



HANDBOOK

2017/18 Edition
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**GRADUATE PROGRAM IN CANCER BIOLOGY
CANCER BIOLOGY DIRECTORY**

Program Director

Elizabeth Lawlor, M.D., Ph.D.

NCRC B520/Rm 1352

Office: (734) 615-4814

Lab: (734) 615-4405

Email: elawlor@umich.edu

Administrator

Zarinah Aquil, M.Ed.

2978 Taubman Health Sciences Library

Office: (734) 615-4846

Email: zaquil@umich.edu

PIBS Office

Program in Biomedical Sciences

2960 Taubman Medical Library

Office: (734) 647-7005

Email: pibs@umich.edu

MSTP Office

Medical Scientist Training Program

2965 Taubman Medical Library

Office: (734) 647-6176

Email: mstp@umich.edu

Steering Committee

Name

Department

Elizabeth Lawlor, M.D., Ph.D.

Pediatrics & Communicable Diseases; Pathology

Michael Imperiale, PhD.

Microbiology & Immunology

Gary Hammer, M.D., Ph.D.

Molecular & Integrative Physiology; Internal Medicine

Maria Castro, Ph.D.

Neurosurgery; Cell and Developmental Biology

Diane Robins, Ph.D.

Human Genetics

Rackham Faculty Ally for Diversity

Sofia Merajver, M.D., Ph.D.

Student Representatives

Anjan Saha (aksaha@umich.edu)

David Markovitz Lab

Donald Little (dwlittle@umich.edu)

Gary Hammer Lab

Introduction

The Cancer Biology Program is an interdisciplinary Ph.D. granting program at the University of Michigan that offers academic and research training in the field of cancer biology. Formal classroom instruction in cancer biology and related fields will be combined with intensive mentoring by program faculty to provide the students with the intellectual and technical skills required for their careers. The Cancer Biology Program spans many disciplines, including cell biology, genetics, biochemistry, microbiology, pharmacology, pathology, epidemiology, bioinformatics, and immunology, to name a few. The Cancer Biology Program represents a unique set of training and educational activities that, taken collectively, are distinct from anything currently offered in the existing doctoral programs at University of Michigan and that expose the student to the full breadth of cancer biology while allowing immersion in a dissertation topic of the student's choice. Students in this program are expected to perform and publish research of high quality and of scientific and biomedical relevance.

The Cancer Biology Program is an integral component of the educational mission of the UM Comprehensive Cancer Center. Program faculty are members of the Cancer Center and the center provides administrative and financial support to the program. Students in the Cancer Biology Program benefit from this integration and from the education and career development opportunities that are initiated by the Cancer Center.

This handbook provides the information necessary for students to complete the requirements for a Ph.D. degree in the Cancer Biology Program.

Steering Committee

The Steering Committee is advisory to the Director and is responsible for determining and overseeing program policy. Additionally, it also advises students and reviews each student's progress annually, addresses student concerns, approves thesis committee selections, and resolves issues concerning the Program's curriculum.

Academic Mentoring

During the first year of study, academic mentoring will be provided by the Cancer Biology Director as needed for information about Cancer Biology and coursework. Once a mentor and a dissertation committee are chosen, they will assume the bulk of the responsibility for continued mentoring and career planning. The Director and Steering Committee will remain available to all students to provide additional advice throughout the course of their graduate studies.

TIMETABLE

A provisional timetable for completion of the program is provided, although each student will be guided through the program individually.

Milestone	To be completed by
<p style="text-align: center;"><u>PRE-CANDIDATE:</u></p> <p style="text-align: center;">Lab rotations (2 mandatory; additional possible)</p>	August 31 of year 1 (within PIBS)
Choice of Ph.D. Program	End of year 1 in PIBS (usually by June 1)
All course work	End of year 2 COMMENT: Journal Club/Research Student Seminar (Cancer Bio 800) is taken for credit in Fall and Winter semesters of years 1 and 2. After year 2, attendance is required every semester.
Selection of thesis advisor (mentor)	By the end of year 1 for most students, with occasional exceptions
Preliminary Exam, oral and written, after which candidacy is achieved	End of Year 2
<p style="text-align: center;"><u>CANDIDATE:</u></p> <p style="text-align: center;">Completion of degree requirements</p>	Expected to be 5 years from time of matriculation into PIBS

Training in Ethical Issues in Science

On entering the Graduate Program through PIBS, students are issued copies of the Rackham Graduate School “Student Handbook” and the University of Michigan Medical School “Guidelines for Responsible Conduct of Research.” The former addresses the standards of student behavior expected of all members of the graduate community. The latter discusses in depth the responsibilities of a Ph.D. mentor, appropriate methods of data collection and analysis, guidelines for manuscript authorship and issues pertaining to relationships between industry and academic institutions. During the first year, graduate students attend an 8 session seminar series in Ethics in Research prepared and presented as part of PIBS 503. Per NIH policy, trainees are required to retake the training every 4 years.

Course Selection and Grades

The Rackham Graduate School requires students to complete a minimum of 18 credits of graded coursework in order to achieve candidacy including the grade of S – Satisfactory. Courses elected as visit (audit) do not meet this requirement, nor do any doctoral courses (those designated as 990, etc.).

All coursework for the Cancer Biology Program must be passed with a cumulative minimum GPA of B (3.00 on a 4.00 point scale).

The requirements described below are based on the structures of both the Rackham Graduate School and PIBS.

Cancer Biology Program Requirements

The program requires all of the following courses:

Core PIBS courses in Cell biology, biochemistry and genetics (see PIBS handbook)
(Fall semester; 3-6 credits)

Cancer Biology 554: The Science of Cancer
(Winter semester; 4 credits)

Cancer Biology 800: Cancer Biology Journal Club
(Fall and Winter semesters; 1 credit each, taken during the 1st & 2nd year)

Bioinformatics 525: Foundations in Bioinformatics and Systems Biology
(or an equivalent course) (Winter semester, 3 credits)

Elective Coursework

Cancer Biology students may take additional elective credits to reach 18 credits required by Rackham prior to sitting the prelim exam. It is recommended that the elective courses be selected to complement the student's research interests and include relevant PIBS core courses to fill in any gaps in the student's undergraduate education. Courses and the offered times do change frequently; students are to check the [PIBS Curriculum Guide](#) for the most updated listing and should consult the Program Director.

The program strongly recommends the following course be taken in the second year, before the prelim exam:

Pharmacology 502: Introduction to Scientific Communication

Typical Cancer Biology Student Curriculum

Year One:

Fall Semester

PIBS 503 (1 credit)

PIBS 600 (lab rotation) (1-8 credits)

PIBS 800 (1 credit)

Cancer Biology 800 (1 credit)

*Human Genetics 541 (3 credits)

*Cell Developmental Biology 530 (3 credits)

*Biological Chemistry 550 (3 credits)

* Student chooses up to 2 of 3 classes to advance knowledge or remediate in order to prepare for prelims.

Total credits: minimum of 9

Year One:

Winter Semester

Cancer Biology 554 (3 credits)

Bioinformatics 525 (3 credits)

Cancer Biology 800 (1 credit)

PIBS 600 (lab rotation) (1-8 credits)

PIBS 800 (1 credit)

Total credits: minimum of 9

Year Two:

Fall Semester

Cancer Biology 800 (1 credit)
Elective courses (variable for each student)
Cancer Bio 599 (1-8 credits)

Total credits: minimum of 9

Year Two:

Winter Semester

Cancer Biology 800 (1 credit)
Pharmacology 502 (2 credits)
Cancer Bio 995 (1-8 credits)

Total credits: maximum of 8

Students are required to take Cancer Biology 800 during the fall and winter terms of Year 1 and Year 2. However, they must participate and attend each term and present once an academic term until they successfully defend. Please note that Cancer Biology students must register for their mentor's section of Cancer Biology 995 (candidate) each Fall and Winter term until they successfully defend.

REQUIREMENTS OF THE CANCER BIOLOGY PROGRAM

1. A minimum of 18 credit hours in graduate-level course work (*course numbers designated 500 and above), excluding 800, with no grades of "B-" or below. Courses must be re-taken if a grade of B- or lower is obtained.
2. At least two laboratory research rotations.
3. Successful completion of the preliminary examination.
4. Successful completion of a research project and defense of a thesis.
5. At least one first authored peer-reviewed research manuscript in press.

Grades

Students whose cumulative grade point average falls below a "B" will be placed on academic probation by Rackham for the subsequent term. The student must then consult with the Cancer Biology Program Director. Two consecutive terms of probation will result in a review by the Steering Committee, and may result in loss of monetary support and/or a request for the student's withdrawal from the graduate program.

COURSE REQUIREMENTS FOR MSTP STUDENTS

MSTP students come into the Program with 18 credits toward their Ph.D. Once in the Program, the following courses are required:

Cancer Biology 554: The Science of Cancer (Winter semester; 4 credits)

Cancer Biology 800: Cancer Biology Journal Club
(Fall and Winter semesters; 1 credit each, taken during the 1st & 2nd year)

Bioinformatics 525: Foundations in Bioinformatics and Systems Biology (Winter semester, 3 credits)

Transfer Students

Graduate students who wish to transfer to the Cancer Biology Program from other Departments/Programs within the University's Horace Rackham School for Graduate Studies should first contact the Cancer Biology Program Director, who will then bring up the matter with the Steering Committee. The Program Director will also request that the student's academic file be provided for review. If the transfer is approved, the student will be responsible for completing all Cancer Biology Program requirements, as detailed in the Program's Handbook.

Cancer Biology Seminar Series

The Cancer Biology Seminar Series, held during the Fall and Winter terms, include formal presentations by Cancer Biology Program students, faculty members as well as invited guest speakers from outside the University. The following external speakers are scheduled for the 2016-2017 academic year:

- Christian Jobin, Ph.D. (University of Florida College of Medicine) on 10/26/16
- Ralph DeBerardinis, MD, Ph.D. (Children's Medical Center Research Institute & UT Southwestern Medical Center) on 11/16/16;
- Carla Kim, Ph.D. (Harvard Medical School and Boston Children's Hospital) on 3/1/17;
- Matthew Vander Heiden, MD, Ph.D. (MIT) on 3/29/17
- Goutham Narla, MD, Ph.D. (Case Western) on 5/10/17

Cancer Biology students are expected to attend these Wednesday 4 pm seminars, as well as to participate in selected luncheons with speakers throughout the academic year.

Cancer: Cells to Society Seminar Series

Program students are expected to attend this Cancer Center-sponsored series that exposes cancer trainees to “big picture issues” in cancer research that span across disciplines. Such issues include, but are not limited to, challenges around drug development, research funding, health care disparities, access to and design of clinical trials, integration of technology, reproducibility and rigor in research, and advocacy. Thus, Cells to Society has been designed to be a high-level seminar series that is intended to reach pre-doctoral and post-doctoral trainees, as well as junior and senior faculty, from across the Cancer Center.

The list of topics and speakers for 2016/17 is shown below:

Date	Topic	Presenters
9/28/16	Bridging the Gap – Why Do Early Phase Trials Fail So Often?	J. Leopold (DT)/C. Lao (TACR)
11/30/16	The Cancer Moonshot: Apollo 11 or Apollo 13?	T. Lawrence (CT, TACR)/D. Hayes (TACR)
1/25/17	Designing Oncology Clinical Trials in the Age of Molecular Medicine: Learning from the Past to Move into the Future	G. Kalemkerian (TACR)/ J. Taylor (CEP)
2/22/17	Cancer Risk and Prevention –	D.Arenberg (CEP)/L. Pearce (CEP)
4/26/17	Biomarkers & the Future of Disease Monitoring	M. Tewari (TACR)/TBD
5/31/17	Precision Medicine in Cancer – The Promise and the Challenge	A. Chinnaiyan (CG, TACR)/A. Schott (TACR)

Cancer Biology Annual Retreat

In the fall, the Cancer Biology Program sponsors an on-campus retreat, which highlights selected research within the Program. The retreat program features a keynote speaker, a poster session/reception, short talks presented by Program faculty, students and postdocs highlighting the diverse and excellent research in the Cancer Biology program, a panel discussion, as well as meals. All members of the Cancer Biology Program are invited to submit abstracts of their research. The Steering Committee makes the decision as to who is selected to present at the retreat.

Keynote speakers:

2017 - Inder Verma, Ph.D. (Salk Institute for Biological Studies)

2016 - Elaine Fuchs, Ph.D. (Rockefeller)

2015 - Peter Jones, Ph.D., D.Sc. (Van Andel Research Institute)

 Davide Ruggero, Ph.D. (UCSF)

2014 – Scott W. Lowe, Ph.D. (Memorial Sloan Kettering Cancer Center)

2013 - Gabriele Bergers, Ph.D. (UCSF)

Cancer Biology Training Grant

Second year graduate students in good standing are eligible for funding from a NCI Training Grant, “Cancer Biology Training Grant,” now in its 24th year. (Project Director Dr. Elizabeth Lawlor).

Research Rotations

For complete information on rotations please see the [PIBS Faculty Rotation Availability Site](#). All students are required to complete two rotations, in the fall and winter terms. Students that are matriculating in July, prior to the start of the academic term are required to do a minimum of three. Rotations are normally either a full semester or a half semester and 1-4 graded credits (PIBS 600) are earned depending on the length. Students are encouraged to contact faculty members early to discuss rotation possibilities.

Teaching

While the program has no formal requirements for teaching, students are encouraged to seek out opportunities to act as teaching assistants of Graduate Student Instructors. The PIBS office can facilitate this process.

Thesis Advisor

Upon completion of the research rotations required by PIBS, the student will choose a mentor who is a member of the Cancer Biology Program faculty to guide the student's dissertation research. This usually occurs at the end of the first year of graduate school. The mentor must be a member of the instructional track. If the mentor is not on the instructional track, a Cancer Biology Program faculty from the instructional track will be chosen to serve as co-chair of the dissertation committee.

Any student training in the lab of a newly appointed junior faculty member must identify a co-mentor for their dissertation research. Junior faculty will be governed by this policy until they have successfully trained a student in any of the PIBS programs.

The responsibilities of the thesis mentor are to train, mentor and advise the student in biomedical research, prepare the student for a career in science, and set a professional example by maintaining the highest scientific and ethical standards.

Advancement to Candidacy: The Preliminary Exam

In addition to coursework, students must successfully pass a preliminary examination to advance to candidacy for the doctoral degree. The exam is taken during the end of the fall or winter term of the 2nd year. The exam is formatted to ensure that we are truly testing the skills that are required to become an independent, critical thinker. The preliminary exam consists of two parts.

Part One

The student will prepare a "Commentary" or "News & Views" type document of roughly 750 words on an assigned paper recently published in the cancer research field. In the piece, the student will prepare an introduction to the paper and particularly the major topic/topics covered in the paper in question, so that others not intimately familiar with the specifics of the paper can understand the necessary background for the work and will have a big picture sense of the field from reading this portion of your "News & Views" piece. The student will then critically comment on how the studies and findings in the paper have advanced knowledge in the specific research field in question and the cancer research field generally, emphasizing the major new conclusions and impact of the paper. Finally, in the last third of the piece, the student will discuss some potential new directions and experimental studies that would be likely and promising avenues to extend the findings and conclusions offered in the paper in question. The student's written document will be submitted one week in advance of Component #2 of the Preliminary Examination (the oral presentation). The document will be critically evaluated by the members of their prelim exam committee.

Part Two

The student will have a 120 min oral examination focusing on the paper in question and their News and Views piece. They should prepare a well-focused PowerPoint presentation that provides an overview of the topic and assigned paper and the written piece submitted. Much of the examination will include in-depth questions from the review team about their general knowledge of the topic and the studies and data in the research paper in question, and especially their research plan, including the relevant experimental approaches and the likely results and potential pitfalls of their plans to extend on the published work.

Additional information about the submitted piece is as follows:

- 1) The main text of the "News & Views" Piece should be roughly 750 words and should be no more than 1000 words.
- 2) Students should provide a short title for their "News & Views" piece that might be expected to capture interest in the piece.
- 3) The document should have fewer than or equal to 20 references cited. The reference list is NOT included in the word count.
- 4) The style and reference format should be similar to that in Cell or Cancer Cell.
- 5) Students should generate one or two new schematic figure for their piece, along with a figure legend explaining the schematic figure(s). The figure/figures should capture the main findings and conclusions in the research paper as well as highlight the future plans/work that are proposed to pursue. The figure(s) and figure legend(s) are not included in the word length.
- 6) Students are specifically requested NOT to seek any in-depth assistance from others, including other students or faculty members, in the writing of their piece or the preparation of their PowerPoint presentation.

In closing, students need to write an ORIGINAL piece and should emphasize future research directions and unanswered questions in the last one-third of the written piece. The approaches and data in the published paper and future research plans and unanswered questions should also be front-and-center as the students think about preparing for the oral defense of their piece.

Students will find many examples of commentary, perspective, news-and-views type pieces in Cell, Cancer Cell, Science, and Nature that they can review and perhaps "model" their piece on.

Selection of Dissertation Committee and Research Topic

The Dissertation Committee provides critical advice to the student during the course of the training process. The thesis advisor will chair the committee and the membership of the committee will follow the guidelines of the [Rackham Graduate School](#). Both the dissertation topic and the composition of the committee are determined by the student in consultation with the thesis advisor, and must be approved by the Steering Committee and the Rackham Graduate School. The student must be sure to provide a brief description of their proposed project (i.e. a paragraph describing the thesis proposal which should include a title as well as a central hypothesis or question to be addressed) as well as their reasoning for the selection of each committee member (e.g. faculty member has expertise on topic). The committee must include at least four members, three of whom are tenure or tenure-track members of the University of Michigan. At least three of the members must hold appointments in Cancer Biology. One member must be a cognate, i.e., from outside the Cancer Biology Program. The student is expected to meet with the committee at least once a year, with the first meeting occurring no later than six months after advancement to candidacy. The committee chair will prepare a report after each meeting, which will be submitted to the Steering Committee for review. The [Rackham website](#) should be consulted for detailed information pertaining to the Ph.D. dissertation and other information regarding graduate training.

Students should be sure to email their committee a copy of the data they'll be presenting at least three working days in advance of the committee meeting. Not at their first committee meeting, but in subsequent meetings, they should also include in the email to their committee a brief self-assessment of the progress they've made since the last meeting. Students and their mentors are responsible for ensuring that their Ph.D. progress report is completed, signed by the student and each member of their committee, and returned to the Student Services Representative within 7 days after the meeting.

Dissertation Defense

Each student must write and successfully defend a dissertation. In addition, the student must have at least one first author publication published or in press in a recognized peer-reviewed journal prior to the defense date.

Master's Degree Policy

The Cancer Biology Program is a doctoral program. As such, it is fully expected that all students will successfully complete all the requirements for the Ph.D. The Steering Committee has determined that, if a student decides to withdraw from the Program prior to completing these requirements, it will only consider awarding a Master's degree if the withdrawal is due to extenuating or exceptional circumstances, **and** the student has made significant progress towards the PhD. The latter includes having completed all course requirements with a "B" or better average, advanced to candidacy, and demonstrated research accomplishments as evidenced by authorship on a publication (which has at least been submitted) in a peer-reviewed journal. Each student's petition will be decided on an individual basis and must also have the approval of the thesis mentor and dissertation committee.

Vacation Policy

The Cancer Biology Program adheres to the vacation policy set forth by PIBS. Students are entitled to time off during vacation periods, such as University-designed holidays, winter and spring breaks, and may request time off during the summer. Students must discuss proposed vacation periods with their mentors well ahead of time. Any further vacation time should have the additional approval of the Cancer Biology Program Director, and it may be granted without financial support. Since progress towards completion of dissertation studies is normally directly related to the amount of time devoted to work in the lab, it is highly recommended that students enrolled in classes take advantage of time off from classwork to make progress in the laboratory.

Student Financial Aid

All students in good standing will be provided with a monthly stipend, comprehensive health care coverage, and coverage of tuition and fees. For the first year, PIBS will cover all expenses. In year two, the student may be supported by a combination of individual fellowships, pre-doctoral training grant funds, institutional funds and research grants. Once a mentor has been selected and the student has passed the preliminary examination at the end of year 2, funding will be provided by the mentor's laboratory unless training grant support or other fellowships are available. Cancer Biology faculty members who accept Cancer Biology students must complete and submit the Financial Commitment Form listing the source(s) of funding (including the grant number) that will support that student in the years that the graduate student is a member of their lab.

Should the mentor not be able to meet the financial responsibility for any Cancer Biology student in his or her lab, the financial obligation for the student falls on the mentor's primary department. The chair of the mentor's primary department must sign and date the letter of financial responsibility before a Cancer Biology student is formally accepted in a mentor's lab.

Student Employment Outside the Program

The faculty of the Cancer Biology Program believes that Ph.D. training is a full-time endeavor. Outside employment subtracts from the time and mental energy a student can devote to his or her research. In addition, it is an NIH policy that students who are supported by a federal training grant may not be employed outside their training program. For this reason, students are forbidden to engage in outside employment.

RESPONSIBILITIES OF STUDENTS FOR THEIR PROGRESS THROUGH THE PROGRAM

In addition to fulfilling the above requirements of the Cancer Biology Program, students are responsible for:

1. Ensuring that the preliminary written proposal and oral exam are completed in a timely fashion.
2. Ensuring that the thesis advisor and dissertation committee are chosen in a timely fashion and according to the guidelines of the program. The first committee meeting must be held within 6 months of achieving candidacy.
3. Scheduling thesis committee meetings at least once a year and submitting progress reports following each committee meeting.
4. Making timely progress toward completion of the Ph.D. and giving careful and timely consideration to further career goals (post-docs, jobs, etc.).
5. Ensuring that Rackham requirements for the dissertation, defense and graduation are met.
6. Actively participating in the weekly Journal Club/Research Seminar Series, Annual Program Retreat, the PIBS annual recruitment weekends.
7. Serving as a student representative for the Cancer Biology Program.

RESPONSIBILITIES OF CANCER BIOLOGY FACULTY

1. Serving on committees as asked, particularly on preliminary examination committees, and on dissertation committees.
2. Should a faculty member lose their funding or for any reason is unable to support their student, the student's financial support will be the responsibility of the faculty member's primary department.
3. Monitoring and assuring timely progress through the Cancer Biology Program of students in their laboratories. Should the mentor, for any reason, leave the University or be unable to continue to serve as a student's mentor, it is the responsibility of the mentor to resolve and document the following issues for Cancer Biology students in the lab:
 - A. What experimental aims must be completed to finish the student's thesis, and what is the anticipated time frame for completion of these studies?
 - B. How frequently will the student's Committee meet?
 - C. What will be the source of the student's individual financial support, and how will the student's research be supported?
 - D. In which lab will the student's research be performed?
4. Submitting required reports in a timely fashion (rotation evaluations, thesis progress evaluations).
5. Ensuring timely scheduling of the organization of dissertation committees for their trainees, and scheduling of thesis committee meetings and dissertation defenses.
6. Active participation in the weekly Journal Club/Research Seminar Series (each faculty member is alphabetically assigned to give a verbal critique to one trainee after their presentation) a minimum of two times per academic year, the Annual Program Retreat, the PIBS annual recruitment Weekends, PIBS 503.
7. Serving as a faculty representative for the Cancer Biology Program.
8. Taking on needed roles in administering the Program.

Useful Online Resources

Rackham Resources for Students

Graduate Student Handbook Policies and Procedures

http://www.rackham.umich.edu/policies/academic_policies/

Dissertation Handbook: A Guide to Preparing and Submitting your Doctoral Dissertation

<http://www.rackham.umich.edu/downloads/oard-dissertation-handbook.pdf>

Gradtools - Rackham (www.gradtools.umich.edu)

This is a special set of on-line tools in the CTools environment to help Rackham doctoral students as they work toward their degrees. Included is a Dissertation Checklist. Students are encouraged to make use of this helpful resource.

Academic Resources

PIBS Curriculum Guide

<https://sites.google.com/a/umich.edu/pibs-students/academics>

Center for Research on Learning and Teaching

<http://www.crlt.umich.edu/index.php>

Disability Resources

<http://ssd.umich.edu/>

Dissertation Resources

http://www.rackham.umich.edu/dissertation_information/

Diversity at Michigan

Association of Multicultural Scientists at U-M

<https://maizepages.umich.edu/organization/ams>

Students of Color of Rackham

<http://www.umich.edu/~scorweb/about.html>

Funding Resources

Rackham Funding

<https://secure.rackham.umich.edu/Fellowships/support/list.php>

<http://www.rackham.umich.edu/funding/>

<http://www.med.umich.edu/pibs/prospective/fund/index.html>

NIH F31 Fellowships

<http://grants.nih.gov/grants/guide/pa-files/PA-11-111.html>

American Cancer Society

<http://www.cancer.org/>

Scientific Grants and Funding - <http://sciencecareers.sciencemag.org/funding>

National Science Foundation - <http://www.nsf.gov/index.jsp>

APPENDIX A : CANCER BIOLOGY PROGRAM FACULTY/STUDENT DIRECTORY

CANCER BIOLOGY GRADUATE PROGRAM

2016-2017

For a more detailed list of the research interests of Cancer Biology faculty members, please visit the [Cancer Biology Faculty webpage](#).

PROGRAM DIRECTOR:

Elizabeth R. Lawlor M.D., Ph.D.

Russell G. Adderley Professor of Pediatric Oncology
Associate Professor, Departments of Pediatrics and Pathology
elawlor@umich.edu

Research interests:

Pediatric cancer biology with a focus on Ewing sarcoma and stem cell pathway deregulation.

FACULTY:

Kate Barald, Ph.D.

Professor of Cell & Developmental Biology
Professor of Biomedical Engineering
Director, Michigan NIH PREP Program
kfbarald@umich.edu

Research interests:

Development of new therapeutic agents for the treatment of hormone-responsive cancers, including Neurofibromatosis 1. We also work on the development of sensory systems, particularly the vertebrate inner ear and are developing new stem cell based approaches to hearing and deafness.

David Beer, Ph.D.

John and Carla Klein Professor of Thoracic Surgery
dgbeer@umich.edu

Research interests:

My laboratory is exploring the mechanism by which Wnt signaling regulates target gene expression, using *Drosophila* as a model system

Kenneth Cadigan, Ph.D.

Professor of Molecular, Cellular, and Developmental Biology
cadigan@umich.edu

Research interests:

My laboratory is exploring the mechanism by which Wnt signaling regulates target gene expression, using *Drosophila* as a model system.

Christine E. Canman, Ph.D.

Associate Professor of Pharmacology

ccanman@umich.edu

Research interests:

We are investigating how specialized DNA polymerases are regulated by the Fanconi anemia pathway and influence the therapeutic response of cells treated with ionizing radiation or DNA crosslinking agents.

John M. Carethers, M.D.

John G. Searle Professor and Chair, Dept. of Internal Medicine

jcarether@umich.edu

Research interests:

Dr. Carethers' laboratory studies the development and progression of colorectal neoplasms, using bench to bedside approaches in his translational laboratory. The laboratory focuses on familial and sporadic colorectal cancer, in particular, the consequences of defective DNA mismatch repair (MMR).

Thomas E. Carey, Ph.D.

Professor of Pharmacology and Otolaryngology/Head & Neck Surgery

Co-Director-Head & Neck Oncology Program

careyte@umich.edu

Research interests:

My research interests are the mechanisms of cancer progression and resistance to treatment in head and neck cancer and the role of high-risk Human papilloma viruses in cancers of the oropharynx, nasopharynx, oral cavity, larynx and nasal sinuses.

Maria Castro, Ph.D.

Richard Schneider Collegiate Professor of Neurosurgery and Cell and Developmental Biology

maricas@umich.edu

Research interests:

Cancer biology and therapeutics: epigenetics, cancer metabolism, signaling networks that mediate cancer progression. Uncovering the role of secreted cancer ligands in hematopoietic stem cells' development, anti-tumor immunity, and nanotechnologies to develop novel anti-cancer therapy.

Mark Y. Chiang, M.D., Ph.D.

Assistant Professor of Internal Medicine, Hematology/Oncology

markchia@umich.edu

Research interests:

Our lab is committed to defining the molecular signals that drive induction and maintenance of childhood leukemia. We study strategies to selectively target the oncogenic functions of Notch signaling as opposed to its physiological and tumor suppressor functions.

Arul Chinnaiyan, M.D., Ph.D.

Director, Michigan Center for Translational Pathology

S.P. Hicks Endowed Professor of Pathology

Investigator, Howard Hughes Medical Institute

American Cancer Society Research Professor

arul@umich.edu

Research interests:

Functional genomic, proteomic and bioinformatics approaches to study cancer and understand cancer biology as well as to discover clinical biomarkers.

Mark Day, Ph.D.

Professor of Urology

mday@umich.edu

Research interests:

Our research is focused on prostate and bladder epithelial adhesion and survival and the influence of the microenvironment on these processes and on tumorigenesis in these organs.

Zora Djuric, Ph.D.

Research Professor, Departments of Family Medicine and

Environmental Health Sciences (Nutrition Program)

zoralong@umich.edu

Research interests:

Dr. Djuric's lab is currently evaluating the relationships between diet composition, obesity and cancer prevention. This research uses biomarkers of cancer risk as an endpoint in clinical trials

Colin Duckett, Ph.D.

Director of Program Development, North Campus Research Complex;

Co-Director, Cancer Cell Biology Program, Comprehensive Cancer Center;

Professor, Departments of Pathology and Internal Medicine

colind@umich.edu

Research interests:

Research is focused on the role of IAP proteins in cancer, with emphasis on the potential of IAP antagonists as therapeutic agents

Xing Fan, M.D., Ph.D.

Associate Professor of Neurosurgery and Cell & Developmental Biology

xingf@umich.edu

Research interests:

Study signaling pathways that regulate brain development and tumor formation to develop novel therapy targeting brain cancer stem cells.

Eric R. Fearon, M.D., Ph.D.

Emanuel N. Maisel Professor of Oncology
Professor, Departments of Internal Medicine, Pathology, and Human Genetics
Director, University of Michigan Comprehensive Cancer Center
Division Chief, Molecular Medicine & Genetics (MMG)/Int Med
fearon@umich.edu

Research interests:

Studies of oncogene and tumor suppressor gene defects in cancer pathogenesis, particularly gastrointestinal cancers.

David O. Ferguson M.D., Ph.D.

Associate Professor of Pathology
daviferg@umich.edu

Research interests:

The Ferguson laboratory studies how mammalian cells maintain a stable genome. The proteins that accomplish this serve to prevent cancer and ensure proper functioning of the immune system. Currently, our main focus is a multi-protein complex called MRN, which is mutated in human cancer predisposition and immunodeficiency syndromes.

Gary D. Hammer, M.D., Ph.D.

Millie Schembechler Professor of Adrenal Cancer
Director - Endocrine Oncology Program
ghammer@umich.edu

Research interests:

The long range objective of Dr. Hammer's laboratory is to understand the cellular and molecular mechanisms by which signaling pathways and downstream transcription factors coordinate the specification of adrenocortical cells within the adrenal gland.

Michael Imperiale, Ph.D.

Arthur F. Thurnau Professor, Department of Microbiology and Immunology
imperial@umich.edu

Research interests:

We study the molecular biology of the small DNA tumor virus, BK polyomavirus, which causes significant disease in transplant recipients including cancer patients undergoing BMT.

Evan T. Keller, Ph.D., DVM

Professor of Urology and Pathology
etkeller@umich.edu

Research interests:

Mechanisms that contribute to bone metastasis, contribution of aging to the development of genitourinary disease.

Venkateshwar G. Keshamouni, Ph.D.

Associate Professor of Internal Medicine, Pulmonary & Critical Care Division

vkeshamo@umich.edu

Research interests:

Deregulation of TGF-beta signaling in lung cancer with a focus on mechanisms of Epithelial-mesenchymal transitions, tumor suppression and immune evasion with a goal of identifying therapeutic targets.

David Lombard, M.D., Ph.D.

Associate Professor of Pathology

davidlom@umich.edu

Research interests:

Sirtuin deacylases and their relationships with cancer and other age-associated diseases.

Pedro Lowenstein, M.D., Ph.D.

Richard Schneider Collegiate Professor of Neurosurgery and Cell and Developmental Biology

pedrol@umich.edu

Research interests:

Cancer biology and therapeutics: is to discover the cellular, molecular, and structural basis of malignant glioma growth and invasion, role of GBM derived micro RNAs into the tumor microenvironment, GBM stem cell biology, tumor derived double-stranded DNA and the STING signaling pathway.

Costas Lyssiotis, Ph.D.

Assistant Professor, Molecular & Integrative Physiology

clyssiot@umich.edu

Research Interests:

Tumor Metabolism, Cancer, Pancreatic Cancer, Metabolomics, Autoimmunity

Ivan Maillard, MD, Ph.D.

Associate Professor, Life Sciences Institute;

Associate Professor of Internal Medicine, Division of Hematology/Oncology;

Associate Professor of Cell and Developmental Biology, Director, Leukemia Program

imaillar@umich.edu

Research interests:

Notch signaling, hematopoietic stem cells, leukemia, T cell differentiation and homeostasis, bone marrow transplantation, alloimmunity

Sami Malek, MD

Associate Professor, Internal Medicine - Division of Hematology/Oncology

smalek@umich.edu

Research interests:

Chronic Lymphocytic Leukemia (CLL) genetics, CLL biomarkers, targeted therapy development, MDS/AML genetics, lymphoma genetics

David M. Markovitz, M.D.

Professor of Internal Medicine, Division of Infectious Diseases

dmarkov@umich.edu

Research interests:

Our laboratory studies the interaction between human cellular factors and retroviruses, and their role in oncogenesis and immunity.

Sofia D. Merajver, M.D., Ph.D.

Professor of Internal Medicine and Epidemiology

Scientific Director, Breast Oncology Program

Director, Breast and Ovarian Cancer Risk Evaluation Program

smerajve@umich.edu

Research interests:

Molecular genetics of aggressive breast cancer phenotypes and comparative studies and integrated modeling.

Andrew G. Muntean Ph.D.

Assistant Professor of Pathology

andrewmu@umich.edu

Research interests:

Epigenetic and transcriptional mechanisms controlling normal and malignant hematopoietic stem cells

Nouri Neamati, PhD

John G. Searle Professor of Medicinal Chemistry

neamati@umich.edu

Research interests:

Preclinical drug development, Anticancer drug design and discovery, Molecular Pharmacology, Medicinal chemistry, Computer-aided drug design.

Jacques E. Nör, D.D.S., M.S., Ph.D.

Donald A Kerr Professor of Dentistry

Professor of Otolaryngology and Biomedical Engineering

jenor@umich.edu

Research interests:

Head and neck cancer stem cells; Tumor angiogenesis; Salivary gland cancer; Cancer Biology

Diane M. Robins, Ph.D.

Professor of Human Genetics

drobins@umich.edu

Research interests:

We study hormonally regulated gene transcription and androgen receptor function, from molecular to organismal levels, in mouse models of development and oncogenesis. An additional project focuses on the physiological consequences and genetic diversity of KRAB-ZFP epigenetic modulators.

JoAnn Sekiguchi, Ph.D.

Associate Professor of Internal Medicine, Division of Molecular Medicine & Genetics

Associate Professor of Human Genetics

sekiguch@umich.edu

Research interests:

DNA repair and recombination. Molecular mechanisms of lymphocyte development. Molecular genetics of human immunodeficiencies and genomic instability cancer predisposition syndromes.

David H. Sherman, Ph.D.

Hans W. Vahlteich Professor of Medicinal Chemistry

Associate Dean for Research and Graduate Education (College of Pharmacy)

Professor of Microbiology & Immunology and Chemistry; Life Sciences Institute

davidhs@umich.edu

Research interests:

David Sherman explores the biochemical pathways of marine microorganisms with the goal of finding new drug candidates for infectious diseases and cancers.

Donna S. Shewach, Ph.D.

Professor of Pharmacology

Faculty Lead, Translational Research Education Certificate Program

dshewach@umich.edu

Research interests:

Improving cancer chemotherapy through novel mechanisms and gene therapy strategies

Corey Speers, MD, PhD

Assistant Professor of Radiation Oncology

cspeers@med.umich.edu

Research Interests:

Radiation oncology, data analysis, radiation resistance, triple negative breast cancer, bioinformatics, high throughput data analysis

Yi Sun, M. D., Ph.D.

Professor & Director, Division of Radiation & Cancer Biology, Dept. of Radiation Oncology

sunyi@umich.edu

Research interests:

SAG E3 ubiquitin ligase in angiogenesis, apoptosis and tumorigenesis; Drug discovery by modulating p53 and p53 signal pathways; Discovery of radiosensitizer

Scott Tomlins, MD, Ph.D.

Assistant Professor, Departments of Pathology and Urology
Member, Michigan Center for Translational Pathology

tomlinss@umich.edu

Research interests:

Using high-throughput techniques to characterize the cancer genome and transcriptome to identify cancer-specific aberrations to better understand cancer biology and identify clinically relevant biomarkers and therapeutic targets

Thomas D. Wang, MD, PhD

H. Marvin Pollard Collegiate Professor of Endoscopy Research and
Professor of Internal Medicine, Biomedical Engineering, and Mechanical Engineering

thomaswa@umich.edu

Research interests:

Crypt purification in colorectal cancer and genetic heterogeneity in evolution of esophageal cancer

Stephen J. Weiss, M.D.

Upjohn Professor of Internal Medicine and Oncology;
Research Professor, Life Sciences Institute

sjweiss@umich.edu

Research interests:

Transcriptional and post-translational regulation of the 3-dimensional cell-extracellular matrix interactions that underlie epithelial-mesenchymal transition programs, tumor progression, invasion, metastasis and angiogenesis.

Max S. Wicha, M.D.

Professor, Department of Internal Medicine
Founding Director Emeritus, University of Michigan Comprehensive Cancer Center
Madeline and Sidney Forbes Professor of Oncology

mwicha@umich.edu

Research interests:

Effects of extracellular matrix components on cell growth and differentiation. Cancer stem cells

Thomas E. Wilson, M.D. Ph.D.

Professor of Pathology and Human Genetics

wilsonte@umich.edu

Research interests:

DNA repair genetics and biochemistry and its influence on genome stability in germline, cancer and yeast; transcription-replication interactions; bioinformatics

Weiping Zou, M.D., Ph.D.

Charles B. de Nancrede Professor

Professor of Surgery, Immunology and Biology

Co-Director, Tumor Immunology and Host Response Program

Director, Translational Research

Co-Director, Immune Monitoring Core

wzou@umich.edu

Research interests:

Tumor immunotherapology and immunotherapy, with an emphasis on cross-talk among immune cell subsets, stromal cells, tumor cells and tumor stem cells in the tumor microenvironment, and its impact on tumor immunity, tolerance and therapy.

CURRENT CANCER BIOLOGY STUDENTS:

April Adams	aprilada@umich.edu	<u>Mentor:</u> Nor
Megan Altemus	meghull@umich.edu	Merajver
Julian Bahr	jcbahr@umich.edu	Weiss
Jillian Boden	jmboden@umich.edu	Cheung/Sekiguchi
Kayla Capper	kaylamn@umich.edu	Sekiguchi
Benjamin Chandler	chandlerb@umich.edu	Speers
Daysha Ferrer-Torres	dferrert@umich.edu	Beer
Allegra Hawkins	allegrah@umich.edu	Lawlor
Megan Hull	meghull@umich.edu	Merajver
Evelyn Jiagge	emawunyo@umich.edu	Merajver/Wicha
Aaron Koch	aakoch@umich.edu	Sherman
Donald Little	dwlittle@umich.edu	Hammer
Dipika Mohan	drmohan@umich.edu	Hammer
Barbara Nelson	barbnels@umich.edu	Lyssiotis
Morgan Penny	mkpenny@umich.edu	Hammer
Christie Rodriguez Ramirez	chrisrr@umich.edu	Nor
Anjan Saha	akasaha@umich.edu	Markovitz

GRADUATE STUDIES COORDINATOR/ADMINISTRATOR:

Zarinah Aquil, M.Ed. zaquil@umich.edu 734-615-4846

STEERING COMMITTEE:

Elizabeth Lawlor, M.D., Ph.D.	Pediatrics & Communicable Diseases; Pathology
Michael Imperiale, PhD.	Microbiology & Immunology
Maria Castro, Ph.D.	Neurosurgery; Cellular and Developmental Biology
Gary Hammer, M.D., Ph.D.	Molecular & Integrative Physiology; Internal Med
Diane Robins, Ph.D.	Human Genetics

FIRST YEAR STUDENT ADVISOR:

Michael Imperiale, Ph.D.

MEDICAL SCIENTIST TRAINING PROGRAM (M.D./PH.D.) OPERATING COMMITTEE REPRESENTATIVE:

Ivan Maillard, M.D., Ph.D.

JOURNAL CLUB/RESEARCH SEMINAR (Cancer Bio 800) COURSE DIRECTOR:

Costas Lyssiotis, Ph.D. and Howard Crawford, Ph.D.

Molecular Biology of Cancer (Cancer Bio 553) COURSE DIRECTOR: Drs Duckett & Robins
Cancer Pathogenesis & Treatment (Cancer Bio 554) COURSE DIRECTOR: Drs. Canman & Robins

PIBS 503 REPRESENTATIVES:

Drs. Zora Djuric, Michael Imperiale, Elizabeth Lawlor, Scott Tomlins, Corey Speers, Sofia Merajver



APPENDIX B: SUMMARY REPORT ON LABORATORY THESIS PROGRESS

PART I: To be completed by Student and submitted to thesis committee 1 week prior to annual meeting

Student's name _____

First term in Cancer Biology: _____ I entered through PIBS MSTP

Year in program 1st 2nd 3rd 4th 5th 6th

Research rotation #1 _____

Research rotation #2 _____

Research rotation #3 _____

Research rotation #4 _____

PhD thesis mentor _____

Thesis committee members:

Are you pursuing a dual degree? Yes What is the other program/ degree? _____

No

Are you enrolled in a certificate program? Yes What certificate program? _____

No

Research

Dissertation research focus _____

Dissertation title (in progress) _____

Briefly describe the aims and experimental approaches of your project

Describe your major research accomplishments during the past year?

Are there any particular problems that you have encountered in your research?

What do you see as the key things for you to focus on for the next year?

Are you satisfied with your research progress? If not, discuss any obstacles you have experienced and possible solutions.

Do you feel that you are “on track” towards completion of your PhD? If not, please explain why.

My last dissertation committee meeting was on _____.

Part II: To be completed and submitted (along with Part I) within 1 week of annual committee meeting.
MUST BE TYPED AND SENT ELECTRONICALLY by Committee Chair to
 Program administrator (zaquil@umich.edu) and Program director (elawlor@umich.edu)

Student: _____ Faculty Mentor: _____
 Year of matriculation: _____ Anticipated date of graduation: _____
 This report covers the period from _____ to _____

Place an "X" in the box that best describes the student's overall performance. Performance details should be elaborated on the next page and discussed with the student.

	Master (performing at level of post-doc)	Advanced (expected level for a senior PhD candidate)	Learner (appropriate stage for early candidate)	Novice	Unable to comment
Productivity					
Effort					
Technical ability in contributions to project					
Contributions to opening and maintaining communication					
Intellectual contribution to the project					
Reads and comprehends the literature					
Makes connections between published work and his/her project					
Contributions to discussion of work by other colleagues					
Knowledge of project					

	Master (performing at level of post-doc)	Advanced (expected level for a senior PhD candidate)	Learner (appropriate stage for early candidate)	Novice	Unable to comment
Personal initiative					
Creativity					
Presentation skills: Written					
Presentation skills: Oral					
Progress towards long term career goals					

Summary comments of thesis committee:

Please be sure to address the two following points in your comments:

1) Is there a clear plan to generate a manuscript from the presented work (i.e. is it in a state suitable for publication already and, if not, is there a clear plan to get it there)? This is especially important for students in 3rd year and beyond since a 1st author publication is a requirement for graduation.

2) Is the student's research in a stage where they should begin writing the thesis? This should be a focus of the committee at the meeting which occurs 8-12 months before the date by which the student hopes to defend.

This report was discussed with the student on _____.

Student Signature _____

Mentor Signature _____

Thesis committee members:

Doctoral Program in Cancer Biology

APPENDIX C: SUMMARY REPORT ON LABORATORY THESIS PROGRESS

Date:

Student:

Mentor:

Semester:

Grade Earned S/U PLEASE NOTE: **I will enter the Grade via Wolverine Access for you.**

Summary of Research effort:

A. Time put into actual laboratory work:

Extensive _____ Adequate _____ Little _____

B. Reading relevant scientific research articles

Extensive _____ Adequate _____ Little: _____

C. Intellectual interest in the project:

Extensive _____ Adequate _____ Little: _____

D. Student's capacity to grasp the appropriate concepts and follow the analytical transition between concept and experimental design:

Good _____ Average _____ Poor _____

E. Please rank (circle) student's own intellectual input into the experimental design:

Total passivity with _____ *Strong creative contribution*
All input from advisor 1 2 3 4 5 *by the student*

Please comment on the student's strengths and weaknesses in research:

Are you satisfied with the student's progress?:

When did the student's Dissertation Committee last meet and what were their recommendations? (Please note: The Doctoral Program in Cancer Biology requires that the Dissertation Committee meet within 6 months after the student passes the preliminary exam, and at least once each year thereafter until the defense)

I HAVE DISCUSSED THIS REPORT WITH MY MENTOR.

STUDENT SIGNATURE: _____

MENTOR SIGNATURE: _____

Presenter: _____
 Faculty Reviewer: _____
 Date: _____

Please give the completed form to the presenter. The Cancer Biology Program Office does not need a copy.

**APPENDIX D: Cancer Biology Research Seminar 800
 JC/Research Seminar Evaluation
 Fall 2016/Winter 2017**

1. Please briefly comment on the trainee's JC/research seminar:

	Suggestions:
a) Introduction/Background	
b) Experimental	
c) Conclusion	
d) Data interpretation	
e) General knowledge of topic (as reflected by presentation of relevant background information and discussion of questions)	

2. Please briefly comment on the trainee's style and clarity:

	Suggestions:
a) Ease of speaking	
b) Flow between slides	
c) Depth of explanation	
d) Level of scientific vocabulary	

3. Visual presentation:

Excellent _____ Good _____ Needs improvement _____

4. Positive aspects:

5. Areas needing improvement (if applicable):

