ONCOLOGY

Cancer Biology Program
Office: Louis M. Elliman Building, 421 E. Canfield Ave, Room 3217; 313-578-4302
Program Director: Larry H. Matherly
Website: http://cancerbiologyprogram.med.wayne.edu/

Medical Physics Program
Office: Gershenson Radiation Oncology Center, 4201 St. Antoine Boulevard, 1D-UHC: 313-576-9624:
Program Director: Jay Burmeister
Website: http://medicalphysics.med.wayne.edu/ (http://www.medicalphysics.med.wayne.edu/)

Faculty by subject area:

- Cancer Biology (p. 1)
- Radiation Oncology (p. 1)

Cancer Biology

AZMI, ASFAR SOHAIL: Ph.D., M.S., B.S., Aligarh Muslim University; Professor

BEEBE-DIMMER, JENNIFER L.: Ph.D., M.P.H., University of Michigan; B.A., University of Wisconsin; Professor

BEPLER, GEROLD: M.D., Ph.D., Philipps University; Professor

BOERNER, JULIE: Ph.D., Mayo Clinic Foundation Graduate School; M.S., B.S., University of Wisconsin; Associate Professor

CACKOWSKI, FRANK C.: Ph.D., M.D., University of Pittsburgh School of Medicine; B.S. Carnegie Mellon University; Associate Professor

CHEN, WEI: Ph.D., M.S., University of Michigan; M.S., University of Toledo; B.S., Shanghai Jiao Tong University; Associate Professor

DOU, QINGPING: Ph.D., Rutgers University; B.S., Shandong University; Professor

DYSON, GREGORY: Ph.D., University of Michigan; B.A., Canisius College; Associate Professor

GE, YUBIN: Ph.D., M.S., Jilin University; Professor

GIBSON, HEATHER M.: Ph.D., Wayne State University; B.S., Michigan State University; Assistant Professor

JOINER, MICHAEL: Ph.D., Institute of Cancer Research, University of London; M.A., B.A., Queens' College; Professor

KIDDER, BENJAMIN: Ph.D., University of Minnesota; B.A., Saint Olaf College; Associate Professor

KIM, SEONG HO: M.D., Kyung Hee University; Ph.D., M.S., University of Ulsan; Professor

LI, JING: Ph.D., National University of Singapore; M.S., B.S., West China University of Medical Sciences; Professor

MATHERLY, LARRY H.: Ph.D., Pennsylvania State University; B.S., New Mexico State University; Professor

MOHAMMAD, RAMZI M.: M.D., M.Sc., Baghdad University; B.S., Mosul University; Professor

PATRICK, STEPHAN: Ph.D., Wright State University; B.S., Urbana University; Professor

PURRINGTON, KRISTEN: Ph.D., M.P.H., M.A., B.S., University of Michigan; Associate Professor

RISHI, ARUN: Ph.D., M.S., University College of London; Professor

ROBERTS, CHERYL: Ph.D., Technical University Munich; M.Sc., University of St. Andrews; Assistant Professor

SCHWARTZ, ANN: Ph.D., M.P.H., B.S., University of Michigan; M.S., Wayne State University; Professor

SHEKHAR, MALATHY: Ph.D., The Indian Institute of Science; M.Phil., B.S., University of Madras; Professor

SHIELDS, ANTHONY: M.D., Harvard Medical School; Ph.D., B.S., Massachusetts Institute of Technology; Professor

VIOLA, NERISSA T.: Ph.D., Syracuse University; B.S., University of Philippines; Associate Professor

WAGNER, KAY-UWE: Ph.D., University of Halle-Wittenberg; M.S., B.S., University of Leipzig; Professor

WU, GEN SHENG: Ph.D., Peking Union Medical College; Professor

WU, GUOJUN: Ph.D., Fudan University; Professor

XIE, YOUMING: Ph.D., University of Texas Health Science Center at Houston; M.S. University of Saskatchewan; B.S., Jinan University; Professor

YANG, ZENG-QUAN: Ph.D., Tokyo Medical and Dental University; M.S., Peking Normal University; Professor

ZHANG, XIAOHONG: Ph.D., M.S., University of Texas; B.S., Beijing Normal University; Professor

Radiation Oncology

BURMEISTER, JACOB: Ph.D., Wayne State University; M.S., Michigan State University; B.S., Alma College; Professor (Clinician-Educator)

DOMINELLO, MICHAEL: D.O., University of New England; B.S., Fairfield University; Assistant Professor (Clinician-Educator)

HART, KIMBERLY: M.D., Wayne State University; B.A., University of Michigan; Assistant Professor (Clinician-Educator)

KIM, HAROLD E.: M.D., Northwestern University; B.S., Loyola University; Professor (Clinician-Educator)

MAIER, JORDAN: M.D., Wayne State University; B.A., University of Michigan; Assistant Professor (Clinician-Educator)

MILLER, STEVEN R.: M.D., Wayne State University; B.S. Michigan Technological University; Associate Professor (Clinical)

VAISHAMPAYAN, NITIN: M.D., Wayne State University; B.A., Kalamazoo College; Assistant Professor (Clinician-Educator)

- Cancer Biology (M.S.) (http://bulletins.wayne.edu/graduate/school-medicine/programs/oncology/cancer-biology-ms/)
- Cancer Biology (Ph.D.) (http://bulletins.wayne.edu/graduate/school-medicine/programs/oncology/cancer-biology-phd/)
- Medical Physics (M.S.) (http://bulletins.wayne.edu/graduate/school-medicine/programs/oncology/medical-physics-ms/)

- Medical Physics (Ph.D.) (http://bulletins.wayne.edu/graduate/school-medicine/programs/oncology/medical-physics-phd/)
- Medical Physics (DMP) (http://bulletins.wayne.edu/graduate/school-medicine/programs/oncology/medical-physics-dmp/)
- Medical Physics (Graduate Certificate) (http://bulletins.wayne.edu/graduate/school-medicine/programs/oncology/medical-physics-graduate-certificate/)

Cancer Biology

CB 7130 Clinical Aspects of Cancer Biology Cr. 1
Cancer Biology Ph.D. students accompany clinicians during rounds in hospital and outpatient clinics, as well as attend clinical conferences, tumor boards and related sessions. Offered for S and U grades only. Offered Spring/Summer.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.

CB 7210 Fundamentals of Cancer Biology Cr. 4
This course focuses on fundamental principles underlying the complex field of contemporary cancer biology. The lectures are organized into two thematic blocks: I, mechanisms of cancer development and progression, and II, characteristics of cancer types and approaches to cancer therapy. Offered Fall.
Restriction(s): Enrollment is limited to Graduate level students.

CB 7220 Molecular Biology of Cancer Development Cr. 4
The course will provide a basic understanding of the molecular biology of cancer with emphasis on core concepts and molecular technologies. The course will include lectures, student-led discussions, and critical reading of literature. Students are required to present and actively participate in discussions. Offered Winter.
Prerequisite: IBS 7015 with a minimum grade of C and CB 7210 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

CB 7240 Molecular Mechanisms of Cancer and Therapy Cr. 4
This course will introduce graduate students to the biology of solid tumors and hematological malignancies, and the principles of conventional chemotherapy, targeted therapy, radiation therapy, and immunotherapy. The lectures cover cancer-related signaling pathways, tumor immunology, tumor microenvironment, cancer metastasis, tumor imaging, mechanisms of drug action, pharmacokinetics and clinical implementation. Offered Fall.
Prerequisite: IBS 7015 with a minimum grade of C and CB 7210 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

CB 7300 Special Topics in Cancer Biology Cr. 1-5
This special topics course will provide students with the opportunity for in-depth study of emerging themes and technologies on basic, translational, epidemiologic and clinical topics related to cancer, as well as augment material from other courses in Cancer Biology. Offered Every Term.
Prerequisite: CB 7210 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.
Repeatable for 5 Credits

CB 7430 Cancer Epidemiology Cr. 2
This course introduces concepts and methods used in cancer epidemiology research and focuses on the cancer burden in the United States and worldwide, as well as the major causes of cancer. Students will be required to review and provide critical appraisal of selected literature in innovative areas of cancer epidemiologic research. Offered Fall.
Restriction(s): Enrollment is limited to Graduate level students.

CB 7500 Introduction to Cancer Biostatistics Cr. 2
This is an introductory masters-level course in biostatistics for students pursing a master's degree in Cancer Biology. The main goal of this course is for the student to be introduced to basic statistical methods utilized in cancer research including experimental design, statistical hypothesis tests, linear regression, and survival analysis. The course will utilize Excel and the PSPP programming environment for instruction. Offered Winter.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology; enrollment limited to students in a Master of Science degree.

CB 7510 Journal Club/Seminar Cr. 1
This journal club/seminar format course is required for master's students in the Cancer Biology Graduate Program. Classes will be split between cancer research-focused paper presentations/discussions and seminar presentations. Offered Winter.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology; enrollment limited to students in a Master of Science degree.
Repeatable for 2 Credits

CB 7600 Applied Cancer Biostatistics Cr. 2
The objective of this course is to equip students with the knowledge and skills to understand, apply, and interpret fundamental biostatistical concepts using a statistical software package. These skills are essential for conducting, evaluating, and presenting research in the field of biological science. Students will gain hands-on experience with a statistical software package to manage, analyze, and present biological data. Key activities include data recording, transformation, generating descriptive and inferential statistics, and interpreting statistical reports and outcomes in the context of biological research. Offered Winter.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.

CB 7700 Recent Developments in Cancer Biology Cr. 1
This course is a journal club designed for students to develop proficiency in critically evaluating original cancer biology literature, to broaden their knowledge of contemporary topics in cancer biology, and to provide insights into current research strategies. Each student is expected to participate in class discussions. Offered Fall, Winter.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.
Repeatable for 4 Credits

CB 7710 Individual Studies in Cancer Biology Cr. 1-3
Cancer Biology graduate students pursue experimental research under the guidance of selected faculty. This is the research rotation through which students select their Ph.D. dissertation mentor. Students are required to complete three rotations. Offered Every Term.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.
Repeatable for 3 Credits

CB 7800 Rigor and Reproducibility in Cancer Biology Cr. 1
This course will introduce students to basic principles of rigorous and reproducible Cancer Biology research. This includes experimental design and data interpretation, publishing, animal and human research, and other topics relevant to the conduct of research in Cancer Biology. Offered Winter.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.

CB 7890 Seminar in Cancer Biology Cr. 1
This course provides Cancer Biology students with the opportunity to present their dissertation research to their peers. This class not only provides students with the opportunity to develop their oral presenting skills but also gives the students a chance to critically evaluate their peers' research. Offered Fall, Winter.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.
Repeatable for 4 Credits

CB 7996 Research Cr. 1-7
Directed study and pre-dissertation research with faculty in the program. Offered Every Term.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.
Repeatable for 7 Credits

CB 7999 Master's Essay Cr. 1-4
Review of relevant literature and research summary based on master's research in Cancer Biology. Offered Every Term.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.
Repeatable for 4 Credits

CB 8910 Applied Cancer Bioinformatics Cr. 1
This course is to equip students with the knowledge and skills of the basic concepts and computational methods in the interdisciplinary field of bioinformatics and their applications in biomedical and cancer research. The course will focus on the multi-omics data generated from next generation sequencing technology. Students will receive an introduction to the concepts, analysis and interpretation of multi-omics data and their applications in cancer research. This course is designed to instruct students having a general background in molecular biology. No coding or programming experience is required. Offered Fall.
Restriction(s): Enrollment is limited to Graduate level students.

CB 8920 Principles of Translational and Clinical Cancer Research Cr. 1
The goal of this course is for the students to understand the fundamentals of translational and clinical cancer research with emphasis on identifying clinically meaningful research goals and application of laboratory based research into clinical trials. The students will attend a series of lectures from clinical oncology faculty members. Students will work with their clinical mentors to develop translational research projects or correlative end points for a clinical trial concept. Students are expected to present a brief proposal of the project at the end of the course, which will be evaluated by the course director. Offered Fall.
Prerequisite: CB 7130 with a minimum grade of C
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.

CB 8999 Master's Thesis Research and Direction Cr. 1-8
Offered Every Term.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.
Repeatable for 8 Credits

CB 9991 Doctoral Candidate Status I: Dissertation Research and Direction Cr. 3-9
Candidacy Research Offered Every Term.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.

CB 9992 Doctoral Candidate Status II: Dissertation Research and Direction Cr. 1-18
Candidacy Research Level 2 Offered Every Term.
Prerequisite: CB 9991 with a minimum grade of S
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.

CB 9995 Candidate Maintenance Status: Doctoral Dissertation Research and Direction Cr. 0
Offered Every Term.
Restriction(s): Enrollment is limited to students with a major in Cancer Biology.
Repeatable for 0 Credits

Radiation Oncology

ROC 5010 Introduction to Radiological Physics Cr. 4
Nature of radiation and its interaction with matter. Theory of dosimetry and instrumentation for detection of radiation. Principles of radiation protection. Applications of radiation in radiology and related problems. Offered for graduate credit only. Offered Fall.
Restriction(s): Enrollment is limited to Graduate level students.

ROC 5990 Directed Study in Medical Sciences Cr. 1-4
Introduction to modern methodology of cancer research. Students of the Division of Cancer Biology of the Department of Radiation Oncology conduct research projects under direction of research scientists. Areas of research include: molecular biology, enzyme purification, tumor biology, cellular biochemistry. Offered for graduate credit only. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.

ROC 6710 Physics in Medicine Cr. 3
Applications of physics in medicine including radioactivity; interaction of radiation in matter; x-ray, CT, MRI, ultrasound, and PET imaging; nuclear medicine; radiation oncology. Offered Winter.

ROC 7000 Imaging Physics I Cr. 5
Basic theory of medical imaging. Introduction to magnetic resonance imaging and spectroscopy, ultrasound; diagnostic radiology: radiography, fluoroscopy, CT, digital radiography, and mammography. Offered Fall.
Prerequisites: ROC 5010 with a minimum grade of C (may be taken concurrently)
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7010 Imaging Physics II: Nuclear Medicine Cr. 2
Physics of nuclear medicine, with emphasis on imaging. Offered Winter.
Prerequisite: ROC 7000 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7020 Physics of Radiation Therapy Cr. 3
Lecture and demonstration in physics of radiation therapy. Offered Winter.
Prerequisite: ROC 5010 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7040 Radiation Dosimetry Cr. 2
Lecture and demonstration on principles of radiation dosimetry. Dosimetry of photons, electrons, neutrons and dose from radioactive materials. Offered Winter.
Prerequisite: ROC 5010 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7060 Applied Radiobiology in Radiological Science Cr. 2
Fractionation, oxygen enhancement ratio, characterization of neutron beams and heavy particles for radiation therapy, radiosensitivity within cell division. Offered Fall.
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7070 Radiation Safety Cr. 2
Lectures on radiation safety procedures and practices; governmental regulations on radiation safety. Offered Spring/Summer.
Prerequisite: ROC 5010 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7080 Radiotherapy Physics Laboratory Cr. 2
Practical laboratory exercises in ionometric and solid-state dosimetry techniques, quality assurance procedures for selected radiation therapy and diagnostic radiological equipment. Offered Spring/Summer.
Prerequisite: ROC 7020 with a minimum grade of C and ROC 7040 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7110 Treatment Planning Cr. 2
Practical aspects of radiotherapy treatment planning. Lectures and exercises in patient data acquisition and computerized treatment planning for a variety of sites with both teletherapy and brachytherapy. Offered Fall.
Prerequisite: ROC 7020 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7120 Radionuclide Therapy Cr. 2
Development of radionuclide technology and its medical use from its discovery to the latest developments. Offered Fall.
Prerequisite: ROC 5010 with a minimum grade of C and ROC 7020 with a minimum grade of C and ROC 7040 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7130 Nuclear Medicine Physics Laboratory Cr. 2
Laboratory experiments calibration, Q.A., etc., on isotope generators, isotope calibrators, counting systems, spectrometers, cameras, spect and PET systems, Counting statistics, spectrum analysis. Offered Spring/Summer.
Prerequisite: ROC 7010 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7150 Radiation Oncology Anatomy and Physiology Cr. 2
Independent study course covering radiological (CT/MRI) anatomy and basic anatomy and medical terminology pertinent to radiation oncology. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7160 Advanced Topics in Medical Physics Cr. 2
Advanced imaging principles for students pursuing careers in medical physics or any other profession related to diagnostic imaging. Offered Winter.
Prerequisite: ROC 5010 with a minimum grade of C and ROC 7000 with a minimum grade of C
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7170 Professional Aspects of Medical Physics Cr. 2
Provide an overview of the professional aspects of clinical radiation oncology physics. Involvement in practical aspects of clinical radiation oncology physics including analysis of quality assurance and practice quality improvement initiatives, review of regulatory and external certification requirements, etc. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7890 Seminar Cr. 1
Presentations by graduate students, staff, visitors with emphasis on topics relevant to radiation biophysics and radiological health. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.

ROC 7990 Directed Study Cr. 1-5
Independent study in the uses of new technologies in clinical radiology. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.
Repeatable for 5 Credits

ROC 7999 Essay Direction Cr. 3
Preparation of an in-depth paper on a subject in radiological physics. Offered Every Term.
Restriction(s): Enrollment is limited to students with a major, minor, or concentration in Medical Physics or Radiological Physics; enrollment is limited to Graduate level students.

ROC 8990 Special Problems in Radiation Biophysics Cr. 1-7
Independent study in advanced topics to be selected by the student in consultation with instructor. Offered Every Term.
Restriction(s): Enrollment is limited to students with a major in Medical Physics or Radiological Physics; enrollment is limited to Graduate level students.
Repeatable for 7 Credits

ROC 9990 Pre-Doctoral Candidacy Research Cr. 1-8
Research in preparation for doctoral dissertation. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.
Repeatable for 12 Credits

ROC 9991 Doctoral Candidate Status I: Dissertation Research and Direction Cr. 3-9
Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.
Repeatable for 9 Credits

ROC 9992 Doctoral Candidate Status II: Dissertation Research and Direction Cr. 1-18
Offered Every Term.
Prerequisite: ROC 9991
Restriction(s): Enrollment is limited to Graduate level students.
Repeatable for 18 Credits

ROC 9993 Doctoral Candidate Status III: Dissertation Research and Direction Cr. 7.5
Offered Every Term.
Prerequisite: ROC 9992
Restriction(s): Enrollment is limited to Graduate level students.

ROC 9994 Doctoral Candidate Status IV: Dissertation Research and Direction Cr. 7.5
Offered Every Term.
Prerequisite: ROC 9993
Restriction(s): Enrollment is limited to Graduate level students.

ROC 9995 Candidate Maintenance Status: Doctoral Dissertation Research and Direction Cr. 0
Offered Every Term.
Prerequisite: ROC 9994
Restriction(s): Enrollment is limited to Graduate level students.

ROC 9996 Radiation Oncology Physics Clinical Rotation I Cr. 9
Prereq: DMP candidate in department and written consent of the program director. Required in Fall term of Year 3 of Professional Doctorate program. Offered for S and U grades only. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.

ROC 9997 Radiation Oncology Physics Clinical Rotation II Cr. 9
Prereq: Satisfactory completion of ROC 9996 and written consent of the program director. Required in Winter term of Year 3 of Professional Doctorate program. Offered for S and U grades only. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.

ROC 9998 Radiation Oncology Physics Clinical Rotation III Cr. 7.5
Prereq: Satisfactory completion of ROC 9997 and written consent of the program director. Required in Fall term of Year 4 of Professional Doctorate program. Offered for S and U grades only. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.

ROC 9999 Radiation Oncology Physics Clinical Rotation IV Cr. 7.5
Prereq: Satisfactory completion of ROC 9998 and written consent of the program director. Required in Winter term of Year 4 of Professional Doctorate program. Offered for S and U grades only. Offered Every Term.
Restriction(s): Enrollment is limited to Graduate level students.