The graduate program in Cellular and Molecular Biology (CMB) has been a pioneer in graduate education fields of cell biology and molecular biology at the University of Wisconsin–Madison since 1961. The program is research-oriented and interdisciplinary leading to the PhD degree. UW–Madison has one of the largest and most prestigious biology facilities in the world, well-noted for its cooperation and collaboration across department boundaries. Cellular and Molecular Biology (CMB) is an important part of that interdepartmental strength, providing students with the opportunity to work with more than 200 faculty members in 40 departments.

Research and coursework experience allow students to obtain a solid foundation in cell biology and molecular biology that is tailored to their professional objectives. Research focus groups are composed of students and faculty studying a common research area. The focus groups are: cancer biology, cell adhesion and cytoskeleton, cellular and molecular metabolism, developmental biology and regenerative medicine, immunology, membrane biology and protein trafficking, molecular and genome biology of microbes, physiology, plant biology, RNA biology, systems biology, transcriptional mechanisms, and virology.

ADMISSIONS

Please consult the table below for key information about this degree program’s admissions requirements. The program may have more detailed admissions requirements, which can be found below the table or on the program’s website.

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

FUNDING

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 restrictions related to funding.

PROGRAM RESOURCES

All students accepted into the PhD degree program receive financial support from Graduate School fellowships, interdepartmental training grants, and/or research assistantships. The program strives to maintain a nationally competitive stipend. Students are guaranteed a stipend each year in addition to tuition remission. The current stipend rate can be found on the Financial (https://cmb.wisc.edu/financial-health-insurance/) page of the CMB handbook. Graduate students are also eligible for comprehensive health insurance; individual or family coverage is available at a minimal cost. Students are strongly encouraged to apply for a National Science Foundation Graduate Fellowship at the time of application to graduate school and/or during the first or second year on campus.

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.

CELLULAR AND MOLECULAR BIOLOGY, PHD

The graduate program in Cellular and Molecular Biology (CMB) has been a pioneer in graduate education fields of cell biology and molecular biology at the University of Wisconsin–Madison since 1961. The program is research-oriented and interdisciplinary leading to the PhD degree. UW–Madison has one of the largest and most prestigious biology facilities in the world, well-noted for its cooperation and collaboration across department boundaries. Cellular and Molecular Biology (CMB) is an important part of that interdepartmental strength, providing students with the opportunity to work with more than 200 faculty members in 40 departments.

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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.

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.
Mode of Instruction Definitions
Accelerated: Accelerated programs are offered at a fast pace that condenses the time to completion. Students typically take enough credits aimed at completing the program in a year or two.

Evening/Weekend: Courses meet on the UW–Madison campus only in evenings and/or on weekends to accommodate typical business schedules. Students have the advantages of face-to-face courses with the flexibility to keep work and other life commitments.

Face-to-Face: Courses typically meet during weekdays on the UW-Madison Campus.

Hybrid: These programs combine face-to-face and online learning formats. Contact the program for more specific information.

Online: These programs are offered 100% online. Some programs may require an on-campus orientation or residency experience, but the courses will be facilitated in an online format.

CURRICULAR REQUIREMENTS

Required Courses
Eleven credits of coursework, not including 990 research credits, are required to complete the CMB course requirements. One course must be taken from the "molecular biology core" list of courses and one course must be taken from the "cell biology core" list of courses. The remaining credits can come from either the "molecular biology / cell biology core" or "elective" list of classes to bring the total number of credits to ten. In addition, one credit must be fulfilled through the required ethics course.

Code Title Credits

Molecular Biology Core 3
- BIOCHEM/GENETICS/MD GENET 620 Eukaryotic Molecular Biology
- BIOCHEM/GENETICS/MICROBIO 612 Prokaryotic Molecular Biology
- ONCOLOGY/M M & I/PL PATH 640 General Virology-Multiplication of Viruses

Cell Biology Core 2-3
- BOTANY 860 Plant Cell Biology
- ZOOLOGY/NEURODPT/NTP 765 Developmental Neuroscience
- PATH 750 Cellular and Molecular Biology/Pathology
- ONCOLOGY 703 Carcinogenesis and Tumor Cell Biology
- GENETICS/CRB 710 Developmental Genetics
- GENETICS/BOTANY/M M & I/PL PATH 655 Biology and Genetics of Fungi

Ethics Core 1
- BIOCHEM 729 Advanced Topics
- ONCOLOGY 715 Ethics in Science
- SURG SCI 812 Research Ethics and Career Development

Elective Courses 4-5
- B M E 510 Introduction to Tissue Engineering
- B M E 520 Stem Cell Bioengineering
- B M E/CBE 783 Design of Biological Molecules
- B M E/CRB 670 Biology of Heart Disease and Regeneration
- B M E 545 Engineering Extracellular Matrices
- B M E 556 Systems Biology: Mammalian Signaling Networks
- B M I/COMP SCI 576 Introduction to Bioinformatics
- B M I/STAT 541 Introduction to Biostatistics
- B M I/STAT 877 Statistical Methods for Molecular Biology
- B M I 826 Special Topics in Biostatistics and Biomedical Informatics

All Cellular and Molecular Biology course requirements must be completed by the end of the student’s second year, before completing the preliminary exam and obtaining dissertator status.

Assessments and Examinations
Doctoral students are required to take a comprehensive preliminary/oral examination at the end of their second year. In order to complete their preliminary exam, students must have cleared their record of all Incomplete and Progress grades (other than research and thesis). Deposit of the doctoral dissertation in the Graduate School is required.

Language Requirements
No language requirements.

Graduate School Breadth Requirement
Doctoral students in the CMB program are not required to complete a doctoral minor or graduate/professional certificate, but may choose to.
## COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOCHEM/B M / BMOLCHEM/ MATH 609</td>
<td>Mathematical Methods for Systems Biology</td>
</tr>
<tr>
<td>BOTANY/ BIOCHEM/ GENETICS 840</td>
<td>Regulatory Mechanisms in Plant Development</td>
</tr>
<tr>
<td>BIOCHEM/ BOTANY 621</td>
<td>Plant Biochemistry</td>
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<tr>
<td>BIOCHEM/ NUTR SCI 619</td>
<td>Advanced Nutrition: Intermediary Metabolism of Macronutrients</td>
</tr>
<tr>
<td>BIOCHEM 570</td>
<td>Computational Modeling of Biological Systems</td>
</tr>
<tr>
<td>BIOCHEM 601</td>
<td>Protein and Enzyme Structure and Function</td>
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<tr>
<td>BMOLCHEM 675</td>
<td>Advanced or Special Topics in Biomolecular Chemistry</td>
</tr>
<tr>
<td>BOTANY/ ENTOM/ PL PATH 505</td>
<td>Plant-Microbe Interactions: Molecular and Ecological Aspects</td>
</tr>
<tr>
<td>BOTANY/ PL PATH 563</td>
<td>Phylogenetic Analysis of Molecular Data</td>
</tr>
<tr>
<td>CHEM 665</td>
<td>Biophysical Chemistry</td>
</tr>
<tr>
<td>CRB/ MEDICINE 701</td>
<td>Cell Signaling and Human Disease</td>
</tr>
<tr>
<td>CRB 640</td>
<td>Fundamentals of Stem Cell and Regenerative Biology</td>
</tr>
<tr>
<td>CRB 650</td>
<td>Molecular and Cellular Organogenesis</td>
</tr>
<tr>
<td>F&amp;W ECOL/ HORT/STAT 571</td>
<td>Statistical Methods for Bioscience I</td>
</tr>
<tr>
<td>GENETICS/ HORT 550</td>
<td>Molecular Approaches for Potential Crop Improvement</td>
</tr>
<tr>
<td>GENETICS/ CHEM 626</td>
<td>Genomic Science</td>
</tr>
<tr>
<td>GENETICS/ BIOCHEM 631</td>
<td>Plant Genetics and Development</td>
</tr>
<tr>
<td>GENETICS 633</td>
<td>Population Genetics</td>
</tr>
<tr>
<td>GENETICS/ MD GENET 677</td>
<td>Advanced Topics in Genetics</td>
</tr>
<tr>
<td>GENETICS 885</td>
<td>Advanced Genomic and Proteomic Analysis</td>
</tr>
<tr>
<td>M M &amp; I/PATH- BIO 528</td>
<td>Immunology</td>
</tr>
<tr>
<td>M M &amp; I 677</td>
<td>Advanced Topics in Medical Microbiology</td>
</tr>
<tr>
<td>M M &amp; I 740</td>
<td>Mechanisms of Microbial Pathogenesis</td>
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<tr>
<td>MICROBIO 657</td>
<td>Bioinformatics for Microbiologists</td>
</tr>
<tr>
<td>NEURODPT/ NTP/ PSYCH 611</td>
<td>Systems Neuroscience</td>
</tr>
<tr>
<td>NTP 670</td>
<td>Stem Cells and the Central Nervous System</td>
</tr>
<tr>
<td>M M &amp; I/PATH- BIO 750</td>
<td>Host-Parasite Relationships in Vertebrate Viral Disease</td>
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<tr>
<td>MED PHYS 671</td>
<td>Selected Topics in Medical Physics</td>
</tr>
<tr>
<td>MICROBIO/ BMOLCHEM 668</td>
<td>Microbiology at Atomic Resolution</td>
</tr>
<tr>
<td>MICROBIO 607</td>
<td>Advanced Microbial Genetics</td>
</tr>
<tr>
<td>NEURODPT/ NTP 610</td>
<td>Cellular and Molecular Neuroscience</td>
</tr>
<tr>
<td>ONCOLOGY 675</td>
<td>Advanced or Special Topics in Cancer Research</td>
</tr>
<tr>
<td>ONCOLOGY 778</td>
<td>Bioinformatics for Biologists</td>
</tr>
<tr>
<td>OPHTHALM 750</td>
<td>Ocular Diseases of the Mammalian Vision System</td>
</tr>
<tr>
<td>PATH 751</td>
<td>Biology of Aging</td>
</tr>
<tr>
<td>PATH 803</td>
<td>Pathogenesis of Major Human Diseases</td>
</tr>
<tr>
<td>PATH 807</td>
<td>Immunopathology: The Immune System in Health and Disease</td>
</tr>
<tr>
<td>PATH-BIO 675</td>
<td>Special Topics</td>
</tr>
<tr>
<td>ZOOLOGY 604</td>
<td>Computer-based Gene and Disease/Disorder Research Lab</td>
</tr>
</tbody>
</table>

## RESEARCH CREDITS

A minimum of 51 credits taken in graduate level courses are required: the 11 above, and the remaining credits can be 990 research credits.

**Total Credits** 51

1 EXCEPTION: MD/PhD students are only required to take 3 credits from the Core Curriculum or the Elective Courses list.

2 EXCEPTION: MD/PhD students are not required to take an ethics course because they received this training in their MD courses.

## 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

### PRIOR COURSEWORK

**Graduate Credits Earned at Other Institutions**

On a case-by-case basis, refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

**Undergraduate Credits Earned at Other Institutions or UW-Madison**

On a case-by-case basis, refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

**Credits Earned as a Professional Student at UW-Madison (Law, Medicine, Pharmacy, and Veterinary careers)**

On a case-by-case basis, refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.
Credits Earned as a University Special student at UW-Madison

On a case-by-case basis, refer to the Graduate School: Transfer Credits for Prior Coursework (https://policy.wisc.edu/library/UW-1216/) policy.

**PROBATION**

Refer to the Graduate School: Probation (https://policy.wisc.edu/library/UW-1217/) policy.

**ADVISOR / COMMITTEE**

The thesis advisor will assist the graduate student throughout the duration of their PhD studies. Upon choosing a thesis advisor, the student should formulate goals and expectations when starting in a permanent lab home. The student and thesis advisor should work together to ensure that mutual goals and expectations are met. The thesis advisor will monitor and guide the student’s progress toward the PhD degree, provide the student with advice about how and when to meet the degree requirements of the program, and help the student decide on appropriate coursework during PhD studies.

After joining a thesis lab, students are required to form a thesis committee. The purpose of the thesis committee is to: guide the student through the process of earning the PhD degree and meeting all Cellular and Molecular Biology program requirements; assist the student in developing as an independent scientist in the student’s area of research; provide the student with an array of ideas and opportunities regarding the direction of the research and thesis project; and evaluate the student’s research proposal, attend curriculum certification, preliminary exam, annual progress report, and thesis defense.

The thesis committee consists of five faculty members, including the thesis advisor. All committee members must be readers when the student defends their dissertation. Three committee members, including the thesis advisor, must be faculty trainers in the Cellular and Molecular Biology program. Two committee members must be outside the student’s direct area of expertise.

**CREDITS PER TERM ALLOWED**

15 credits

**TIME LIMITS**

Refer to the Graduate School: Time Limits (https://policy.wisc.edu/library/UW-1221/) policy.

**GRIEVANCES AND APPEALS**

These resources may be helpful in addressing your concerns:

- Bias or Hate Reporting (https://doxo.students.wisc.edu/bias-or-hate-reporting/)
- Graduate Assistantship Policies and Procedures (https://hr.wisc.edu/policies/gapp/#grievance-procedure)
- Hostile and Intimidating Behavior Policies and Procedures (https://hr.wisc.edu/hib/)
- Office of the Provost for Faculty and Staff Affairs (https://facstaff.provost.wisc.edu/)
- Employee Assistance (http://www.eao.wisc.edu/) (for personal counseling and workplace consultation around communication and conflict involving graduate assistants and other employees, post-doctoral students, faculty and staff)
- Employee Disability Resource Office (https://employeedisabilities.wisc.edu/) (for qualified employees or applicants with disabilities to have equal employment opportunities)
- Graduate School (https://grad.wisc.edu/) (for informal advice at any level of review and for official appeals of program/departmental or school/college grievance decisions)
- Office of Compliance (https://compliance.wisc.edu/) (for class harassment and discrimination, including sexual harassment and sexual violence)
- Office Student Assistance and Support (OSAS) (https://osas.wisc.edu/) (for all students to seek grievance assistance and support)
- Office of Student Conduct and Community Standards (https://conduct.students.wisc.edu/) (for conflicts involving students)
- Ombuds Office for Faculty and Staff (http://www.ombuds.wisc.edu/) (for employed graduate students and post-docs, as well as faculty and staff)
- Title IX (https://compliance.wisc.edu/titleix/) (for concerns about discrimination)

**Overview**

If a student feels unfairly treated or aggrieved by faculty, staff, or another student, the University offers several avenues to resolve the grievance. Students’ concerns about unfair treatment are best handled directly with the person responsible for the objectionable action. If the student is uncomfortable making direct contact with the individual(s) involved, they should contact the advisor or the person in charge of the unit where the action occurred (CMB Program Administration or Chair, Lab Department Administration or Chair, Lab Manager, etc.). Many departments and schools/colleges have established specific procedures for handling such situations; check their web pages for more information. If such procedures exist at the local level, these should be investigated first. For more information, see the Graduate School Academic Policies and Procedures. (http://grad.wisc.edu/acadpolicy/#grievancesandappeals)

**Procedure**

Procedures for proper accounting of student grievances within the CMB Program:

- The student is encouraged to speak first with the person toward whom the grievance is directed to see if a situation can be resolved interpersonally at this level.
- Should satisfactory resolution not be achieved, the student should contact the CMB Office and the CMB Program Chair to discuss the grievance. The program will facilitate problem resolution through informal channels and facilitate any complaints or issues of students.
- The first attempt is to help the student informally address the grievance prior to any formal complaint. Students are also encouraged to talk with their faculty advisor or thesis committee members if appropriate.
- If the issue is not resolved to the student’s satisfaction, the student can submit a formal grievance in writing to the CMB Office and CMB Program Chair. The written formal grievance must be submitted within 60 days of the alleged unfair treatment.
- On receipt of a written complaint, a faculty committee will be convened within 10 working days by the CMB Program to manage the grievance. The program faculty committee will obtain a written response from the person toward whom the complaint is directed. This response will be shared with the person filing the grievance.
- Within 10 working days of being convened, the faculty committee will make a decision regarding the grievance. The CMB Program
will report on the committee’s decision and any action taken by the
committee in writing to both the student and the party toward whom
the complaint was directed.

- At this point, if either party (the student or the person toward whom
the grievance is directed) is unsatisfied with the decision of the faculty
committee, the party may file a written appeal within 10 working days
of the committee’s decision. The appeal will go to the tenure home
School/College of the grieving student’s primary advisor.

The Graduate School has procedures for students wishing to further
appeal a grievance decision made at the school/college level. These
policies are described in the Graduate School’s Academic Policies and
Procedures. (https://grad.wisc.edu/documents/grievances-and-appeals/)

OTHER

Cellular and Molecular Biology students all earn a stipend that is set by
the program each year, and tuition is covered. First year rotating students
are funded through the Cellular and Molecular Biology program during the
first semester. After the first semester, students are typically funded by
their thesis advisor. In some cases, students earn individual fellowships or
training grant slots and are funded through these mechanisms. Contact
the Cellular and Molecular Biology program for specific questions about
stipend level, etc.

PROFESSIONAL DEVELOPMENT

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.

PROGRAM RESOURCES

The CMB program offers and encourages participation in many
professional development opportunities. The student-led Professional
Development Committee plans events such as visiting speakers, panelists,
and an annual mock interview event. The program shares information
about alumni and their current employment with CMB students and
encourages collaboration between the two groups. At the annual student
retreat, students hear a panel featuring CMB alumni working in academic
and non-academic positions. Program requirements such as an annual oral
presentation and an annual thesis committee meeting foster professional
development skills. Students also have opportunities to participate in
program governance and leadership roles in other program activities such
as advising and orientation, recruiting, admissions, the Diversity, Equity &
Inclusion Committee, and the Coordinating Committee. A weekly email
newsletter publicizes other relevant upcoming professional development
opportunities. More information can be found on the CMB Professional
Development page (https://cmb.wisc.edu/professional-development/).

LEARNING OUTCOMES

LEARNING OUTCOMES

1. Gain a broad understanding of the cellular and molecular principles
that underlie biological processes.
2. Develop proficiency in a chosen area of cellular and molecular biology.
3. Learn to think critically and problem solve to address research
challenges using a broad range of theories, research methods, and
approaches to scientific inquiry.
4. Create research and scholarship that makes a substantive contribution
to the field of cellular and molecular biology.
5. Experience collaboration with scientists within the lab, the
department, the program, the university, and beyond.
6. Clearly and effectively communicate scientific ideas and research to
both scientists and non-scientists in written and oral forms.
7. Exhibit and foster ethical and professional conduct.
8. Gain exposure to potential career paths and develop leadership and
professional skills that will prepare them for a successful and rewarding
career.
9. Develop and apply skills to foster a climate of inclusion for diverse
members of the scientific community.

PEOPLE

Faculty Chairs: David Wassarman (Program Chair), Daniela Drummond-
Barbosa (Admissions Chair), Caroline Alexander (Awards Chair), Beth
Weaver (Curriculum Chair), Colleen McDowell (Diversity Chair)

Focus Group Chairs: Caroline Alexander (Cancer Biology), Wilmara
Salgado-Pabon (Cell Adhesion and Cytoskeleton), Dudley Lamming
<Cellular and Molecular Metabolism>, Junsu Kang (Developmental
Biology and Regenerative Medicine), Lisa Arendt (Immunology),
Sebastian Bednarek (Membrane Biology and Protein Trafficking), Robert
Landick (Molecular and Genome Biology of Microbes), Raunak Sinha
(Physiology), Hiroshi Maeda (Plant Biology), David Brow (RNA Biology),
Megan McClean (Systems Biology), Melissa Harrison (Transcriptional
Mechanisms), Paul Ahlquist (Virology).

For a list of all participating faculty, see the program website (http://
www.cmb.wisc.edu).