CANCER BIOLOGY, PH.D.

The graduate program in cancer biology offers a course of study and research leading to the Ph.D. degree. Although a master’s degree is offered under special circumstances, students are not admitted for a master’s degree.

The Cancer Biology Graduate Program was established at the McArdle Laboratory for Cancer Research in 1940 as the first graduate program in the United States to offer a degree in basic cancer research. The program now includes more than 50 faculty trainers from multiple departments including Oncology, Medicine, Human Oncology, Cell and Regenerative Biology, Medical Microbiology and Immunology, and others. This interdepartmental structure offers students remarkably diverse training opportunities that span the entire breadth of cancer biology research from haploid or diploid genetics, viral and chemical carcinogenesis, eukaryotic cell and molecular biology, virology, molecular toxicology, and whole-animal carcinogenesis. Through the graduate curriculum, students are introduced to the body of knowledge that has been derived directly from experiments on the induction, properties, and therapy of cancer, and receive the necessary background to conduct independent research.

Curriculum requirements are designed to be flexible, providing a maximal opportunity for specialization within this multidisciplinary field. Students learn through core and elective courses; by participation in seminars, conferences, and clubs related to their specific areas of expertise; and most important, from their research advisors. Students who join the program select research advisors after conducting a minimum of three monthlong rotations in different laboratories during the first semester. After choosing an advisor, students will also create an advisory committee of five faculty members who will provide guidance throughout the process of earning the Ph.D. degree. The average time to complete the Ph.D. is 5.5 years. The program prepares students for careers in teaching and research in academia, government, and industry.

ADMISSIONS

Students seeking admission to the program must complete a bachelor’s degree in biology, biochemistry, chemistry, molecular biology, or a related area from an accredited college or university and should have a grade point average of at least 3.0 (on a 4.0 scale). The background of the student should include basic courses in these areas as well as several advanced courses in chemistry, microbiology, biochemistry, genetics, physiology, and molecular biology. Prior laboratory research experience is highly desirable.

Applicants must submit a completed application online, personal statement (reasons for graduate study), unofficial college transcripts, updated CV/resume (highlighting laboratory experience), and three letters of recommendation.

GRADUATE SCHOOL ADMISSIONS

Graduate admissions is a two-step process between academic degree programs and the Graduate School. Applicants must meet requirements of both the program(s) and the Graduate School. Once you have researched the graduate program(s) you are interested in, apply online (https://grad.wisc.edu/admissions).

FUNDING

GRADUATE SCHOOL RESOURCES

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information (https://grad.wisc.edu/funding) is available from the Graduate School. Be sure to check with your program for individual policies and processes related to funding.

PROGRAM RESOURCES

The program is committed to ensure continuing financial support for all cancer biology Ph.D. students in good standing. Financial support includes a competitive stipend and tuition remission. All graduate students are also eligible for comprehensive health insurance. Ph.D. students are supported from a variety of different sources including research assistantships and fellowships, and NIH training grants. There is no teaching requirement for cancer biology students; however, many opportunities exist on campus for those who wish to gain teaching experience.

Students are admitted into the Cancer Biology Program as a Research Assistant (RA) unless they have received a fellowship or training grant.

FINANCIAL INFORMATION

- **Stipend:** All Cancer Biology students are awarded a pretax stipend of $27,000 for the 2017–18 year (12-month appointment). You will receive your first full paycheck in early October (for part of August and full month of September). Students will receive a paycheck at the beginning of every month going forward.
- **Tuition:** Tuition is remitted. If you receive a tuition bill, you should contact the Program Coordinator immediately. Students will be responsible for any late fees.
- **Segregated Fees and Other Fees:** Each semester, students with a Research Assistant title will be responsible for paying segregated fees and other fees. These fees cover the cost of University Health Services, bus passes, use of the unions, etc. Fees may be paid online through your MyUW Student Center or at the Bursar’s Office (Student Services Tower, East Campus Mall, Room 10501). Students will be responsible for paying a $100 late fee if fee payment is not made by the deadline.
- **Research Assistants (RA)**
  - **Stipend:** RAs are awarded a pretax stipend of $27,000 for the 2017–18 year (12 month appointment) paid by the advisor.
  - **Tuition:** Remitted.
  - **Segregated Fees & Other Fees:** RAs are responsible for paying segregated and other fees each semester.
  - **Taxes:** Taxes are withheld from monthly paycheck.
- **Fellows/Trainees**
  - **Stipend:** All or the majority of stipend is paid by the fellowship/training grant (if fellowship/training grant funding rate is below the Cancer Biology stipend, it will be supplemented to match the current Cancer Biology stipend rate).
  - **Tuition:** Paid by the fellowship/training grant.
  - **Segregated Fees:** Paid by the fellowship/training grant.
  - **Taxes:** Often taxes and social security are not automatically withheld from a Trainee/Fellow's paycheck. Trainees or Fellows
are responsible for paying the necessary taxes directly to the Internal Revenue Service (http://www.irs.gov) and the Wisconsin Department of Revenue (https://www.revenue.wi.gov/Pages/home.aspx). Most students file quarterly estimated tax payments; failure to do so can result in tax penalties. The University of Wisconsin Service Center has put together a website with general information about tax filing (http://uwservice.wisc.edu/tax/filing-resources.php).

**REQUIREMENTS**

**MINIMUM GRADUATE SCHOOL REQUIREMENTS**

Review the Graduate School minimum academic progress and degree requirements (http://guide.wisc.edu/graduate/#policiesandrequirementstext), in addition to the program requirements listed below.

**MAJOR REQUIREMENTS**

**MODE OF INSTRUCTION**

<table>
<thead>
<tr>
<th>Mode to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

**Mode of Instruction Definitions**

**Evening/Weekend:** These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the meeting schedule of a specific program, contact the program.

**Online:** These programs are offered primarily online. Many available online programs can be completed almost entirely online with all online programs offering at least 50 percent or more of the program work online. Some online programs have an on-campus component that is often designed to accommodate working schedules. Take advantage of the convenience of online learning while participating in a rich, interactive learning environment. For more information about the online nature of a specific program, contact the program.

**Hybrid:** These programs have innovative curricula that combine on-campus and online formats. Most hybrid programs are completed on-campus with a partial or completely online semester. For more information about the hybrid schedule of a specific program, contact the program.

**Accelerated:** These on-campus programs are offered in an accelerated format that allows you to complete your program in a condensed time-frame. Enjoy the advantages of on-campus courses with minimal disruption to your career. For more information about the accelerated nature of a specific program, contact the program.

**CURRICULAR REQUIREMENTS**

<table>
<thead>
<tr>
<th>Minimum Credit Requirement</th>
<th>51 credits</th>
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</thead>
<tbody>
<tr>
<td>Minimum Residence Credit Requirement</td>
<td>32 credits</td>
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</tbody>
</table>

**Minimum Graduate Coursework Requirement**

Half of degree coursework (26 credits out of 51 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (https://registrar.wisc.edu/course-guide/).

**Overall Graduate GPA Requirement**

3.00 GPA required.

**Other Grade Requirement**

Students must earn a B or above in the following courses, otherwise the course must be repeated: ONCOLOGY 703 Carcinogenesis and Tumor Cell Biology, ONCOLOGY 715 Ethics in Science, ONCOLOGY 725 Readings in Cancer Biology, and ONCOLOGY 735 Current Problems in Cancer Biology.

**Assessments and Examinations**

All doctoral students must pass an oral preliminary examination. All requirements for a doctoral degree, except for the dissertation, must be completed at this time.

- Six months before the final oral defense, all doctoral students must present a semifinal dissertation proposal to their committee for approval.
- All doctoral students must pass a final oral defense of their doctoral dissertation and subsequently deposit the dissertation in the Graduate School.

**Language Requirements**

No language requirements.

**Doctoral Minor / Breadth Requirements**

The Cancer Biology Program does not require students to complete a minor; however, the option is available to those who wish to do so. Acceptance of the minor requires the approval of the Advisor and respective department in which the minor is administered.

- If you wish to complete a minor, you must inform the Program Coordinator of your minor option selection by the end of the first year. The minor must be approved by your Certification Committee and must be completed along with the major course requirements by the end of your second year. Please note that minor coursework may count towards the elective course requirements.

**REQUIRED COURSES**

The curriculum for Cancer Biology is designed to introduce you to research related to the induction, properties, and therapy of cancer and to ensure that you have the necessary background in one or more areas of related, fundamental science to enable you to do original research. Courses are drawn from the Department of Oncology as well as various related departments, including Bacteriology, Biochemistry, Biomolecular Chemistry, Chemistry, Genetics, Human Oncology, Medical Microbiology and Immunology, Pathology and Laboratory Medicine, and Pharmacology.

The Graduate School at UW-Madison requires PhD students to complete a minimum of 51 credits in order to obtain a PhD Degree. These credits are fulfilled via core curriculum courses, 990 research, and electives. Courses numbered below 300, audit, and pass/fail do not satisfy the minimum requirement. It is suggested that you take approximately 2 courses per semester with the remaining credits being 990 research. All courses must be completed by the end of your second year, before completing the Preliminary Exam.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONCOLOGY/PL PATH 640</td>
<td>General Virology-Multiplication of Viruses (recommended)</td>
<td>3</td>
</tr>
<tr>
<td>ONCOLOGY 703</td>
<td>Carcinogenesis and Tumor Cell Biology (required)</td>
<td>3</td>
</tr>
</tbody>
</table>
Beginning in your second year, you will be required to give an annual, formal presentation in the Cancer Biology Student/Postdoc Seminar Series. You will register for ONCOLOGY 901 Seminar during the semester in which you present. Your seminars will be recorded and you will receive feedback from the seminar course instructor to help improve your public speaking and presentation skills. Attendance at this seminar series is required. The schedule is posted on the McArdle website (https://mcardle.wisc.edu/news-events/cancer-biology-studentpostdoc-seminar-series).

In addition, you are expected to attend the Cancer Biology Seminar throughout your graduate career (no registration required). The Cancer Biology Seminar, which features local and outside faculty speakers, is held on Wednesdays at 10:30 a.m. in 1345 HSLC. The schedule is posted on the McArdle website (http://www.mcardle.wisc.edu/events/cancerbiology_seminar.htm).

### Elective Coursework

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOCHEM 601</td>
<td>Protein and Enzyme Structure and Function</td>
<td>2</td>
</tr>
<tr>
<td>BIOCHEM/GENETICS/MICROBIO 612</td>
<td>Prokaryotic Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOCHEM/PHMCOL-M/ZOOLOGY 630</td>
<td>Cellular Signal Transduction</td>
<td>3</td>
</tr>
<tr>
<td>MICROBIO/M M &amp; I/PATH BIO 528</td>
<td>Immunology</td>
<td>3</td>
</tr>
<tr>
<td>MICROBIO/GENETICS 607</td>
<td>Advanced Microbial Genetics</td>
<td>3</td>
</tr>
<tr>
<td>MICROBIO/M M &amp; I 740</td>
<td>Mechanisms of Microbial Pathogenesis</td>
<td>3</td>
</tr>
<tr>
<td>PATH 803</td>
<td>Pathogenesis of Major Human Diseases</td>
<td>3</td>
</tr>
<tr>
<td>BIOCHEM/GENETICS/MD GENET 620</td>
<td>Eukaryotic Molecular Biology</td>
<td>3</td>
</tr>
<tr>
<td>BIOCHEM 625</td>
<td>Mechanisms of Action of Vitamins and Minerals</td>
<td>2</td>
</tr>
<tr>
<td>CRB 640</td>
<td>Fundamentals of Stem Cell and Regenerative Biology</td>
<td>3</td>
</tr>
<tr>
<td>CRB 650</td>
<td>Molecular and Cellular Organogenesis</td>
<td>3</td>
</tr>
<tr>
<td>CRB/MEDICINE 701</td>
<td>Cell Signaling and Human Disease</td>
<td>1</td>
</tr>
<tr>
<td>CBE/BME 520</td>
<td>Stem Cell Bioengineering</td>
<td>3</td>
</tr>
<tr>
<td>CBE/BME 783</td>
<td>Design of Biological Molecules</td>
<td>3</td>
</tr>
<tr>
<td>PATH 750</td>
<td>Cellular and Molecular Biology/Pathology</td>
<td>2-3</td>
</tr>
<tr>
<td>M M &amp; I/PATH-BIO 750</td>
<td>Host-Parasite Relationships in Vertebrate Viral Disease</td>
<td>3</td>
</tr>
</tbody>
</table>

### POLICIES

#### GRADUATE SCHOOL POLICIES

The Graduate School’s Academic Policies and Procedures (https://grad.wisc.edu/acadpolicy) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

#### MAJOR-SPECIFIC POLICIES

**GRADUATE PROGRAM HANDBOOK**

The Graduate Program Handbook (https://cancerbiology.wisc.edu/policyandprogress) is the repository for all of the program’s policies and requirements.

#### PRIOR COURSEWORK

**Graduate Work from Other Institutions**

With program approval, students are allowed to count no more than 9 credits of graduate coursework from other institutions. Coursework earned five or more years prior to admission to a master’s degree or doctoral degree is not allowed to satisfy requirements.

**UW–Madison Undergraduate**

With program approval, students are allowed to count no more than 7 credits numbered 300 or above from a UW–Madison undergraduate degree.

**UW–Madison University Special**

With program approval, students are allowed to count no more than 15 credits of coursework numbered 300 or above taken as a UW–Madison Special student. Coursework earned ten or more years prior to admission to a doctoral degree is not allowed to satisfy requirements.

#### PROBATION

A semester GPA below 3.0 or an incomplete grade (I) will result in the student being placed on academic probation. If a semester GPA of 3.0 is not attained or the incomplete grade is not cleared during the subsequent semester of full-time enrollment, the student may be dismissed from the program or allowed to continue for 1 additional semester based on advisor appeal to the Graduate School.

#### ADVISOR / COMMITTEE

All students are required to have an advisor. Students must create a certification committee (advisor plus four additional faculty members) by the end of their first year. After passing their preliminary examination, students are required to conduct a progress report meeting with their certification committee each year. Failure to do so may result in a hold being placed on the student’s registration.

#### CREDITS PER TERM ALLOWED

15 credits
TIME CONSTRAINTS
All doctoral students must pass their preliminary examination by the end of their second year (August 31). Under special circumstances, a one-semester extension may be granted when justified in writing by the student and advisor.

A candidate for a doctoral degree who fails to take the final oral examination and deposit the dissertation within five years after passing the preliminary examination may be required to take another preliminary examination and to be admitted to candidacy a second time.

Doctoral degree students who have been absent for ten or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.

OTHER
- Bachelor’s degree from an accredited U.S. institution, or comparable degree from an international institution, with a major in biology, biochemistry, chemistry, molecular biology, or related area
- Undergraduate GPA of at least 3.0 on the equivalent of the last 60 credit hours OR a master’s degree with a minimum cumulative GPA of 3.0
- Basic course background in chemistry, microbiology, biochemistry, genetics, physiology, and molecular biology recommended
- Prior laboratory research

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES
Take advantage of the Graduate School’s professional development resources (https://grad.wisc.edu/pd) to build skills, thrive academically, and launch your career.

LEARNING OUTCOMES
1. Articulates research problems, potentials, and limits with respect to theory, knowledge, or practice within the field of study.

2. Formulates ideas, concepts, designs, and/or techniques beyond the current boundaries of knowledge within the field of study.

3. Creates research, scholarship, or performance that makes a substantive contribution.

4. Demonstrates breadth within their learning experiences.

5. Advances contributions of the field of study to society.

6. Communicates complex ideas in a clear and understandable manner.

7. Fosters ethical and professional conduct.

PEOPLE

Faculty: Alarid (co-director), Loeb (co-director), Ahlquist, Alexander, Arendt, Asimakopoulos, Audhya, Beebe, Bradfield, Bresnick, Burkard,