Jesse Y. Harris, Professor Emeritus of Radiological Sciences, (508-934-3771); Ph.D. Rutgers University 1968; Radiation biology, environmental radiation, environmental impact evaluation. **[email: harrisj@woods.uml.edu]**

Clayton S. French, CHP, Associate Professor of Radiological Sciences (508-934-3286); Ph.D. University of Lowell 1985; Health physics, mathematical modeling, computer programming. **[email: frenchcf@aol.com]**

Kenneth W. Skrable, CHP, Professor Emeritus of Radiological Sciences (508-934-3287); Ph.D. Rutgers the State University 1969; Health physics, internal dose, external dose. **[email: skrablekw@aol.com]**

UNIVERSITY OF MASSACHUSETTS LOWELL (Continued)

Other Faculty

Gus. P. Couchell, Professor of Physics, Nuclear Physics Program.
Walter A. Schier, Professor of Physics, Nuclear Physics Program.
Arthur Mittler, Professor of Physics, Nuclear Physics Program.
Gunther H. R. Kegel, Professor of Physics, Nuclear Physics Program.

Other Information

All of the academic programs are strongly based in the physical and biological sciences. A five-year BS/MS degree option is available. Graduate students can receive support under DOE, INPO, NRC, and industry-based research fellowships. A limited number of teaching assistantships are available to qualified students. Scholarships are available to undergraduates. All students are given opportunities for gaining applied work experience through internships at the UML Nuclear Center, hospitals, nuclear power stations, and other participating organizations.

Visiting Faculty Financial Assistance

UMass Lowell has no in-place program for supporting visiting faculty. UMass Lowell considers requests for visiting faculty on a case by case basis and may provide financial support or matching funding under certain circumstances.

Student Financial Assistance

UMass Lowell offers a wide variety of financial assistance including scholarships, fellowships, student teaching assistantships, student research assistantships, and work study programs.

Research Facilities

UMass Lowell has a 1-MW Research Reactor, 5-MW Van Der Graaff Accelerator, radiochemistry and radiobiology laboratories, nuclear instrumentation laboratory, environmental radioactivity measurement laboratories, operational health physics laboratory, dosimetry laboratory, X-ray facility, and computer room dedicated to the Radiological Sciences Program. Off-campus research venues are available at nearby hospitals, radiopharmaceutical production facility, power reactor utility companies, universities, and engineering companies.

Professional Certification

Students in Radiological Sciences are encouraged to obtain ABHP certification. In addition to offering an elective graduate course in ABHP Certification Preparation, M.S. degree candidates can opt to take Part I of the ABHP as an alternative to the comprehensive examination required for students who choose to complete a 3-credit research project rather than a 9-credit thesis.

26. UNIVERSITY OF MICHIGAN

School of Public Health
Telephone: (313) 936-0763 / Fax: (313) 764-9424

Program Director:
Dr. James E. Martin
School of Public Health
University of Michigan
Ann Arbor, Michigan 48109-2029

HP Degrees Granted:
M.S. in Health Physics
Ph.D. in Health Physics

Remote Delivery of Course: None

	MS	PhD
HP Enrollment (Fall 1996):	12	2
HP Graduates (9/94 to 8/95):	6	0
HP Graduates (9/95 to 8/96):	6	1

Health Physics Faculty (•25% FTE toward the HP program)

Stephen P. Ethier, Assistant Professor of Radiation Biology, Department of Radiation Oncology; Ph.D. University of Tennessee 1982; Radiation biology and cancer risk.

David M. Hamby, CHP, Assistant Professor of Radiological Health, Environmental & Industrial Health; Ph.D. University of North Carolina 1989; Environmental radiation and risk assessment.

James E. Martin, Associate Professor of Radiological Health, Environmental & Industrial Health; Ph.D. University of Michigan 1965; Health physics, radiation physics, radioactive waste management, radiological assessment, radioanalytical measurements, internal radiation dosimetry.

Joseph A. Miklos, Lecturer and Research Investigator in Radiological Health, Environmental & Industrial Health; MPH University of Michigan 1980; Thermoluminescent dosimetry.

Student Financial Assistance
Scholarships, fellowships, limited number of student teaching and student research assistantships.

UNIVERSITY OF MICHIGAN (School of Public Health) (Continued)

Research Facilities

Resources for graduate training in radiation protection are extensive and of high quality. Our laboratories contain radioanalytical facilities, two X-ray machines, radon sources, and beta, gamma, and neutron sources (PuBe and ^{252}Cf) traceable to the National Institute of Standards and Technology. Our equipment is extensive for work in dosimetry, radon, and radwaste; the National Testing Laboratory for performance for personnel dosimeters was demonstrated here. Students use ionization chambers, an extrapolation chamber, TLD readers, germanium detectors, multichannel analyzers, alpha and beta spectrometers, a liquid scintillation analyzer, a low-background alpha/beta counter, and portable survey meters. Students also have access to a 2 MW_t research reactor, large computers, a linear accelerator, a cyclotron, and other research facilities.

27. UNIVERSITY OF MICHIGAN

Department of Nuclear Engineering & Radiological Sciences
Telephone: (313) 764-4260 / Fax: (313) 763-4540

Program Director:

Professor Kim Kearfott
University of Michigan
Department of Nuclear Engineering & Radiological Sciences
2355 Bonisteel Blvd., Rm. 1906 Cooley Bldg.
Ann Arbor, Michigan 48109-2104
(313) 763-9117
email: kearfott@umich.edu

HP Degrees Granted:

B.S.E. in Nuclear Engineering (Radiological Health Engineering Option)
M.Eng. in Radiological Health Engineering
M.S.E. or M.E. in Nuclear Engineering (Nuclear Measurements and Imaging Option)
Ph.D. in Nuclear Engineering (Radiological Health Engineering Option)
Ph.D. in Nuclear Engineering (Nuclear Measurements and Imaging Option)

Remote Delivery of Course: Selected courses in the BS, MS, and PhD programs.

	BS	MS	MEng	PhD
HP Enrollment (Fall 1996):	14	2	12	19
HP Graduates (9/94 to 8/95):	15	3	3	3
HP Graduates (9/95 to 8/96):	13	2	12	3

Health Physics Faculty (•25% FTE toward the HP program)

William R. Martin, Professor of Nuclear Engineering & Radiological Sciences and Senior Associate Dean, College of Engineering (313-764-5534); Ph.D. University of Michigan 1976; Nuclear reactor theory and analysis, computational particle transport, Monte Carlo methods, advanced computers. **[email: wrm@engin.umich.edu]**

Ronald F. Fleming, Professor of Nuclear Engineering & Radiological Sciences and Director of Michigan Memorial Phoenix Project (313-764-6215); Ph.D. University of Michigan 1975; Nuclear measurements, neutron dosimetry, radiation spectroscopy, nuclear reactor operations. **[email: flemingr@f.imag.itd.umich.edu]**

UNIVERSITY OF MICHIGAN (Nuclear Engineering & Radiological Sciences) (Continued)

Michael J. Flynn, Adjunct Associate Professor of Nuclear Engineering & Radiological Sciences (313-764-4260); Ph.D. University of Michigan 1975; Radiation imaging, digital radiography, computed tomography, x-ray microscopy, dynamic radiography. **[email: mikef@rad.hfh.edu]**

James P. Holloway, Assistant Professor of Nuclear Engineering & Radiological Sciences (313-936-3126), Ph.D. University of Virginia 1989; Mathematical modeling and analysis, numerical methods, radiation transport and shielding, nuclear reactor physics. **[email: hagar@engin.umich.edu]**

Kimberlee J. Kearfott, CHP, Professor of Nuclear Engineering & Radiological Sciences (313-764-4260); Sc.D Massachusetts Institute of Technology 1980; Radiation protection engineering, radiation imaging, radiation detection, internal and external radiation dosimetry, radon gas detection and mitigation, medical physics, medical health physics. **[email: kearfott@umich.edu]**

Glenn F. Knoll, Professor of Nuclear Engineering & Radiological Sciences (313-936-0121); Ph.D. University of Michigan 1963; Nuclear instrumentation, radiation spectroscopy, radiation imaging. **[email: Glenn_F._noll@um.cc.umich.edu**]

Edward W. Larsen, Professor of Nuclear Engineering & Radiological Sciences (313-936-0124); Ph.D. Rensselaer 1971; Radiation transport processes, radiation therapy. **[email: edlarsen@engin.umich.edu]**

David Wehe, Associate Professor of Nuclear Engineering & Radiological Sciences (313-764-5225); Ph.D. University of Michigan 1984; Radiation detection, radiation imaging. **[email: dkw@engin.umich.edu]**

Other Faculty

A. Ziya Akcasu, Professor of Nuclear Engineering & Radiological Sciences.
Micheal Atzmon, Associate Professor of Nuclear Engineering & Radiological Sciences.
Mary L. Brake, Associate Professor of Nuclear Engineering & Radiological Sciences.
James J. Duderstadt, Director of the Millennium Institute, University of Michigan and Professor of Nuclear Engineering & Radiological Sciences.
Ronald M. Gilgenbach, Professor of Nuclear Engineering & Radiological Sciences.
David Hamby, Assistant Professor of Environmental and Industrial Health.

UNIVERSITY OF MICHIGAN (Nuclear Engineering) (Continued)

Terry Kammash, Stephan S. Attwood Professor of Engineering and Professor of Nuclear Engineering & Radiological Sciences.
Y. Y. Lau, Professor of Nuclear Engineering & Radiological Sciences.
John C. Lee, Professor of Nuclear Engineering & Radiological Sciences.
James E. Martin, CHP, Associate Professor of Environmental and Industrial Health.
Joseph A. Miklos, Instructor of Environmental and Industrial Health.
Gary S. Was, Professor of Nuclear Engineering & Radiological Sciences.

28. UNIVERSITY OF MISSOURI-COLUMBIA

Nuclear Engineering Program
Telephone: (573) 882-3550 / Fax: (573) 884-4801

Program Director:
Dr. William H. Miller
Nuclear Engineering Program
E2433 Engineering Building East
University of Missouri-Columbia
Columbia, Missouri 65211
email: ne@risc1.ecn.missouri.edu

HP Degrees Granted:
M.S. in Nuclear Engineering (Health Physics Option)
Ph.D. in Nuclear Engineering (Health Physics Option)

Remote Delivery of Course: Entire MS and PhD curricula

	MS	PhD
HP Enrollment (Fall 1996):	8	11
HP Graduates (9/94 to 8/95):	5	0
HP Graduates (9/95 to 8/96):	5	0

Health Physics Faculty (•25% FTE toward the HP program)

William H. Miller, PE, Chairman and Professor of Nuclear Engineering (573-882-9692); Ph.D. University of Missouri 1976; Proton recoil neutron spectrometers, angular energy and neutron spectra measurements, gamma-ray imaging, energy systems, public information. [**email**: whmiller@risc1.ecn.missouri.edu]

Tushar Ghosh, Director of Graduate Studies and Assistant Professor of Nuclear Engineering (573-882-9736); Ph.D. Oklahoma State University 1989; Mass transfer in absorption processes-experimental and theoretical investigation, absorption phenomena (particularly radon) in biological systems, kinetics and reaction mechanisms of catalytic reactions, activation of coals, indoor air quality.
[email: ghosh@ecvax2.ecn.missouri.edu]

UNIVERSITY OF MISSOURI-COLUMBIA (Continued)

Susan M. Langhorst, CHP, Campus Radiation Safety Officer and Assistant Professor of Nuclear Engineering (573-882-7221). **[email: ehssue@mmccmail.missouri.edu]**

Sudarshan K. Loyalka, PE, Curators' Professor, Professor of Nuclear Engineering and Director of Particulate Systems Research Center (573-882-3568); Ph.D. Stanford University 1967; Kinetic theory of gases, neutron transport, mechanics of aerosols including radon progeny, physics and thermal hydraulics of nuclear reactors, reactor safety analysis. **[email: loyalka@ecvax2.ecn.missouri.edu]**

Robert V. Tompson, Assistant Professor of Nuclear Engineering (573-882-2881); Ph.D. University of Missouri 1988; Kinetic theory of gases, experimental and theoretical aerosol mechanics, neutron transport theory, nuclear reactor physics and safety. **[email: tompson@ ecvax2.ecn.missouri.edu]**

Other Faculty

Evan Boote, Adjunct Assistant Professor of Nuclear Engineering, Assistant Professor of Radiology.
Julie Dawson, Adjunct Assistant Professor of Nuclear Engineering, ABR.
Gary Ehrhardt, Adjunct Assistant Professor of Nuclear Engineering, Research Reactor.
Michael Glascock, Adjunct Assistant Professor of Nuclear Engineering, Research Reactor.
Keith Hickey, CHP, Adjunct Assistant Professor of Nuclear Engineering.
Kiratadas Kutikkad, Adjunct Assistant Professor of Nuclear Engineering, Research Reactor.
Stephen Pickup, Adjunct Assistant Professor of Nuclear Engineering.
Mark A. Prelas, PE, Professor of Nuclear Engineering.
Wynn A. Volkert, Professor of Radiology and Nuclear Engineering.

Other Information

Participating university for the DOE Applied Health Physics Fellowship Program. Affiliated closely with the Research Reactor (10 MWth) and its 120 employees as engaged in research, isotope production, radiation services, and radioactivity shipment.

29. UNIVERSITY OF MISSOURI-ROLLA

Department of Nuclear Engineering
Telephone: (314) 341-4720 / Fax: (314) 341-6309

Program Director:
Dr. Arvind Kumar
102 Fulton Hall
University of Missouri-Rolla
Rolla, Missouri 65401
(314) 341-4747

HP Degrees Granted:
B.S. in Nuclear Engineering (Health Physics Option)
M.S. in Nuclear Engineering (Health Physics Option)
Ph.D. in Nuclear Engineering (Health Physics Option)

Remote Delivery of Course: Selected courses in the BS program

	BS	MS	PhD
HP Enrollment (Fall 1996):	2		
HP Graduates (9/94 to 8/95):	3		
HP Graduates (9/95 to 8/96):		1	1

Health Physics Faculty (•25% FTE toward the HP program)

Albert E. Bolon, Associate Professor of Nuclear Engineering and Director of the UMR Nuclear Reactor Facility (314-341-4746); Ph.D. Iowa State 1965; Research reactor uses, dose rate measurements from spent nuclear fuel, radiation effects on materials. **[email: abolon@umr.edu]**

Nicholas Tsoulfanidis, Professor of Nuclear Engineering, Radiation Safety Officer, Assistant Dean of The School of Mines and Metallurgy (314-341-4745); Ph.D. University of Illinois 1968; Radiation transport, radiation dose calculations, radiation protection (health physics and shielding).
[email: tsoul@umr.edu]

Research Facilities
A 200-kW nuclear research reactor, state-of-the-art radiation counting equipment.

Student Financial Assistance
Scholarships, fellowships, and assistantships are available.

30. UNIVERSITY OF NEVADA LAS VEGAS

Department of Health Physics
Telephone: (702) 895-4320 / Fax: (702) 895-4819

Interim Chair:
Dr. Mark Rudin
4505 Maryland Parkway
Las Vegas, Nevada 89154-3037
(702) 895-3299
email: mrudin@ccmail.nevada.edu

HP Degrees Granted:
B.S. in Health Physics
M.S. in Health Physics

Remote Delivery of Course: None

	BS	MS
HP Enrollment (Fall 1996):	35	9
HP Graduates (9/94 to 8/95):	1	
HP Graduates (9/95 to 8/96):	1	

Health Physics Faculty (•25% FTE toward the HP program)

Mark J. Rudin, Interim Chair, Department of Health Physics (702-895-4320); PhD Purdue University 1989; Environmental restoration, waste management, risk analysis. **[email: mrudin @ccmail.nevada.edu]**

Other information
Established an M.S. degree in Health Physics in 1996. The Department includes undergraduate programs in Nuclear Medicine and Comprehensive Imaging.

31. UNIVERSITY OF NORTH CAROLINA

Department of Environmental Sciences and Engineering
Telephone: (919) 966-3840 / Fax: (919) 966-7911

Program Director:
James E. Watson, Jr.
Department of Environmental Sciences and Engineering
University of North Carolina
Capel Hill, North Carolina 27599-7400
email: james_watson@unc.edu

Degrees Granted in Health Physics:
M.S. in Public Health
M.S. in Environmental Sciences and Engineering
Ph.D. in Environmental Sciences and Engineering

Remote Delivery of Course: None

	MS	PhD
HP Enrollment (Fall 1996):	5	1
HP Graduates (9/94 to 8/95):	5	0
HP Graduates (9/95 to 8/96):	2	1

Health Physics Faculty (•25% FTE toward the HP program)

Douglas J. Crawford-Brown, Professor (919-966-6026); Ph.D. Georgia Institute of Technology 1980; Development of mathematical theories of radionuclide biokinetics dosimetry, development of mathematical theories of cancer causation.
[email: cbrown@sphvax.sph.unc.edu]

James E. Watson, Jr., Professor (919-966-3840); Ph.D. University of North Carolina 1970; Indoor radon and radon in drinking water, low-level radioactive waste management. **[email: james_watson@unc.edu]**

Donald G. Willhoit, CHP, Associate Professor (919-962-5507); Sc.D. University of Pittsburgh 1964; Low-level radioactive waste management, hazardous waste management in the institutional environment. **[email: dgw.hsafety@mhs.unc.edu]**

Other Faculty

Merril Eisenbud, Adjunct Professor of Radiological Hygiene
Philip E. Hamrick, CHP, Adjunct Associate Professor of Radiological Hygiene

UNIVERSITY OF NORTH CAROLINA (Continued)

Parker C. Reist, Professor of Air and Industrial Hygiene
Bobby M. Wilson, Adjunct Instructor of Radiological Hygiene

Other Information
Program provides education in industrial hygiene as well as health physics.

Visiting Faculty Financial Assistance
Visiting faculty member would need to be self-supported.

Student Financial Assistance
Fellowships, student teaching assistantships, student research assistantships.

Research Facilities
Radiological laboratories equipped with a full compliment of radiation detection instrumentation.

32. UNIVERSITY OF PITTSBURGH

Environmental and Occupational Health
Telephone: (412) 967-6500 / Fax: (412) 624-1020

Program Director:
Dr. H. Gregg Claycamp
University of Pittsburgh
Environmental and Occupational Health
260 Kappa Drive
Pittsburgh, Pennsylvania 15238
email: hgc2@vms.cis.pitt.edu

HP Degrees Granted:
M.S. in Environmental and Occupational Health
Post-M.S. Certification in Radiation Health
Ph.D. in Environmental and Occupational Health

Remote Delivery of Course: None

	MS	**PhD**
HP Enrollment (Fall 1996):	4	0
HP Graduates (9/94 to 8/95):	2	0
HP Graduates (9/95 to 8/96):	2	0

Health Physics Faculty (•25% FTE toward the HP program)

William L. Bigbee, Associate Professor of Environmental and Occupational Health and Co-Leader, Molecular Carcinogenesis Program, University of Pittsburgh Cancer Institute; Ph.D. University of Oregon 1975; Biochemistry and molecular epidemiology. **[email: wlbigbee@pitt.edu]**

H. Gregg Claycamp, CHP, Associate Professor of Environmental and Occupational Health (412-967-6524); Ph.D. Northwest University 1982; Radiation and chemical risk assessment, mechanisms of radiation-induced DNA damage, effective dose from low- LET radiation. **[email: hgc2@vms.cis.iptt.edu]**

Bernard L. Cohen, Professor of Physics and Adjunct Professor of Environmental and Occupational Health (412-624-9245); D.Sc. Carnegie Mellon University 1950; Radon measurement and assessments, radiation and hazardous waste wastes risk analysis.

Jerry C. Rosen, CHP, Associate Professor of Environmental and Occupational Health, University Radiation Safety Officer (412-624-2728); M.S. University of Rochester 1965; Internal dosimetry, environmental radiation measurements, radiation doses.

UNIVERSITY OF PITTSBURGH (Continued)

William R. Schell, Professor Emeritus of Environmental and Occupational Health (412-967-6581); Ph.D. University of Washington 1963; Applications of isotopic and radiochemical tracers to environmental problems, development of nuclear measurement methods, assessment of radioactive materials.

Michael J. Tobin, Assistant Professor of Environmental and Occupational Health (412-967-6582); Ph.D. Carnegie Mellon University 1986; Novel radiochemical separations, radiotracer applications, migration of environmental contaminants. **[email: tobin@vms.cis.pitt.edu]**

Niel Wald, Professor of Environmental and Occupational Health, Professor of Radiology (School of Medicine) (412-624-2735); M.D. New York University 1948; Chromosome damage from radiation and other environmental mutagens, automated cytogenic dosimetry, clinical management of radiation injury.
[email: wald@vms.cis.pitt.edu]

Other Faculty

Walter F. Good, Assistant Professor of Environmental and Occupational Health, Associate Professor of Radiology (School Of Medicine).
John M. Herron, Research Assistant Professor of Environmental and Occupational Health, Research Associate Professor of Radiology (School Of Medicine).
Chris Shaw, Professor of Environmental and Occupational Health, Associate Professor of Radiology (School Of Medicine).

Visiting Faculty Financial Assistance
No formal mechanism is in place. Opportunities to collaborate on specific projects arise occasionally.

Student Financial Assistance
Approved DOE Applied Health Physics Fellowship site. Applicants may be considered for graduate assistantships.

Research Facilities
The program is housed in a large laboratory research building that includes radiation laboratories, cytogenetics, biochemistry, molecular biology, and computer laboratories. Access to whole-body counting, high-dose radiation facilities, and research in radiation imaging is possible depending on the research interests of the student.

33. THE UNIVERSITY OF TENNESSEE

Department of Nuclear Engineering
Telephone: (615) 974-5048 / Fax: (615) 974-0668

Program Director:
Dr. H. L. Dodds
Department of Nuclear Engineering
The University of Tennessee
Knoxville, Tennessee 37996-2300

HP Degrees Granted:
M.S. in Nuclear Engineering (concentration in Radiological Engineering)
Ph.D. in Nuclear Engineering (concentration in Radiological Engineering)

Remote Delivery of Course: None

	MS	PhD
HP Enrollment (Fall 1996):	22	10
HP Graduates (9/94 to 8/95):	13	0
HP Graduates (9/95 to 8/96):	11	1

Health Physics Faculty (•25% FTE toward the HP program)

P. G. Groer, Associate Professor of Nuclear Engineering (615-974-5048); Ph.D. Vienna 1967; Radiation risk analysis, radiation dosimetry (external and internal), Bayesian estimation techniques, reliability and probabilistic risk assessment.
[email: utne@utkux.utk.edu]

E. M. Katz, Associate Professor of Nuclear Engineering (615-974-5048); Ph.D. University of Tennessee 1975; Health physics laboratory.

L. F. Miller, Professor of Nuclear Engineering (615-974-5048); Ph.D. Texas A&M University 1976; Radiological assessments, radiation dosimetry, nuclear instrumentation, neural networks, computational methods.
[email: utne@utkux.utk.edu]

Other Faculty

Abu Ahmed, Adjunct Professor of Nuclear Engineering
William Casso, Adjunct Professor of Nuclear Engineering
Keith Eckerman, Adjunct Professor of Nuclear Engineering
Paul Frame, CHP, Adjunct Professor of Nuclear Engineering
Gloria Mai, Adjunct Professor of Nuclear Engineering

THE UNIVERSITY OF TENNESSEE (Continued)

Rafael Perez, Professor of Nuclear Engineering
David Simpson, CHP, Adjunct Professor of Nuclear Engineering
Joseph Thie, Adjunct Professor of Nuclear Engineering
James Turner, CHP, Adjunct Professor of Nuclear Engineering

Other Information
Our Adjunct Faculty are composed primarily of Health Physics professionals from Oak Ridge National Laboratory or Oak Ridge Associated Universities who teach health physics courses and/or direct graduate student research in health physics.

Visiting Faculty Financial Assistance
Office and secretarial support would be provided.

Student Financial Assistance
Scholarships, fellowships, student teaching and research assistantships.

Research Facilities
Nuclear instrumentation laboratory, reactor simulator, ^{252}Cf irradiation facility, computing laboratory, low-enriched graphite-moderated subcritical assembly, sample assay laboratory, wet chemistry laboratory, reactor facilities at ORNL.

34. UNIVERSITY OF TEXAS
HEALTH SCIENCE CENTER AT SAN ANTONIO

Department of Radiology
Telephone: (210) 567-5550 / Fax: (210) 567-5549

Program Director:
Gary D. Fullerton
University of Texas Health Science Center at San Antonio
Radiological Sciences
7703 Floyd Curl Drive
San Antonio, Texas 78284
email: fullerton@uthscsa.edu

HP Degrees Granted:
M.S. in Medical Physics (Medical Health Physics Option)

Remote Delivery of Course: None

	MS
HP Enrollment (Fall 1996):	1
HP Graduates (9/94 to 8/95):	1
HP Graduates (9/95 to 8/96):	0

Health Physics Faculty (•25% FTE toward the HP program)

Gary D. Fullerton, Professor of Radiology, Division Chief, Radiological Sciences (210-567-5550); Ph.D. University of Wisconsin Madison 1975; Magnetic resonance imaging, MR contrast mechanisms, interaction of water with macromolecules, molecular sources of MR relaxivity, biophysics of medical imaging processes.
[email: fullerton@uthscsa.edu]

David Kopp, Clinical Professor (210-567-5600); Ph.D. University of Kansas 1970; Nuclear medicine instrumentation.

Jack Lancaster, Associate Professor (210-567-8100); Ph.D. University of Texas Health Science Center at Dallas 1978; Medical imaging devices, acquisition, communications and display of medical images, general images analysis, processing and synthesis techniques for medical imaging. **[email: jlancaster@uthscsa.edu]**

Wayne Wiatrowski, CHP, Clinical Associate Professor (210-567-5550); Ph.D. University of Texas Health Science Center at San Antonio 1979; Operational health physics and radiation therapy.

Other Faculty

Martin L. Meltz, Associate Professor of Radiobiology.

Student Financial Assistance
Student research assistantships

Research Facilities
Cyclotron used to produce positron-emitting radionuclides for human use research studies, nine linear accelerators used in radiation oncology, two High-Dose-Rate Brachytherapy systems.

35. UNIVERSITY OF WISCONSIN

Department of Medical Physics
Telephone: (608) 262-2170 / Fax: (608) 262-2413

Program Director:
Dr. Paul M. DeLuca, Jr.
Department of Medical Physics
1530 Medical Sciences Center
1300 University Avenue
Madison, Wisconsin 53706-1532
(608) 262-2171
email: pmd@cema.medphysics.wisc.edu

Degrees Granted:
M.S. in Medical Physics (Health Physics Option)
M.S. and Ph.D. in Medical Physics

Remote Delivery of Course: None

	MS	PhD
HP Enrollment (Fall 1996):	22	21
HP Graduates (9/94 to 8/95):	16	6
HP Graduates (9/95 to 8/96):	13	7

Health Physics Faculty (•25% FTE toward the HP program)

Onofre T. DeJesus, Associate Professor of Medical Physics and Radiology (608-263-8929); Ph.D. Virginia Polytechnic 1980; Radiopharmaceutical chemistry, positron emission tomography. **[email: odejesus@facstaff.wisc.edu]**

Paul M. DeLuca, Jr., Professor and Chairman (608-262-2171); Ph.D. Notre Dame 1971; radiation protection (health physics), neutron dosimetry, radiobiological research with fast neutrons. **[email: pmd@cema.medphysics.wisc.edu]**

Larry A. DeWerd, Professor, CHS and Director of Radiation Calibration Service (608-263-0378); Ph.D. University of Wisconsin Madison 1970; Thermoluminescence dosimetry, electroradiography, quality assurance in diagnostic radiology.
[email: dewerd@facstaff.wisc.edu]

Michael N. Gould, Associate Professor (608-263-6615); Ph.D. University of Wisconsin Madison 1977; Radiobiology and oncology. **[email: mgould@humonc.wisc.edu]**

UNIVERSITY OF WISCONSIN (Continued)

James E. Holden, Professor (608-262-5998); Ph.D. Pennsylvania 1971; External detection and mathematical modeling in tracer studies of biological transport and metabolism, mathematical image science.
[email: holden@madmod.medphysics.wisc.edu]

T. Rockwell Mackie, Associate Professor (608-262-7358); Ph.D. Alberta Canada 1984; Radiotherapy treatment planning, Monte Carlo modeling, dosimetry, cavity theory. **[email: mackie@macc.wisc.edu]**

Ernest L. Madsen, Professor (608-263-7932); Catholic University of America Washington D.C. 1968; Medical ultrasound imaging and tissue characterization, magnetic resonance imaging, hyperthermia via ultrasound.
[email: elmadsen@facstaff.wisc.edu]

Charles A. Mistretta, Professor (608-263-8313); Ph.D. Harvard 1968; digital radiography. **[email: cmistrta@facstaff.wisc.edu]**

Robert J. Nickles, Professor and Director of the Cyclotron Facility (608-263-1026); Ph.D. University of Wisconsin Madison 1968; Generation and utilization of short-lived radionuclides for physiological measurements and diagnosis, positron emission tomography. **[email: nickles@petrus.medphysics.wisc.edu]**

Bhudatt R. Paliwal, Professor and Director of Radiation Therapy Physics Section (608-263-8500); Ph.D. University of Texas at Houston 1973; Application of hyperthermia in treatment of cancer, electron-arc therapy, electron dosimetry and treatment planning, CT and MRI applications in radiotherapy treatment planning. **[email: paliwal@madrad.radiology.wisc.edu]**

Walter W. Peppler, Professor, CHS (608-263-3440); Ph.D. University of Wisconsin Madison 1981, Digital Fluoroscopy. **[email: wpeppler@facstaff.wisc.edu]**

James A. Sorenson, Professor (608-263-2608); Ph.D. University of Wisconsin Madison 1971; Magnetic resonance imaging, spectroscopy.
[email: jasorens@facstaff.wisc.edu]

Bruce R. Thomadsen, Assistant Professor (608-263-8500); Ph.D. University of Wisconsin Madison 1989; Radiotherapy physics.
[email: thomad@madrad.radiology.wisc.edu.]

Michael S. Van Lysel, Associate Professor (608-263-9650); Ph.D. University of Wisconsin Madison 1983; Diagnostic imaging in cardiology, digital subtraction angiography. **[email: vanlysel@facstaff.wisc.edu]**

UNIVERSITY OF WISCONSIN (Continued)

Ronald T. Wakai, Associate Professor (608-262-2170); Ph.D. Illinois Urbana 1987; Biomagnetism, "SQUID" detectors. **[email: wakai@macc.wisc.edu]**

James A. Zagzebski, Professor and Vice-Chairman of the Department for Faculty Development and Research (608-265-4929); Ph.D. University of Wisconsin Madison 1972; Medical ultrasound imaging and tissue characterization, quality assurance of medical ultrasound systems, application of ultrasound in speech research, use of ultrasound in hyperthermia. **[email: jimzag@macc.wisc.edu]**

Student Financial Assistance

Teaching assistantships, fellowships, Wisconsin Alumni Research Foundation (WARF) Fellowships, Advanced Opportunity Fellowships (AOF), Departmental Fellowships, Research Assistantships, Project Assistantships, NIH National Research Service Award Traineeships.

Research Facilities

Tomotherapy Research Facility, Proton Cyclotron, Radiation Calibration Laboratory, Radiation Therapy and Hyperthermia Laboratory, Digital Radiography Laboratory, Digital Cardiac Angiography Laboratory, Ultrasound Scattering Research and Phantom Development Laboratory, Magnetic Resonance Applied Imaging Laboratory, Biomagnetism Laboratory, Electron Storage Ring, 1-MW Triga Research Reactor, Nuclear Physics Laboratory.

36. WASHINGTON STATE UNIVERSITY TRI-CITIES

Environmental Science Program
Telephone: (509) 372-7323 / Fax: (509) 372-7471

Program Director:
Dr. R. Gene Schreckhise
Coordinator, Environmental Science Program
Washington State University Tri-Cities
100 Sprout Road
Richland, WA 99352
email: gschreck@beta.tricity.wsu.edu

HP Degrees Granted:
M.S. in Environmental Science (Environmental and Occupational Health Science Option)

Remote Delivery of Course: Limited to only WSU branch campuses

	MS
HP Enrollment (Fall 1996):	3
HP Graduates (9/94 to 8/95):	4
HP Graduates (9/95 to 8/96):	3

Health Physics Faculty (•25% FTE toward the HP program)

Presently, all the faculty members involved in the Environmental Science Program at WSU Tri-Cities are Adjunct. A B.S. degree in Environmental Science with the Environmental and Occupational Health Science option was initiated in August 1994.

Visiting Faculty Financial Assistance
We presently have no such program(s) other than obtaining appointments to Pacific Northwest National Laboratory (PNNL) through Associated Western Universities (AWU) or to one of the other Hanford contractors.

Student Financial Assistance
Teaching assistantships and part-time or work-study positions.

Research Facilities
General counting laboratory; access to world-class equipment and instruments on the Hanford Site.

Professional Certification:
Most of the students take the ABHP examination. Local HPS chapter provides a refresher course.

CURRENTLY AVAILABLE FELLOWSHIPS/SCHOLARSHIPS FOR HEALTH PHYSICS STUDENTS

Title: American Dissertation Fellowship
Sponsor: American Association of University Women (AAUW)
Admin: AAUW Education Foundation
Address: 2201 North Dodge Street
Box 4030
Iowa City, Iowa 52243
Telephone: (319) 337-1716
Fax: (319) 337-1204
Eligibility: (1) Awarded to women who will complete required course work and have passed all preliminary exams by November 15
(2) U. S. citizen or permanent resident alien.
Award: Stipend: $14,500 (annually)
(for full-time work on dissertation)
Due Date: November 15 - Fellowship year starts on July 1.

Title: Selected Profession Engineering Dissertation Fellowship
Sponsor: American Association of University Women
Admin: AAUW Education Foundation
Address: 2201 North Dodge Street
Box 4030
Iowa City, Iowa 52243
Telephone: (319) 337-1716
Fax: (319) 337-1204
Eligibility: (1) Must be working on the final year of Master's degree
(2) U. S. citizen or permanent resident alien.
Award: Stipend: $14,500 (annually)
(for full-time work on dissertation)
Due Date: November 15 - Fellowship year starts on July 1.

Title: American Nuclear Society Undergraduate Scholarships
Sponsor/ American Nuclear Society
Admin: 555 North Kensington Avenue
La Grange Park, Illinois 60525
Telephone: (708) 352-6611
Eligibility: (1) Student must have completed one to two years of coursework in a program leading to a degree in nuclear science or engineering and who will be a sophomore in the upcoming year
(2) U.S. Citizen or permanent resident alien
(3) Sponsored by an ANS Local Section, Division, Student Branch, Committee, Member, or Organization Member
Award: $1000 to $3000
Due Date: March 1 - applications will be distributed to Faculty Advisors in early January

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Title: American Nuclear Society Graduate Scholarships
Sponsor/ American Nuclear Society
Admin: 555 North Kensington Avenue
La Grange Park, Illinois 60525
Telephone: (708) 352-6611
Eligibility: (1) Student must be enrolled in, or have been accepted in, a graduate program in nuclear science or engineering at a recognized educational institution
(2) U.S. Citizen or permanent resident alien
(3) Sponsored by an ANS Local Section, Division, Student Branch, Committee, Member, or Organization Member
Award: $1000 to $3500
Due Date: March 1 - applications will be distributed to Faculty Advisors in early January

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Title: American Nuclear Society NEED Scholarship
Sponsor/ American Nuclear Society
Admin: 555 North Kensington Avenue
La Grange Park, Illinois 60525
Telephone: (708) 352-6611
Eligibility: (1) Student must have complete one year of coursework in a program leading to a degree in nuclear science or engineering and who will be a sophomore in the upcoming year
(2) U.S. Citizen or permanent resident
(3) Sponsored by an ANS Local Section, Division, Student Branch, Committee, Member, or Organization Member
(4) Demonstrated financial need
(5) Additional scholarship for women in a delayed educational situation
Award: $3500
Due Date: March 1 - applications will be distributed to Faculty Advisors in early January

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Title: Applied Health Physics Fellowship
Sponsor: Office of Environment, Safety, and Health
U.S. Department of Energy
Admin: Oak Ridge Institute for Science and Education
Address: Applied Health Physics Fellowship Program
Science/Engineering Education Division
Oak Ridge Institute for Science and Education
Attn: Rose Etta Cox
120 Badger Avenue
P.O. Box 117
Oak Ridge, TN 37831-0117
Telephone: (615) 576-9279
Fax: (615) 576-0202
Eligibility: (1) B.S. in physical sciences, life sciences, mathematics, or engineering
(2) Admission as a full-time graduate student in DOE participating university graduate program
(3) Complete not have more than one full-time academic term (semester or quarter) in graduate school
(4) U. S. citizen or permanent resident alien
Award: Stipend: $14,400 (annually)
Practicuum Allowance: $300 (monthly)
Academic Allowance: $1000
Tuition and Fees: Exact Amount
Travel Allowance: Varies
Due Date: Last Monday in January - call ~ September for current application.

Title: Burton J. Moyer Memorial Fellowship
Sponsor: Health Physics Society
Admin: Academic Education Committee of HPS
Health Physics Society
1313 Dolley Madison Boulevard
McLean, Virginia 22101
Telephone: (703) 790-1745
Eligibility: Entering or currently enrolled and continuing students in a master's or doctoral degree program in radiation protection.
Award: One award of $5000
One $850 travel grant to attend the Annual HPS Meeting
Due Date: March 15 - applications published in HPS Newsletter in October

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Title: Civilian Radioactive Waste Management Fellowship
Sponsor: Office of Civilian Radioactive Waste Management
U.S. Department of Energy
Admin: Oak Ridge Institute for Science and Education
Address: Civilian Radioactive Waste Management (CRWM)
Fellowship Program
Science/Engineering Education Division
Oak Ridge Institute for Science and Education
Attn: Marcia DeMarcus
120 Badger Avenue
P.O. Box 117
Oak Ridge, TN 37831-0117
Telephone: 615-241-2890
Fax: 615-576-0202
Eligibility: (1) B.S. in physical sciences, life sciences, mathematics, or engineering
(2) Qualify for acceptance for currently enrolled as a full-time graduate student in DOE participating university graduate program
(3) U. S. citizen or permanent resident alien
(4) Doctoral students may apply; dissertation topic must not have been identified at time of application
Award: Stipend: $14,400 (annually)
Practicuum Allowance: $300 (monthly)
Tuition and Fees: Exact Amount, $8000 max.
Travel Allowance: Varies
Due Date: Last Monday in January - call ~ September for current application.

Title: Fannie and John Hertz Fellowships
Sponsor: Fannie and John Hertz Foundation
Address: Box 5032
Livermore, California 94551-5032
Telephone: 510-373-1642
Eligibility: (1) B.S. degree;
(2) GPA equivalent to A-minus during last 2 years of undergraduate study
(3) U. S. citizen or permanent resident alien
(4) Must attend one of 26 specified graduate schools. Contact the Foundation for a list of eligible graduate schools and application forms and guidelines
(5) Fellowships cannot be used for Ph.D. in conjunction with professional studies (i.e., medical degree)
Award: ~ 25 fellowships awarded annually and are renewable up to 5 yrs.
Stipend: $17,000 per year
Institutional Allowance: $12,000 per year
Due Date: Third Friday in October

Title: Fusion Science Fellowship
Sponsor: Office of Fusion Energy
U.S. Department of Energy
Admin: Oak Ridge Institute for Science and Education
Address: Civilian Radioactive Waste Management (CRWM)
Fellowship Program
Science/Engineering Education Division
Oak Ridge Institute for Science and Education
Attn: Cheryl Terry
120 Badger Avenue
P.O. Box 117
Oak Ridge, TN 37831-0117
Telephone: 615-576-9558
Fax: 615-576-0202
Eligibility: (1) Entering and first-year graduate students with degrees in engineering, the physical sciences, mathematics, or a related discipline
(2) U. S. citizen or permanent resident alien
Award: Annual Stipend: $15,600 (annually)
Practicuum Allowance: $200 (monthly)
Tuition and Fees: Exact Amount
Due Date: Last Monday in January - call ~ September for current application.

Title: GEM Master's Fellowship
Sponsor/ National Consortium for Graduate Degrees for Minorities in
Admin: Engineering and Science
Address: P.O. Box 537
Notre Dame, Indiana 46556
Telephone: 219-287-1097
Fax: 219-287-1486
Eligibility: (1) Belong to one of the ethnic groups: American-Indian, Black-American, Mexican-American, or Puerto Rican and other Hispanics
(2) U. S. citizen
(3) At time of application student must have attained at least junior-year status in accredited engineering discipline
Award: Stipend: $6,000 (per academic year)
Payment of tuition and fees.
Due Date: Applications available August 15 of each year.
Deadline - December 1.

Title: GEM Ph.D. Engineering Fellowship
Sponsor/ National Consortium for Graduate Degrees for Minorities in
Admin: Engineering and Science
Address: P.O. Box 537
Notre Dame, Indiana 46556
Telephone: 219-287-1097
Fax: 219-287-1486
Eligibility: (1) Belong to one of the ethnic groups: American-Indian, Black-American, Mexican-American, or Puerto Rican and other Hispanics.
(2) U. S. citizen.
(3) Must be applicant to the Ph.D. component and must have or be in the process of attaining Master's degree at the time of application.
Award: Stipend: $12,000 (per calendar year)
Payment of tuition and fees.
Due Date: Applications available August 15 of each year.
Deadline - December 1.

Title: Health Physics Society Fellowships
Sponsor: Health Physics Society
Admin: Academic Education Committee of HPS
Health Physics Society
1313 Dolley Madison Boulevard
McLean, Virginia 22101
Telephone: (703) 790-1745
Eligibility: Entering or currently enrolled and continuing students in a Master's or doctoral degree program in radiation protection.
Award: Four awards of $4000 each.
One $850 travel grant to attend the Annual HPS Meeting
Due Date: March 1 - applications published in HPS Newsletter in October

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Title: Health Physics Society Fellowship for Part-Time Students
Sponsor: Health Physics Society
Admin: Academic Education Committee of HPS
Health Physics Society
1313 Dolley Madison Boulevard
McLean, Virginia 22101
Eligibility: (1) Entering or currently enrolled and continuing students in a Master's or doctoral degree program in radiation protection.
(2) Demonstration of special financial need.
Award: One award of $4000
One $850 travel grant to attend the Annual HPS Meeting
Due Date: March 1 - applications published in HPS Newsletter in October

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Title: Link Foundation Energy Fellowship
Sponsor: Link Foundation
Admin: University of Rochester
Address: Office of the Provost
Attn: Barbara Granger
200 Administration Building
Rochester, New York 14627
Telephone: 716-275-5931
Eligibility: (1) Must be doctoral student in academic institution.
(2) Preference is given to proposals dealing directly with energy and that explore ideas not yet fully tested.
Award: Stipend: $14,500 for one year
Fees: $ 2,500
Publication Costs: $ 1,000
Due Date: December 1 - Selections announced March 15

Title: Magnetic Fusion Energy Technology Fellowship
Sponsor: Office of Fusion Energy
U.S. Department of Energy
Admin: Oak Ridge Institute for Science and Education
Address: Magnetic Fusion Science Fellowship Program (MFS)
Science/Engineering Education Division
Oak Ridge Institute for Science and Education
Attn: Cheryl Terry
120 Badger Avenue
P.O. Box 117
Oak Ridge, TN 37831-0117
Telephone: 615-576-9558
Fax: 615-576-0202
Eligibility: (1) Entering and first-year graduate students with degrees in related discipline; and
(2) U. S. citizen or permanent resident alien.
Award: Annual Stipend: $15,600 (annually)
Practicuum Allowance: $200 (monthly)
Tuition and Fees: Exact Amount
Travel Allowance: Actual Cost
Due Date: Last Monday in January - call ~ September for current application

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Title: Merril Eisenbud Fellowship
Sponsor/ New York University Medical Center
Admin: Attn: Dr. Norman Cohen
Laboratory for Radiological Studies
Nelson Institute of Environmental Medicine
Sterling Lake Road
Tuxedo, New York 10987
Telephone: (914) 351-4368
Eligibility: Entering graduate students in the environmental health sciences program at NYU Medical Center
Award: $12,000 annually
Due Date: Open deadline

Title: National Academy for Nuclear Training Undergraduate Scholarship
Address: National Academy for Nuclear Training
700 Galleria Parkway
Atlanta, Georgia 30339
Telephone: (800) 828-5489
Eligibility: (1) U.S. citizen or U.S. national
(2) Considering a career in the nuclear power industry
(3) Be enrolled at an accredited U.S. college/university in an approved curriculum related to a career in the nuclear power industry
(4) Be free of post-graduate obligations (e.g., ROTC or NUPOC)
(5) Have a minimum GPA of 3.0
(6) Must have remaining at least one but no more than three academic years of study (for co-op students, no more than six in-school semesters or nine quarters)
Award: $2,250 for one year
Due Date: Early February - applications sent to faculty representatives in early October

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Title: National Academy for Nuclear Training Graduate Fellowship
Sponsor: National Academy for Nuclear Training
Address: Contact individual health physics graduate program
Eligibility: Master's degree student or 5th year undergraduate with program emphasis in power generation health physics
Award: $12,000 per year
Due Date: Contact individual health physics graduate program

Title: NRRPT Scholarships
Sponsor: National Registry of Radiation Protection Technologists
Address: Dee Dee Woolhiser, NRRPT Executive Secretary
P.O. Box 6974
Kennewick, Washington 99336
Fax: (509) 586-2542
Eligibility: (1) Must be an active member of NRRPT at time of application
(2) Must be accepted in an accredited by an accredited educational institution
(3) Must be pursuing a program of study leading to an Associate's or Bachelor's degree or be qualified for an established professional certification in a technical discipline
Award: $1000 per person per year (total of six awards per year)
Due Date: June 1 - awards to be made by August 31

Title: NSF Graduate Research Fellowship
Sponsor: National Science Foundation
Admin: Oak Ridge Associated Universities
Address: 702 South Illinois Avenue
Suite B-102
Oak Ridge, Tennessee 37830
Telephone: (615) 483-3344
Eligibility: (1) Completion of no more than 30 semester hours (20 quarter hours) of graduate school following completion of the last baccalaureate degree in science or engineering
(2) U. S. citizen or national of the U. S.
Award: Fellowships for a 3-year tenure (usable over a 5-year period).
Stipend: $14,400 (annually)
$8,600 per fellow awarded to sponsoring institution.
Special international research travel allowance.
Due Date: Completed application (comprised of 2 parts) plus proposed plan of study/research, description of previous research experience, course reports and academic transcripts, reference reports, and GRE scores. Part 1 of application due early November; Part 2 in early December.

Title: Nuclear Engineering & Health Physics Fellowship
Sponsor: Office of Nuclear Energy
U.S. Department of Energy
Admin: Oak Ridge Institute for Science and Education
Address: Nuclear Engineering & Health Physics Fellowship Program
Science/Engineering Education Division
Oak Ridge Institute for Science and Education
Attn: Cheryl Terry
120 Badger Avenue
P.O. Box 117
Oak Ridge, Tennessee 37831-0117
Telephone: (615) 576-9558
Fax: (615) 576-0202
Eligibility: (1) B.S. in physical sciences, life sciences, mathematics, or engineering
(2) Admission as a full-time graduate student in DOE participating university graduate program
(3) Not be enrolled, at the time of application, in a graduate program or have previously been enrolled
(4) U. S. citizen or permanent resident alien
Award: Stipend: $14,400 (annually)
Practicuum Allowance: $300 (monthly)
Tuition and Fees: Exact amount
Travel Allowance: Varies due to program funding
Due Date: Last Monday in January - call ~ September for current application

Title: Nuclear Regulatory Commission Graduate Fellowship
Sponsor: Office of Personnel
U.S. Nuclear Regulatory Commission
Admin: Oak Ridge Institute for Science and Education
Address: NRC Graduate Fellowship Program
Science/Engineering Education Division
Oak Ridge Institute for Science and Education
Attn: Rose Etta Cox
120 Badger Avenue
P.O. Box 117
Oak Ridge, TN 37831-0117
Telephone: (615) 576-9279
Fax: (615) 576-0202
Eligibility: (1) B.S. in physical sciences, life sciences, mathematics, or engineering
(2) Acceptance as a full-time graduate student at an appropriate graduate program
(3) U. S. citizen
(4) Eligible for NRC employment, access authorization and/or employment clearance;
(5) Complete not more than one year of graduate school
(assumed to apply at the time of application).
Award: Stipend: $1800 (monthly up to 2 years)
Tuition and Fees: Exact Amount
Orientation, Initial Work,
& Specialized Training: GG-7 ($33K - $35K) (9 mo minimum)
Full government benefits
Employment Obligation: GG-9 ($37K - $40K) (2 yrs for 1 yr)
Full government benefits
Education Allowance $5,000 (annually)
Due Date: Third Monday in January - call ~ September for current application

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Title: Panasonic Fellowship for Graduate Study in Health Physics
Sponsor/ Panasonic Industrial Company
Admin: Attn: David Katzman
Two Panasonic Way
Secaucus, New Jersey 07094
Telephone: (201) 348-5339
Eligibility: (1) Current or entering graduate student in health physics or nuclear engineering
(2) Undergraduate or graduate GPA • 3.0
(3) Student must submit a research proposal in which a Panasonic TLD system will be utilized
Award: $15,000 per year for up to 2 years
Due Date: March 15

Title: Power Reactor Section / Health Physics Society Scholarship
Admin: Scholarship Committee, Power Reactor Section
Address: Dick Warnoch
San Onofre Nuclear Generating Station
P.O. Box 128
San Clemente, California 92672
Telephone: (714) 368-6784
(714) 368-6049 (fax)
Eligibility: Junior or Senior undergraduate students or Associate Degree students enrolled in a health physics degree program at a college or university in the U.S.
Award: Six awards of $1000 each (subject to annual funding)
Due Date: TBA

Title: Society of Women Engineers' Scholarships
Sponsor/ Society of Women Engineers
Admin: 345 East 47th Street
New York, New York 10017
Telephone: (212) 705-7855
Eligibility: (1) Entering freshman in an engineering program at an accredited institution; OR
(2) Sophomore, junior, or senior in an engineering program at an accredited institution;
Award: $1000
Due: Late April

Title: South Texas Chapter HPS Associate Degree Scholarship
Sponsor/ South Texas Chapter of the Health Physics Society
Admin: Attn: Gary Nordwig
Radiation Protection Technology Department
3801 Campus Drive
Waco, Texas 76705
Telephone: (817) 867-2992
Eligibility: Student is beginning or is currently performing full-time work toward an associate degree in health physics or related field offered by a undergraduate program at a Texas institution of higher education.
Award: $550
Due: March 15

Title: South Texas Chapter HPS Bachelor's Degree Scholarship

Sponsor/ South Texas Chapter of the Health Physics Society
Admin: Attn: Gary Nordwig
Radiation Protection Technology Department
3801 Campus Drive
Waco, Texas 76705

Telephone: (817) 867-2992

Eligibility: Student is beginning or is currently performing full-time work toward an bachelor's degree in health physics or related field offered by a undergraduate program at a Texas institution of higher education.

Award: $1100

Due: March 15

ANNEX

NEA SURVEY OF UNIVERSITY-LEVEL EDUCATION PROGRAMMES IN RADIATION PROTECTION

NEA SURVEY OF
UNIVERSITY-LEVEL EDUCATION PROGRAMMES
IN RADIATION PROTECTION

In order to foster better exchange of ideas and research in radiation protection, the CRPPH is sponsoring a survey of university-level education programmes. The objective of this survey is to produce a Handbook of information useful to those students wishing to pursue an education in radiation protection, or to those faculty members wishing to exchange ideas or collaborate with, or take sabbatical leave at other universities in different countries.

The results of this survey will be summarized, by country, and will be published as an OECD Nuclear Energy Agency document, which will be updated periodically.

1. **University/College Information**

University Name: .....

Department Teaching Radiation Protection: .....

Note: If radiation protection is a minor or specialty offered by another discipline (for example, mechanical engineering, chemical engineering, physics, etc.) please specify the parent department.

Address: .....

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Contact person for further information:

Name: ..... Title: .....

Tel: ..... Fax: ..... e-mail: .....

2. **Degree Programmes Offered in Radiation Protection**

	Offered		Average Number of Diplomas Granted Per Year
	Yes	No	
Undergraduate Degree	❑	❑	.....
Master	❑	❑	.....
Other	❑	❑	.....
			.....

3. **Curricula**

Please attach a list of curriculum required for each degree listed above. Include all prerequisites for entry into the programme (required course work, standardized entry examination with minimum acceptable scores, etc.), and graduation requirements (Preliminary Examination, Qualifying Examination, Thesis, etc.).

4. **Faculty**

Please specify the number or average number of faculty members in radiation protection, in the below-listed categories, over the past 3 years.

Full-time Teaching/Research Faculty: .....

Part-time Teaching/Research Faculty: .....

Full-time Research Faculty: .....

Part-time Research Faculty: .....

Visiting Faculty: .....

Other Faculty: .....

5. **Research Areas:**

Please list the principle areas of research pursued in the Department over the past three years. List sufficient detail to allow interested parties (professors and students) to properly situate the research (ex: list “design of dosimeters for power-reactor neutron detection”, not simply, “dosimetry”).

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6. **Visiting Faculty Financial Assistance**

Please discuss the types of financial arrangements which are available to financially assist visiting faculty members, including grant programmes, provisions for partial funding of visiting faculty on sabbatical, etc.

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7. **Students**

Please specify the number or average number of students in radiation protection, in the below-listed categories, over the past 3 years.

	Number of full-time students	Number of part-time students
Undergraduate Level	.....	.....
Master's Level	.....	.....
Doctorate Level	.....	.....
Post-Doctorate Level	.....	.....
Other (specify):	.....	.....

8. **Student Financial Assistance Programmes**

Please indicate whether the following types of financial assistance are available to students:

	YES	**NO**
Scholarships:		
- Nationally Sponsored	❑	❑
- Regionally Sponsored	❑	❑
- Corporately Sponsored	❑	❑
- Professional Society Sponsored	❑	❑

	YES	**NO**
Fellowships:		
- Nationally Sponsored	❑	❑
- Regionally Sponsored	❑	❑
- Corporately Sponsored	❑	❑
- Professional Society Sponsored	❑	❑

	YES	**NO**
Student Teaching Assistantships:	❑	❑
Student Research Assistantships:	❑	❑
Other (specify):	❑	❑

Note: For any positive responses, please attach information containing an address and phone number where detailed information can be acquired.

9. **Research Facilities**

Please list any research facilities (counting laboratories and equipment, whole body counting facilities, research reactors, accelerators, etc.), which are available for teaching and training purposes.

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10. **Professional Certification**

Some type of "Professional Certification" in radiation protection is often required, or suggested, by national or state authorities for certain jobs or positions. If this is applicable in your country, please discuss the steps taken at your university to assure that your graduates are "qualified" to obtain this "Professional Certification", and the steps taken at your university to remain up-to-date with national and/or state requirements.

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Contact person:

Tel: **Fax**:

Degrees Granted:

Faculty: Full-time teaching/research faculty (1)
Part-time teaching/research faculty (1)
Part-time research faculty (2)

Research Areas: •

Financial Assistance:

Contact person:

Tel: **Fax**:
e-mail:

Degrees Granted:

Faculty:

Research Areas: •

Students:	full-time	part-time
undergraduate		
masters		
doctorate		
other		

Student financial assistance programmes:

Research facilities:

Professional Certification: