

## **University of Michigan Department of Urology UROLOGIC ONCOLOGY TRAINING PROGRAM**

The U-M Urologic Oncology Training Program (UOTP) prepares individuals for research careers in the field of academic Urologic Oncology. Incoming residents with an M.D. or M.D./Ph.D. (and who have also completed five years of training with an accredited urology residency program) may be admitted to this two-year program — which is structured around a faculty mentor-supervised research project, and a required core curriculum, focused on:

- 1.) Designing, implementing, analyzing, and reporting on an approved research project**
- 2.) Obtaining formal instruction regarding fundamental research methods**
- 3.) Gaining instruction on either fundamental principles of cancer biology (translational science track) or essential elements of conducting health services research (health services track).**

Trainees who successfully complete the two-year research training program will be qualified for clinical fellowships or academic appointments.

Trainees will choose tracks and mentors prior to entering the program (see diagram at end of document).

Mentor selection is determined through discussions with the Program Director or co-Program Director prior to arrival — in order to seek the best fit for the trainee depending on their research interests.

Selecting a research path (i.e., lab science vs. health services research) and mentor *before* beginning the training program helps to facilitate research project development and accelerate integration into the training program.

NOTE: Prior to initiating any research activity, all trainees must complete a U-M course on the responsible and ethical conduct of human research, and any other relevant research credentialing (e.g., animal research and/or hazardous substances).

### ***TRANSLATIONAL SCIENCE TRACK – YEAR 1***

#### **Core Curriculum**

A core curriculum of didactic instructional courses and seminars are prescribed for each trainee to enhance knowledge in: (1) research methodology and (2) cancer biology. Trainees may omit required courses only upon the recommendation of their faculty mentor and with approval of the Program Director. During their first year, trainees will be required to take 2 courses: Cancer Biology 553 and Bioinformatics 525 (see below). Each trainee must also take one of the two fundamentals of research core option programs described below which are designed to provide graduate level courses in the basic sciences that are relevant to the trainee.

#### **Required Cancer Biology & Biostatistics Curriculum**

The UMCCC has organized an instructional series of lectures on different aspects of cancer biology encapsulated in a formal course: **Cancer Biology 553**. Dr. Michael Imperiale, Professor of Microbiology and Immunology is Director of this course and also PI of the T32 Cancer Biology

Training Grant that supports pre- and post-doctoral trainees. The Cancer Bio 553 course is offered in the fall term and is an overview of the process of carcinogenesis and the pathogenesis of metastasis from the genetic and cellular level to the tissue and organ level. This course also includes presentations on the role of varying treatments (e.g., radiation, chemotherapy and surgery) of cancer. In addition, all first year trainees on the translational science track will also be required to enroll in **Bioinformatics 525, Foundations in Bioinformatics and Systems Biology** (winter term). This course is comprised of three sections: Bioinformatics on the Web, Introduction to Statistics, and Bioinformatics & Systems Biology and provides a sound statistical and bioinformatic framework for the trainee. During the first 3 months of training in year 1, the trainee will decide on a specific research program with his or her mentor.

### **Required Fundamentals of Laboratory Research – Core Option 1**

Trainees who will focus on a molecular oncology project may elect to enroll in a 3-month [Postdoctoral Research Training Program](#), which has been established at the Medical School for many years by Dr. Stephen Weiss, the E. Gifford and Love Barrett Upjohn Professor of Medicine and Oncology. Dr. Weiss is a member of the Cancer Biology Program of the UMCCC. The Post-doctoral Program is designed to introduce physicians to new and emerging concepts in cell and molecular biology. The course is divided into two basic categories: (1) cell biology and biochemistry; and (2) molecular biology and genetics. These two sections (approximately 10 weeks) are taught by a select group of 10 faculty members from the Departments of Biochemistry, Human Genetics, Physiology, Pharmacology, Biology, Internal Medicine, as well as the Howard Hughes Medical Institute. The program is designed to allow each of the faculty members to spend one uninterrupted week with the participants during which time they are immersed in a combination of didactic and laboratory exercises. The course is designed to introduce the trainees to the methods of scientific thought, inquiry and analysis via the presentation of specific research topics. Each week begins with a review of basic concepts relevant to each of the specific topics, an outline of the areas of controversy and finally, the analysis of the relevant scientific literature that has either attempted to or succeeded in addressing these issues. In conjunction with this approach, a series of laboratory exercises have been designed to not only familiarize the participants with a variety of techniques used in cell and molecular biology, but to reinforce basic principles and to de-mystify techniques that intimidate the uninitiated. Taken together, all sessions are designed to use emerging concepts in cell and molecular biology as a means of introducing the participants to the critical importance of identifying the “right” question, selecting the “best” tools to answer the question, using the appropriate logic to interpret experimental results and finally, constructing appropriate conclusions. In the past, seminars have included discussions on the following topics: genome maintenance and expression, signal transduction, viral pathogenesis, Wnt signaling, apoptosis and matrix-metalloproteinases.

### **Required Fundamentals of Laboratory Research – Core Option 2 (Advanced)**

For individuals who do not feel that they require the 3-month course offered in Core Option 1 due to their prior research experience, an alternate instructional program is available with approval from the Program Director and mentor. Students are encouraged to take up to 3 credit hours of courses per year from a wide diversity of courses offered by any of the graduate departments. Each student’s curriculum will be uniquely tailored to meet the special research interests of the trainee as determined in discussion with the chosen PFM. Available courses include are detailed in appendix 3.

Trainee research projects will be chosen following discussions with the mentor. A short three-page NIH style proposal of the research plan will be developed by the trainee and presented to the mentor, Program Director and co-Director for approval. If approval is not obtained, revisions will be requested until the proposal is approved. The research plan will be judged with regards to scientific merit, relevance to urologic oncology and feasibility of completion within the timeframe of the UOTP. Trainees will be required to obtain approval from the Institutional Review Board for all human subjects related protocols. While the trainee will not be limited to a single project, one project will be identified as the main project that is to be completed by the end of year two.

### ***TRANSLATIONAL SCIENCE TRACK — YEAR 2***

No formal courses will be required of the trainee in year 2. If desired, additional courses maybe enrolled in with mentor and Program Director approval. The second year of training in the translational science track will be devoted entirely to laboratory research and completion of the identified research project. Preparation of completed work for presentation (e.g., abstracts for regional and national meetings) as well as peer-reviewed publication is expected. All trainees will be strongly encouraged to obtain assistance with grant preparation through the UMMS. The UMMS offers year round short seminars and courses on grant preparation. From a mentoring perspective, the 2<sup>nd</sup> year will be focused on developing an independent line of scientific focus for the trainee for their first grant application (e.g., career development award) as well as job placement.

### ***HEALTH SERVICES RESEARCH TRACK — YEAR 1***

#### **Core Curriculum**

The proposed training program in health services research consists of 2 major components: (1) course work leading to one of the following Masters degrees from the UM and (2) the completion of an independent clinical research project related to an important urologic topic. In year one, the trainee will undergo intensive course work in general epidemiology, biostatistics and public health to complete the requirements for one of the following degrees: Masters in Public Health and Masters in Clinical Research Design and Statistical Analysis (see below). The appropriate Masters level degree will be chosen with assistance from the mentor after taking into consideration the trainee's prior experience, current research interest and future career plans. During this year, the trainee will also conceive and design a clinical research project with his or her research mentor. In year two, the trainee will complete his or her Masters courses as needed as well as formally commence the clinical research project, collect the necessary data, perform the analyses and present the results at the regional or national level.

#### **Required Course Work towards Masters Level Degree**

The course work for [MPH in Epidemiology](#) will take place over a period of 12 months at the School of Public Health. This particular degree program was selected because of its content relevance to the specific aims of this grant, the one-year time commitment, and its established track record. The MPH program will require the completion of 42 credit hours of course work and involves courses in (1) clinical study design, (2) data collection, (3) biostatistics, (4) the development of surveillance systems, (5) microcomputers and 6) public health policy. Part of the core curriculum will be a course in Applied Biostatistics (4 credit hours) which provides instruction on the fundamental statistical concepts related to clinical research and public health. Topics covered include: descriptive statistics, probability, population sampling, statistical distributions, estimation and inference, hypothesis testing, and statistical analyses methodology through linear regression and analysis of variance. Another core course which will be taken

early in the program is Principles and Methods in Epidemiology, another 4 credit hour course. The concepts and methodology behind epidemiology will be taught in detail. Trainees will learn how to solve problems relating to the incidence and outcomes of human disease using specific examples. Emphasis will also be placed on study designs and epidemiologic parameters. Electives are available and can be selected from the vast offerings from the Department of Epidemiology as well as other departments in the School of Public Health. Relevant examples of electives include courses in genetic epidemiology, cost-effectiveness, nutritional and cancer epidemiology. Graduates of the MPH degree program have traditionally gone on to pursue a wide range of positions in academia, government, and industry.

The [\*Masters degree in Clinical Research Design and Statistical Analysis \(MS CRDSA\)\*](#) is an 18-month program offered by the Biostatistical Department at the School of Public Health. It was developed to provide a means for clinicians and other health related professionals to develop expertise in research design and statistical methods and requires only 4 days of in-class attendance/month. It directly addresses the lack of methodological expertise among clinicians and the study design inadequacies of the clinical research literature. This course work requires 35 credit hours including courses in (1) clinical trials and study design, (2) data collection and threats to validity, (3) epidemiology, (4) biostatistics including SAS programming, (5) legal rules and ethics, (6) cost utility and decision analysis and (7) planning/funding clinical research. This course extends into a portion of year 2. The MS CRDSA was added because of its unique content relevance to the specific aims of this grant. Examples of course work programs fulfilling the requirements for the Masters degree in Clinical Research Design and Statistical Analysis are attached as appendix 1. The vast majority of coursework is focused in the first year.

The [\*Masters of Science in Health Services Research \(MHSR\)\*](#) is an 18-month course offered by the Department of Health Management and Policy at the School of Public Health and is designed to provide intensive coursework and field study in health services research methods. This program is designed to enable students to identify and conduct health services research concerning current and future health policy issues, to provide hands-on experience on current projects that deal with both policy and management issues in today's society, to introduce students to the broad array of research designs and methods that characterize modern health services research, and to provide students with deep and broad knowledge and understanding of the US health care and public health systems. The Masters of Science in Health Services Research extends partially into year 2 and requires the completion of 60 credit hours of a core curriculum which involves courses in (1) Research Methods, (2) Epidemiology, (3) Economics, and (4) Politics and Policy. In addition, the trainees will be required to complete a thesis. The vast majority of coursework is centered in the 1<sup>st</sup> year.

In addition to the above course work, the trainee will begin to plan his/her main clinical research project during the first year with his/her main research mentor. Trainee research projects will be chosen following discussions with the mentor. A short 3 page NIH style proposal of the research plan will be developed by the trainee and presented to the mentor and Program Director and co-Director for approval. If approval is not obtained, revisions will be requested until the proposal is approved. The research plan will be judged with regards to scientific merit, relevance to urologic oncology and feasibility of completion within the timeframe of the UOTP. Trainees will be required to obtain approval from the Institutional Review Board for all human subjects related protocols. While the trainee will not be limited to a single project, one project will be identified as the main project that is to be completed by the end of year two.

## **HEALTH SERVICES RESEARCH TRACK — YEAR 2**

The second year will be devoted to completing Masters course-work, if needed, as well as executing the outlined research project and will involve data acquisition, analysis and reporting

of results. In addition to the required course work, each trainee in the program will be required to initiate, complete and report their findings in a peer-reviewed journal. Potential clinical data for such research will include primary data collection or secondary sources (existing databases in the Urology Department or from other affiliated units). Projects which require primary data collection will be limited to those which can be reasonably be completed in a year's time, e.g., surveys. The faculty's ongoing clinical studies will afford the trainee an opportunity to participate in meaningful research without primary data collection. Existing databases in the Department of Urology include but are not limited to radical prostatectomy, bladder cancer, prostate cancer detection and morbidity following treatment for urologic cancer. The University of Michigan Medical School (UMMS) offers year round short seminars and courses on grant preparation. From a mentoring perspective, the 2<sup>nd</sup> year will be focused on developing an independent line of scientific focus for the trainee for their first grant application (e.g., career development award) as well as job placement.

**Overall curricular schema.**

