

The Biology Majors Guidebook

2024-25

**Department of Biology
Oberlin College**

Checklist of Biology Major Requirements

A. Five core courses:

- _____ BIOL 100 (includes lab)
- _____ BIOL 210 and 211 (students who have already taken BIOL 200 do not need to take 210/211)
- _____ BIOL 223 and 224 (students who have already taken BIOL 213 do not need to take 223/224)

B. Two post-core Biology Department courses:

Two 200-, 300- or 400-level full courses (exclusive of the 200-level core courses listed above) offered by the Oberlin College Biology Department; at least one must have an associated lab component.

- _____ BIOL _____ (with lab)
- _____ BIOL _____

C. Two additional post-core life sciences courses:

The equivalent of two full courses from among any of the following courses. However, no more than two courses from outside the Oberlin Biology Department may be counted.

- _____ a) 200-, 300-, or 400-level BIOL courses _____
- _____ b) 200- or 300-level NSCI courses _____
- _____ c) ENVS 316 (Ecosystems Ecology) or ENVS 340 (Systems Modeling: Systems Thinking)
- _____ d) CHEM 374 (Biochemistry)
- _____ e) GEOS 320 (Paleontology)
- _____ f) BIOL 501 (the equivalent of one full course may be applied to the major)
- _____ g) post-introductory transfer credits (the equivalent of 2 full courses may be applied, with consent of the chair of the department; *it is recommended that you obtain pre-approval from the chair—please see important guidance on page 20*)

NOTE: Coursework from Categories B and C must collectively provide at least 2 lab experiences.

D. At least three (likely four*) courses in affiliated sciences:

- _____ CHEM 101* and CHEM 102 (or AP/IB equivalent; or CHEM 103)
- ***NOTE:** Most students will need to take CHEM 101 as a prerequisite to CHEM 102, although it is possible to enroll directly in CHEM 102 if you pass a placement test (contact the Chemistry & Biochemistry Department for details). Students who test directly into CHEM 102 are not required to complete CHEM 101 for the Biology major.
- _____ CHEM 205
- _____ One course from the following: MATH 132, 133, or 134; STAT 113 or 114; CHEM 254; PHYS 103 or 110; PSYC 200; CSCI 140 or 150; any 200 or 300 level MATH, STAT, or CSCI class

Other important considerations:

1. At least 3.5 full biology courses from categories A, B, and C, including two full courses (or the equivalent) of post-core coursework, must be taken at Oberlin.
2. Post-core coursework taken outside the Oberlin Biology Department and applied to the major may not exceed the equivalent of 2 full courses, and must have approval from the chair. See page 20 for details.
3. Private Readings, FYSP courses, BIOL 103, BIOL 135, and courses with course numbers below 100 **do not** count toward the major.
4. Students may not receive both academic credit and financial compensation for the same research work.
5. A minimum grade of C- (or CR or P) must be earned for any eligible course to count toward the major.

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The Biology Major

The biology major at Oberlin has three learning goals:

- 1) Graduates will have knowledge of key biological concepts and underlying fundamentals and should be able to apply these across all levels of organization.
- 2) Graduates will have critical thinking and functional skills needed to carry out the scientific process from inception through communication of results.
- 3) Graduates will have an understanding of the ways in which biology interrelates with other sciences, disciplines, and society.

Many biology majors proceed to study and work in the life sciences, including fundamental research and applied fields such as medicine and allied health careers, conservation biology, science writing, veterinary medicine, and teaching. By a proper selection of biology and other science courses in consultation with a departmental advisor, a student majoring in biology can prepare for graduate study in a wide range of areas such as animal behavior, biochemistry, biophysics, botany, cell biology, ecology, conservation biology, developmental biology, environmental sciences, evolutionary biology, forestry, genetics, genetic counseling, genomics, immunology, marine biology, molecular biology, morphology, microbiology, mycology, parasitology, physiology, plant biology, public health, systematics, systems biology, translational medicine, virology, and wildlife biology.

Requirements for the Major

Students declaring the major in Biology must comply with the course requirements in effect in the most recent edition of the College Catalog (<https://catalog.oberlin.edu/>) at the time the student declares the major. A checklist of the courses required for the Biology major are also located inside the front cover of this guidebook. With planning, the eleven courses needed to fulfill the major may be easily completed in three years. This allows flexibility for students in their paths through the major, as described below.

Many students experience a more successful college transition by beginning with only a single lab science course in the first semester. If you are eager to enroll in introductory biology and have a strong science background, you may choose to register for both BIOL 100 and CHEM 101 in the first semester. Both classes have a lab, however, so if you have any doubts about taking both courses in your first semester, be sure to consult with your advisor. Some students choose to take CHEM 101 and a mathematics or statistics course in the first semester, delaying BIOL 100 to the second semester. Alternatively, some students elect to take BIOL 100 as their only lab course in the fall semester.

Other courses required of all Biology majors include BIOL 210/211 (Genetics, Evolution, and Ecology) and BIOL 223/224 (Molecular Biology, Cell Biology, and Biochemistry), which include required labs. In each case, the lecture portion of the course (BIOL 210 or 223) counts for a full course, while the associated lab (BIOL 211 or 224) counts for a half course. Beyond these courses and the required Chemistry courses, students may choose from a number of courses in Biology and other departments to complete the major. Examples of various pathways through the major and associated information are located on pages 15-18 of this guidebook. Your academic advisor and/or Biology faculty (if you are not a declared major) are also excellent resources to help you plan your path through the major.

Advanced Placement

Students earning a score of 4 or 5 on the Advanced Placement Biology exam (AP Bio) or a score of 6 or 7 on the International Baccalaureate Biology Higher Level exam will receive 1 full course of natural science credit, as BIOL 604, applied toward graduation requirements, but not toward the Biology major. AP or IB credit does not exempt Biology majors from taking BIOL 100: Organismal Biology.

Faculty Advisors

Biology majors are required to have an advisor from among the continuing Biology faculty. However, you may opt for a biology advisor prior to declaring a major, and you may seek advice from professors who are not your official advisor. All professors maintain regular office hours and can be contacted by email. The department chair maintains regular office hours (posted on the departmental website) and is available to discuss the major or other needs. Students interested in pre-health or veterinary career paths should contact the Premedical Program Director; for more information, visit <https://www.oberlin.edu/arts-and-sciences/departments/pre-medicine-and-health-careers>

Courses for the Major

The complete list of courses accepted for satisfaction of the major in biology is available in the current Oberlin College Course Catalog (<https://catalog.oberlin.edu/>). Introduction to Global Health (BIOL 135), Environmental Biology (BIOL 103), first-year seminars, and other courses numbered below 100 *do not* count toward the major.

The five required core courses, Organismal Biology (BIOL 100), Genetics Evolution and Ecology (BIOL 210 + 211), and Molecular Biology, Cell Biology, and Biochemistry (BIOL 223 + 224) are offered every semester.

200-level BIOL courses require BIOL 100 as a prerequisite. 300- and 400-level BIOL classes require either BIOL 210/211 or BIOL 223/224 as a prerequisite, although a handful of 300-level courses in the areas of ecology and evolution also allow BIOL 103 as a prerequisite (check the Course Catalog for details).

List of upper-level Biology courses offered by current faculty*

BIOL 301 – Developmental Biology
 BIOL 302 – Developmental Biology Lab
 BIOL 307 – Microbiology
 BIOL 308 – Disease Ecology (includes lab) (*not offered in 2024-25*)
 BIOL 309 – Ornithology (includes lab)
 BIOL 312 – Physiology (includes lab)
 BIOL 321 – Plant Biology (includes lab) (*not offered in 2024-25*)
 BIOL 322 – Genetics of Populations (includes lab)
 BIOL 323 + 324 – Plant Systematics + Lab
 BIOL 330 – Genetic Analysis (*may not be offered in 2024-25*)
 BIOL 336 – Genomics (includes lab)
 BIOL 338 – Immunity and Pathogenesis
 BIOL 340 – Eukaryotic Cell Culture Laboratory (*not offered in 2024-25*)
 BIOL 342 – Chemical Ecology (includes lab)
 BIOL 343 – Plant Ecology (includes lab)
 BIOL 344 – Wildlife Conservation (includes lab)
 BIOL 345 – Invertebrate Biology (includes lab)
 BIOL 346 – Advanced Molecular Biology (includes lab)
 BIOL 403 – Seminar: The Cell and Molecular Biology of Pathogen-Host Interactions
 BIOL 407 – Seminar: Origin(s) of Life (*not offered in 2024-25*)
 BIOL 408 – Seminar: Experimental Evolution (*not offered in 2024-25*)
 BIOL 413 – Seminar: Molecular Mechanisms of Social Identity
 BIOL 417 – Seminar: Why Humans Aren't Immortal: Molecular Mechanisms of Aging
 BIOL 423 – Seminar: Biogeography (*not offered in 2024-25*)

*Please note that some of these courses are not offered in 2024-25, and some of these courses may not be offered every year, due to variation in teaching schedules, faculty leaves, and/or faculty turnover. It is always best to check the current version of the Oberlin course catalog and/or with Biology faculty to determine whether a specific course will be offered during a specific academic year.

Transfer Credit

A limited amount of transfer credit may be applied to the major. Specifically, the equivalent of 2 full courses of upper-level credit (i.e., beyond the core sequence of BIOL 100, BIOL 210/211, and BIOL 223/224) may be applied, with consent of the chair of the department for each course to be transferred. It is highly recommended that you seek pre-approval for transfer credit from the current chair prior to enrolling in the courses you wish to transfer for credit. Further guidelines for granting transfer credit are available on page 20. In unusual circumstances, it might be possible to transfer credit for one of the three core courses, but students should consult with the chair for further guidance.

Private Readings

Private Readings (BIOL 995) are arranged with individual faculty members. Many private-reading topics are similar to winter-term topics listed under the appropriate professors' names on pages 6 and 9-10 of this guidebook. Private readings are intended to supplement completed coursework, and should NOT overlap with or replace existing courses except under special circumstances. According to College policy, a student should have completed the basic courses offered by the department in which the work is to be done (in Biology, this means that a student should have completed BIOL 100, and either 210/211 or 223/224). Approval for Private Readings requires signatures of the faculty sponsor, your academic advisor, and the department chair. Private Reading credits do not count toward the major, but they may count toward graduation. See the current Course Catalog for more details regarding Private Reading.

Non-Majors Biology Courses

The introductory course, BIOL 100 (Organismal Biology), has no prerequisite and is open to non-majors. In addition, several first-year seminars are taught with a biological emphasis or scientific theme. Introduction to Global Health (BIOL 135), Biology of Infectious Diseases and Their Global Impact (BIOL 047), and Environmental Biology (BIOL 103) are available to non-majors.

Other Opportunities

Winter-Term Projects. Continuing biology faculty members sponsor winter-term projects representing various areas in biology. Group projects are announced well in advance of the coming Winter Term. Students intending to conduct individual winter-term projects are urged to confer as soon as possible with the appropriate faculty sponsor to ascertain the professor's availability. (*Faculty member unavailable during Winter Term 2025)

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|------------------|---|
| Taylor Allen: | Exploration of research on learning and equity in education; readings in Old Icelandic and Old English; qualitative research projects on resilience and wellbeing. |
| Jane Bennett: | Intensive science review, pre-medical, dental, veterinary and health career internships. Research internships. |
| Monica Blatnik: | Projects involving post-transcriptional gene regulation during vertebrate development. |
| Darla French: | Projects and readings in science education and biology education, the philosophy and history of science, the intersections of science or nature and religion, and the nature of science. |
| Jason Gleditsch: | Data driven research on the patterns of diversity, community assembly, coexistence, and ecosystem services using publicly available data focusing on terrestrial vertebrates (mostly bird, reptile, and amphibian). Also, bird ecology and interactions between birds and plants. |
| Aaron Goldman: | Projects involving protein and proteome evolution with a special focus on early cellular life and the emergence of ancient metabolic systems. |
| Evan Hilpman: | Projects and readings in ecology and evolution, plant-insect interactions, community ecology, chemical ecology, and seed mucilage. |
| Marta Laskowski: | Projects and readings in plant growth and development. |
| Gaybe Moore: | Reading and laboratory-based projects related to infectious disease, immunity, and public health. |
| Mike Moore: | Projects involving plant evolution/systematics, including biological collections, molecular systematics, phylogeography, etc. |

- Maureen Peters: Laboratory studies of biological rhythms, nutrition, and aging in the nematode *Caenorhabditis elegans* using a variety of genetic, cellular and physiological techniques. Readings in clinical and molecular genetics, health careers, molecular biology, cancer biology, and the history of medicine, genetics, and eugenics.
- Alex Pike: Laboratory projects using genetics and/or biochemistry methods to examine the molecular mechanisms of DNA replication and genome integrity.
- Andrew Pike: Projects and readings related to disease ecology and invertebrate biology with a focus on mosquito-borne and tick-borne diseases.
- Angie Roles: Projects and readings in molecular ecology, population and quantitative genetics, evolutionary biology and conservation/invasion biology. Readings or projects in diversity, equity, and inclusion in science education and importance of mental well-being in learning in STEM.
- Laura Romberg: Projects involving the biochemistry of proteins involved in bacterial cell division; independent projects on food science.

Summer Courses. Up to two courses offered during the summer at various institutions and biological field stations may be accepted toward general or major credit, but only by approval (pre-approval recommended) of the Department Chair (currently Prof. Mike Moore). The Department provides a limited number of competitive scholarships to support coursework at marine and inland biological field stations. Interested students are strongly advised to consult with their advisors and the Chair regarding participation in such off-campus programs. Further information on summer courses is posted on bulletin boards in the Department and at <http://www.obfs.org/>.

Applications for Department Scholarships are due in March, and awards are made shortly thereafter, during the Department's Spring Celebration.

Research. While completing the coursework required for the major, many students become interested in specific research topics. Students who wish to conduct research under the direction of a faculty member may enroll in BIOL 501 with that faculty member's consent. Each student selects a research topic in consultation with a faculty sponsor. Consult faculty websites and the student research bulletin board to learn about current research conducted in each lab.

Many students find research opportunities away from campus during summers and winter terms. For example, the Research Experience for Undergraduates (REU) programs funded by the National Science Foundation and similar internship programs provide opportunities for students to engage in mentored research and receive room and board plus a stipend and a variety of institutions and field stations. You can find information about these and other programs at the Biology Department's Science Resources website (<https://www.oberlin.edu/career/set/online-resources/science>) and/or the Internships and Careers in Biology website (<https://www.oberlin.edu/arts-and-sciences/departments/biology/opportunities>).

Students may also conduct faculty-sponsored research with funding from Oberlin College or from external sources. For example, the Oberlin College Research Fellowship (OCRF) is a competitive program that provides two summers of research funding for students from groups historically underrepresented at American colleges and universities (<https://www.oberlin.edu/undergraduate-research/programs/ocrf>). The Oberlin Office of Undergraduate Research (OUR, <https://www.oberlin.edu/undergraduate-research>) lists many other research opportunities, and the Oberlin Center for Learning, Education, and Research in the Sciences (CLEAR, <https://www.oberlin.edu/clear>) also provides resources and support for student research.

Regardless of the opportunity or funding source, interested students should consult with potential faculty sponsors as soon as possible, as grant proposal deadlines are announced only a few times a year. Additional resources regarding student research grants are available from the Office of Undergraduate Research and the Career Development Center.

Honors. Candidates for Honors in Biology are accepted early in the fall semester of their senior year based on general ability, capacity to profit from independent work, and high motivation. As seniors, Honors students enroll in BIOL 501, carry out a research project selected in consultation with a faculty sponsor, give two required talks on their projects, submit a written thesis, and take an oral exam given by their thesis committees. Third-year students interested in this program may initiate a discussion of research possibilities with any member of the Biology faculty. The coordinator of the Honors Program in Biology for 2023-24 is Prof. Laura Romberg.

Department Prizes and Scholarships

The Department awards prizes and scholarships annually to students in recognition of scholastic excellence and professional promise. Awardees are honored at the Biology Department's Spring Celebration, and prize-winners are recognized college-wide during both the Honors Assembly and the Commencement Exercises. The prizes are funded by generous gifts from alumni and friends and are awarded to students deemed most deserving by the faculty. Academic scholarships are supported by endowed funds that enable students to take courses at biological field stations during the summer. The scholarships are awarded competitively, and their availability is announced early in the spring semester.

Extracurriculars

The Biology Majors Committee is a student-run organization of current biology majors. The Committee sends representatives to the regular meetings of the Department faculty and, in general, serves as an important avenue for faculty-student contact outside of courses. Prof. Angie Roles is the faculty liaison for the Majors Committee in 2023-24.

After the Major

What career paths do our majors pursue after graduating? A survey of two recent graduating classes showed that about 38% of our students pursue health careers, including advanced training in medicine, nursing, pharmacy, public health; approximately 20% seek research careers through graduate training in science and engineering programs; 9% are working as laboratory technicians; and about 7% pursue careers in K-12 education. Others report work in a variety of fields including nonprofit charities, conservation, writing and editing, the arts, and business.

How does a biology major prepare for life after Oberlin? The general pattern has been to match disciplinary interests and examine available options and opportunities. Listed below are the most common routes:

Graduate School (MS or PhD). Many majors find themselves interested in pursuing further training in biological research. For these students, graduate school is the next destination. Consult one or more members of the faculty and request advice on areas of study appropriate for your intended career. Many of the faculty members are knowledgeable about the institutions and fields of study that may be of interest to you. In addition, many faculty members are acquainted with the experiences of recent Oberlin graduates who may have been, or are, at the institutions you are considering. Many students take gap years, prior to joining graduate programs, during which they may complete internships, work as lab technicians, or otherwise gain relevant experience while deciding whether to pursue graduate school. We encourage you to discuss your goals and concerns with your faculty advisors.

Other sources of information are available as well. Graduate opportunities are posted on departmental bulletin boards in the Science Center, but many more graduate opportunities can be found online. Likewise, admissions criteria and financial aid vary from institution to institution and can be consulted online. Faculty members can help you navigate these resources if you schedule appointment(s) with them.

National and international scholarships and fellowship programs for graduate study in the sciences should be investigated by biology majors intending to pursue graduate studies. The Career Development Center is the best source of information regarding these opportunities.

Health Science Professional Programs (such as MD, DVM, DPharm, MSN, etc.). Students seeking admission to medical, dental, veterinary, and other health professional schools should learn about the academic and experiential learning requirements, admission exams and the overall timeline of the application process early on in their college years. The Premedical Program Director supports your journey from academics to application materials and interviews. For more information, please visit <https://www.oberlin.edu/arts-and-sciences/departments/pre-medicine-and-health-careers> to be included on the appropriate email lists so that you are contacted about learning opportunities and to schedule a one-on-one consultation. On campus student-led groups such as AMSA, Pre-Vet, and Pre-Dental also provide information and peer support for students with these career interests. Joining these is another invaluable tool to career exploration.

Employment after Graduation. The Career Development Center offers guidance, support, training, and interview opportunities for majors seeking employment immediately after graduation. Early in their college career, students should explore the numerous resources available at the Career Development Center, including workshops on resume preparation, interviewing skills, and networking. Recruiters from private companies and professional schools frequently contact the Career Development Center to schedule their campus visits.

Other Sources of Information about Job Opportunities. The Internships and Careers in Biology website (<https://www.oberlin.edu/arts-and-sciences/departments/biology/opportunities>) on the Biology Department website provides links to a variety of websites that list job and internship opportunities. Job announcements sent to the members of the Biology faculty are posted at this site and on bulletin boards near faculty offices. The Oberlin Career Development Center (<https://www.oberlin.edu/career>) is also an important source of opportunities. The Office of Alumni Affairs maintains a list of alumni who have expressed interest in discussing careers and employment opportunities. Other sources of information include off-campus supervisors with whom many students work on winter-term or summer projects. Finally, it helps to let some faculty members know of your job interests. The faculty often become aware of employment or fellowship opportunities informally and can call attention to suitable ones that may come along.

The Faculty

Faculty members teach both the lecture and laboratory portions of their courses, which are described in the current Oberlin College catalog. In addition to conducting research, most faculty members sponsor student research projects, winter term projects, and private readings.

Taylor Allen, Associate Professor of Biology (he/him). BSE, University of Pennsylvania; PhD, University of Washington. Professor Allen teaches courses on how the body functions (BIOL 100 and 312) and wellbeing (FYSP 142). Research explores inclusive teaching practices, resilience and psychological wellbeing, and muscle contraction.

Jane E. Bennett, Laboratory Coordinator and Lecturer in Biology (she/her). BA, St. Mary's University; MS, Wright State University. Ms. Bennett teaches laboratory classes in BIOL 100. She also trains and coordinates the teaching assistants for this course.

Monica Blatnik, Assistant Professor of Biology (she/her). BS, Xavier University; PhD The Ohio State University. Professor Blatnik's research focuses on understanding post-transcriptional gene regulation during vertebrate embryogenesis, using the zebrafish as a model system. Her teaching includes Developmental Biology (BIOL 301/302), Organismal Biology (BIOL 100), and FYSP 048.

Darla French, Laboratory Coordinator and Lecturer in Biology (she/her). BS, College of Wooster; MS/PhD, Purdue University. Dr. French coordinates and teaches labs in Genetics, Evolution, and Ecology (BIOL 211) and Molecular Biology, Cell Biology, and Biochemistry (BIOL 224).

Jason Gleditsch, Visiting Assistant Professor of Biology (he/him). BS/MS, Penn State University; PhD, University of Illinois. Dr. Gleditsch teaches Environmental Biology (BIOL 103), Genetics, Evolution, and Ecology lab (BIOL 210/211), and Ornithology (BIOL 309). His research focuses on avian ecology and evolution, community ecology, macroecology, and ecological networks. He focuses mainly on seed dispersal interactions between birds and plants as well as introduced species to answer questions related to the evolutionary ecology of birds and the processes that produce and maintain biodiversity across scales.

Aaron Goldman, Associate Professor of Biology (he/him). BA, Swarthmore College; PhD, University of Washington. Professor Goldman's research interests include the evolution of ancient protein families and the early evolutionary history of cellular life. He teaches courses on genomics (BIOL 336) and on molecular biology, cell biology, and biochemistry (BIOL 223/224).

Evan Hilpman, Visiting Assistant Professor of Biology (he/him). BA, Colorado College; PhD, Washington State University. Dr. Hilpman teaches Genetics, Evolution, and Ecology (BIOL 210/211) and Chemical Ecology (BIOL 342). His research focuses on interactions between plant and animal populations; including trait evolution, floral scent, and community ecology.

Marta Laskowski, Robert S. Danforth Professor of Biology (she/her). BS, Indiana University; PhD, Stanford University. Professor Laskowski's research interests include plant physiology, plant developmental biology, and transgenic technologies. Her teaching includes the core course on organismal biology (BIOL 100); an upper-level course and lab on plant development and function (BIOL 321); and a first-year seminar.

Gaybe Moore, Assistant Professor of Biology (he/they). BA, Oberlin College; PhD, Princeton University. Professor Gaybe's research interests include pathogen-host interactions, microbial genetics, host immune responses, and how these topics intersect with public health. He teaches Organismal Biology (BIOL 100), Introduction to Global Health (BIOL 135), and Immunity and Pathogenesis (BIOL 338), and a senior seminar (BIOL 413, Molecular Mechanisms of Social Identity).

Mike Moore, Donald R. Longman Professor of Biology and Chair (he/him). BS, College of William and Mary; MS, University of Illinois at Urbana-Champaign; PhD, University of Texas at Austin. Professor Moore's research interests include systematics and phylogeography of plants, assembly and evolution of floras growing on unusual soils, and Hawaiian plant evolution. He teaches BIOL 100, an upper-level course and lab on plant systematics (BIOL 323/324), a senior seminar (BIOL 423), and FYSP 194.

Maureen Peters, Professor of Biology (she/her). BA, Washington University; PhD, Harvard University. Professor Peters has served as Premedical Program Director. Her interests include classical and molecular genetics, and cellular and molecular biology. She teaches a first-year seminar and Genetic Analysis (BIOL 330).

Alexandra Pike, Visiting Assistant Professor of Biology (she/her). BS, Indiana University; PhD, Johns Hopkins University School of Medicine. She teaches molecular and cellular biology at the introductory (BIOL 223/224) and advanced (BIOL 346) levels, a cell culture laboratory (BIOL 340), as well as an upper-level seminar on the biology of aging (BIOL 417). Her research interests include the molecular biology and biochemistry of DNA replication and telomere length regulation.

Andrew Pike, Assistant Professor of Biology (he/him). BA, Oberlin College; MS, Michigan State University; PhD, Johns Hopkins Bloomberg School of Public Health. Professor Pike's research interests include the interactions between insects and microorganisms and the ways that the mosquito immune system functions. He teaches a core biology lecture (BIOL 100) and lab (BIOL 224) courses as well as upper-level courses (BIOL 338, Disease Ecology; BIOL 345, Invertebrate Biology).

Angela Roles, Associate Professor of Biology (she/her). BS, Wake Forest University; PhD, Michigan State University. Professor Roles' research interests include the effects and context dependence of spontaneous mutations on plant fitness and the evolutionary ecology of local and invasive crayfishes. Her teaching includes: core course on genetics, ecology, and evolution (BIOL 210/211); upper-level course and lab on genetics of populations (BIOL 322); and alternating between a first-year seminar (FYSP 197) and a senior seminar (BIOL 408).

Laura Romberg, Associate Professor of Biology (she/her). BA, Princeton University; PhD, University of California San Francisco. Professor Romberg's research interest is the biochemistry of bacterial cell division. She teaches courses in molecular biology, cell biology, and biochemistry (BIOL 223/224), microbiology (BIOL 307), a senior seminar on the cell biology of host-pathogen interactions (BIOL 403), and a first-year seminar on nutrition.

Support Staff

Dorothy Auble, Resources Coordinator

Twila Colley, Administrative Assistant

Judy Laushman, Greenhouse Manager

Austyn Lilly, Laboratory Technician

Lori Lindsey, Animal Caretaker

Forrest Rose, Facilities Manager

Student Employment

The Department employs students in various capacities during both the school year and the summer; some of the positions require financial-aid eligibility. Many laboratory courses employ student teaching assistants. Biology majors who are interested in these positions should check with the professors in charge of the courses and, additionally, Ms. Bennett for Biology 100. In addition, the introductory courses have OWLS and/or Hoots. Students interested in these positions can find additional information on these and other positions at <https://www.oberlin.edu/clear/mentors>. The College also ensures that tutors are available when needed for Biology courses, especially introductory courses. Several part-time student worker positions are available during both semesters and the summer; interested students should check with Austyn Lilly.

Students may also be employed as part-time or full-time research assistants under the auspices of various research or teaching grants awarded to individual professors. Some of these positions are for the school year and/or the summer. Students seeking this type of employment should consult with individual professors.

Frequently Asked Questions

1. I am considering a double major, or a double degree. What is the best way to manage this?

A double major means two majors in the College of Arts and Sciences, such as History and Biology majors or other combinations. A double major can be accomplished within the four years of your projected stay at Oberlin, especially if you identify your areas of interest and sign up with an advisor in each discipline as soon as possible. Common double majors with Biology are Neuroscience, Environmental Studies, and Chemistry, but humanities and social science majors are also possible. Timely planning and good advice are crucial to completing both majors. Double majors are required to have two major advisors, one from each major program of study.

The double degree program requires admission to both the College and the Conservatory and is a five-year program earning a Bachelor of Arts from the College and a Bachelor of Music from the Conservatory. You will have two advisors, one from your College major and another from your Conservatory discipline. Strong organization skills and efficient planning are keys to success!

2. I want to be able to study abroad and get academic credit for it while I am in college. Is this possible at Oberlin?

Yes, in several ways. The Oberlin-in-London program is run directly by Oberlin College. Also, there are many study abroad programs with which Oberlin has consortial arrangements, as well as others from which Oberlin College accepts transfer credit. Consult the current course catalog for information, inquire from your advisor about the appropriateness of such a program, visit the Study Away Office in person or at <https://www.oberlin.edu/study-away>, and ask to speak to the appropriate adviser in the Dean of Studies Office.

3. Is there something I could do during Winter Term that would be relevant to my planned major in biology?

Yes! Consider an individual or group project that will allow you to train in laboratory or field research, to do volunteer work at a hospital or health center, or to apprentice at a zoo or museum. Also worth considering are reading projects, MCAT reviews, seminar-type discussions, and similar activities both on and off campus (especially with alumni), provided a suitable sponsor can be found. Explore other possibilities by discussing Winter Term experiences with your advisor and with junior or senior majors.

4. Is there any meaningful summer work off-campus I could look into?

That depends on what you mean by 'meaningful.' You could work for money, for experience, and/or for academic credit by taking courses at another institution (although you should first determine whether you may transfer such credits to Oberlin). You could seek a summer internship at a marine lab somewhere, work as a summer lab technician or hospital assistant or health-center volunteer, do field work (e.g. for the Nature Conservancy or the U.S. Forest Service), or conduct research on campus...possibilities abound. Think of what would be interesting and appropriate for you, and check with your advisor and older peers for suggestions.

5. What is research and how do I get involved in research with an Oberlin Biology faculty member?

In addition to teaching, many of the biology faculty pursue research projects in their labs, with the aid of student assistants (sometimes for credit, BIOL 501). Each faculty researcher has specific research topics (see the earlier listing of faculty and interests) and is working on answering particular questions in their lab. "Research" is the practice of scientists – it is the building of new knowledge using the scientific method. Students may be engaged in this work at many stages – in the planning of experiments to address a question, in carrying out previously planned projects, collecting and analyzing data, or working on manuscripts for publication.

Research can be an incredibly valuable experience and the opportunity to do individual research with a professor is one of the things that makes an Oberlin education especially strong. Faculty labs are often space limited, so it is a good idea to start looking for a spot early in your Oberlin career (although we do recommend that you complete BIOL 100 before beginning to seek out a research experience.) To seek a spot in a lab, review the areas of faculty research on the website, and then reach out to faculty by email asking if you can set up a time to talk about research possibilities. You are not expected to have your own ideas as to what you want to research. Some professors will support you to follow up on your own ideas if it is feasible for them and you, but in general, you can expect to start by working on a project that is already ongoing and faculty will make suggestions as to specific projects that you might do in their lab. It is fine to contact more than one faculty member at this point.

For many students, being in a lab creates a social network and supports their classwork. You don't have to be a rock star to join a lab! What is needed is a strong interest, which will help when you inevitably have to pick yourself up after setbacks. You will also need to make sure you have the time in your schedule to commit to research. You can create time in your schedule by taking research as a half course (about 5 hours per week is expected) or as a full course (about 10 hours per week is expected). Those who wish to do honors should speak to a professor about the possibility during their third year. The honors program spans a full year; honors students enroll in BIOL 501 which creates time in their schedules. Come join us and find out what Biology is *really* about!

6. Should I do Honors?

Honors can be a highly valuable experience for personal and professional development. Students who are admitted to the Honors program participate in a broad range of the scientific process over their final year at Oberlin. This includes developing a written proposal and presenting it as a public talk, performing the proposed research, and then writing a formal thesis. In the spring, students present their results at a public talk and defend their thesis before a 3-member committee composed of Oberlin faculty.

It is important to realize that Honors requires a considerable commitment of time and energy for both semesters of your final year, as well as a minimum grade-point average of 3.1 within the Biology major. Honors involves a greater time commitment than regular research: students enroll in BIOL 501 for a full course rather than a half. Students need to carefully consider the pros and cons of completing Honors given their other academic and non-academic commitments during their final year. Timing is also a factor; by the end of your junior year, you should have identified a research advisor who agrees to sponsor your project during your senior year. Completing Honors in Biology is NOT required for admission to a graduate program after Oberlin. If you think you may be interested, you should consult with your advisor about honors as soon as possible, even if it is only a remote possibility in your plans.

7. How is Biology coursework related to the majors in Neuro, Biochem, or Environmental Studies?

These majors require similar introductory or cognate courses. For example, BIOL 100 is also required for the Neuroscience major. Many electives count for two or more of the above majors. In addition, some faculty members have appointments in more than one department or major and are therefore important resources for advice regarding the overlap or interface of these related disciplines.

8. How do I arrange to consult with a biology faculty member about my courses, academic interests, and studying strategies? I am not sure how this is done and am intimidated/shy/nervous about doing it.

Biology faculty will be happy to talk with you about your interests. Ask your current advisor (if not in the Biology faculty) about a professor they would recommend. Call or e-mail a Biology faculty member recommended by majors whom you know and trust. Arrange to meet with the Biology Chairperson. Take a Biology course. Come to a seminar. Ask your Resident Coordinator. Or, email or approach a Biology faculty member and ask to sign up for an appointment during their office hours. A good introduction could be, "I think I want to be a biologist but am not sure. Could you help me decide?"

9. Does the major in biology meet pre-med or pre-vet academic requirements?

In part, yes. Medical, dental, veterinary, and allied-health-sciences schools in general require one year of college-level biology with lab, two years of chemistry with lab, one year of physics with lab, one year of math, and one year of English. The major in biology will more than adequately meet the biology requirement, and most of the chemistry requirement. We highly recommend that our majors take calculus, statistics, physics, and perhaps biochemistry, depending on their interests. Many pre-med students complete these courses. The English requirement is typically not a problem, as these courses count toward the Humanities requirement, and there are many excellent options available during a student's academic career. Some of our students who do not complete the pre-med preparation at Oberlin take the courses elsewhere during the summer or soon after graduation from Oberlin. The College's Premedical Program Director is an excellent person to consult if your career interests involve the health professions. For more, visit <https://www.oberlin.edu/arts-and-sciences/departments/pre-medicine-and-health-careers>

EXAMPLE PATHWAYS THROUGH THE BIOLOGY MAJOR

The biology major is flexible and can be adjusted to fit individual needs. The greatest flexibility in course options is possible when students take the year-long introductory chemistry sequence in the first year because the Biology major requires 2-3 Chemistry courses which must be taken in order. The primary benefit is having more flexibility in scheduling 300-level courses in Biology that require Chemistry, and more semesters available to study abroad. You may wish to consult your academic advisor or a Biology department faculty member for assistance in planning your path through the major.

Below, we give a brief overview of three sample pathways through the Biology major described in this document, before delving into greater detail on the following page.

BRIEF OVERVIEW OF PATHWAYS

Example Pathway 1: Chemistry before Biology

For students who are certain of their interest in majoring in biology, one recommended approach is to begin with only introductory chemistry (CHEM 101 or CHEM 102) in the first semester, leaving introductory biology (BIOL 100) for the second semester. Many students experience a more successful college transition by beginning with only a single lab science course in the first semester.

Example Pathway 2: Biology before Chemistry

Students who wish to explore biology as a potential major and prefer not to take two science courses during their first semester may enroll in BIOL 100 first semester, BIOL 210/211 second semester, then begin the introductory chemistry series either in the spring semester or in the following fall. Students certain of their interest in majoring in biology may also take this approach.

Example Pathway 3: Biology and Chemistry

Students who are eager to enroll in introductory biology and have a strong science background may choose to register for both BIOL 100 and CHEM 101 or CHEM 102 in the first semester.

Notes:

- BIOL 103 and BIOL 135 do not count toward the Biology major. Students completing BIOL 103 or BIOL 135 must still begin the major with BIOL 100.
- Students interested in medical or other professional schools should consult the Premedical Program Director. Additional information for students considering medical school is available at <https://www.oberlin.edu/arts-and-sciences/departments/pre-medicine-and-health-careers>
- Some courses outside the Biology Department count toward the major in Biology. Consult the “Checklist of Biology Major Requirements” at the beginning of this document, or the current College Catalog.
- Remember to check that you will have the necessary prerequisites for the courses you plan to take.
- The Biology Department website has more information: <https://www.oberlin.edu/arts-and-sciences/departments/biology>
- A limited number of BIOL 100 seats are available to first-year students in the fall semester. Additional sections are offered in the spring semester.
- Both BIOL 210/211 and BIOL 223/224 count for 1.5 courses. Students should keep that in mind when enrolling for other courses. The department does not often recommend that students take three courses with labs in the same semester.

DETAILED EXAMPLES OF PATHWAYS THROUGH THE MAJOR

The following three examples illustrate only some of the potential pathways through the first two years of the Biology major. Always check with your academic advisor if you have questions. And if you are a first- or second-year student who doesn't have an advisor in the Biology department and you're certain you want to major in Biology, consider switching to a Biology advisor and declaring a Biology major.

Example Pathway 1: Chemistry (and Math) before Biology

Many students begin with only a single lab science course in the first semester. Beginning with only introductory chemistry (CHEM 101 or CHEM 102) in the first semester, and leaving introductory biology (BIOL 100) for the second semester offers several advantages. Introductory chemistry is required for the major in biology and for many upper level biomedical courses, and given that biology makes use of insights and tools from chemistry, as well as mathematics and statistics, starting with CHEM 101 (or CHEM 102), lays the foundation for a deep, conceptual understanding of biology.

Year 1 Fall Courses:

CHEM 101 + lab
MATH 133 or CSCI 140/150*
2 elective courses

Year 1 Spring Courses:

CHEM 102 + lab
BIOL 100 + lab
2 elective courses

Year 2 Fall Courses:

CHEM 205 + lab
BIOL 210/211 or BIOL 223/224 (both options count for 1.5 courses)
1 elective course

Year 2 Spring Courses:

BIOL 210/211 or BIOL 223/224
2-3 elective courses

**MATH 133 or CSCI 140/150 may be delayed until a later semester for students not wishing to start with 2 NS courses in the first semester.*

Additional required major coursework in this pathway includes:

- One cognate quantitative course (if MATH 133 or CSCI 140/150 not taken)
- Four life science courses at the 200, 300, or 400-level, of which at least two must have a BIOL prefix, and at least two of which must have a lab. See page 2 of this guide for details.

Considerations:

Note that CHEM 205 can be taken concurrently with either BIOL 210/211 or BIOL 223/224. The material covered in CHEM 205 overlaps somewhat with BIOL 223/224, but there is little overlap with BIOL 210/211. Either BIOL 210/211 or BIOL 223/224 could be delayed, though this will reduce the number of fall semesters available to take fall-only 300-level courses for which the delayed course (210/211 or 223/224) is a prerequisite.

Example Pathway 2: Biology before Chemistry

Students who wish to explore biology as a potential major and prefer not to take two science courses during their first semester may enroll in BIOL 100 first semester, BIOL 210 + 211 second semester, then begin the introductory chemistry series in the following fall. Students certain of their interest in majoring in biology may also take this approach. Beginning with biology and delaying chemistry will allow students earlier entry into upper-level elective biology courses that do not have chemistry prerequisites.

Year 1 Fall Courses:

BIOL 100 + lab
3 Elective courses

Year 1 Spring Courses:

BIOL 210 + 211 (which collectively count for 1.5 courses)
2-3 elective courses

Year 2 Fall Courses:

CHEM 101 + lab
3 elective courses

Year 2 Spring Courses:

CHEM 102 + lab
3 elective courses

Year 3 Fall Courses:

BIOL 223 + 224 (which collectively count for 1.5 courses)
2-3 elective courses

Year 3 Spring Courses:

CHEM 205 + lab
3 elective courses

Additional required major coursework in this pathway includes:

- One cognate quantitative course
- Four 200-, 300-, or 400-level life science courses. At least two must have the BIOL prefix, and at least two must have a lab. See page 2 of this guide for details.

Considerations:

1. Note that CHEM 205 can be taken concurrently with BIOL 223/224. Some students may find this beneficial (some overlapping material) while others may wish to avoid this (both are challenging courses).
2. Delaying CHEM 101 and 102 to the second year delays taking the required core courses BIOL 223/224. This will leave only one fall semester to take fall-only 300-level courses that require BIOL 223/224 as a pre-requisite. This includes many biomedical courses. You should consult the Course Catalog for the prerequisites and semesters offered for the upper-level courses you are interested in taking.
3. Delaying the year-long introductory chemistry sequence to the second year also reduces the number of semesters during which study abroad is feasible.
4. A limited number of BIOL 100 seats are available to first-year students in the fall semester. Additional sections are offered in the spring semester.

Example Pathway 3: Biology and Chemistry

Students who are eager to enroll in introductory biology and have a strong science background may choose to register for both BIOL 100 and CHEM 101 in the first semester. Alternatively, some students choose to take CHEM 101 and a mathematics or computer science course in the first semester, delaying BIOL 100 to the second semester. Note that introductory chemistry may be started only in fall semester, whereas introductory biology may be taken in either semester.

Year 1 Fall Courses:

CHEM 101 + lab

BIOL 100 + lab

2 elective courses

Year 1 Spring Courses:

CHEM 102 + lab

BIOL 210 + 211 (which collectively count for 1.5 courses)

1-2 elective courses

Year 2 Fall Courses:

BIOL 223 + 224 (which collectively count for 1.5 courses)

2-3 elective courses

Year 2 Spring Courses:

CHEM 205 + lab

3 elective courses

Additional required major coursework includes:

- One cognate quantitative course,
- Four 200-, 300-, or 400-level life science courses, at least two of which have the BIOL prefix and at least two of which must have a lab. See page 2 of this guide for details.

Considerations:

1. Note that CHEM 205 can be taken concurrently with BIOL 223/224. Some students may find this beneficial (some overlapping material) while others may wish to avoid this (both are challenging courses).
2. A limited number of BIOL 100 seats are available to first-year students in the fall semester. Additional sections are offered in the spring semester.

Guidelines for Requesting Letters of Recommendation

1. **Choose your recommenders well.** Letters of recommendation are intended to provide information not discernible from a transcript or a resume. Such information includes class performance, technical expertise, laboratory experience, overall academic qualifications, motivation, personality characteristics, manual dexterity, work ethic, and so on. It would be wise, then, to seek letters from persons who can describe you in these regards because they have been your teachers in small class settings, or are your academic advisors, or laboratory supervisors.
2. **Be considerate.** Give your recommender *at least two weeks* notice (three to four weeks is better).
3. **Come prepared.** Provide your recommender the following materials or information:
 - a. a list of individuals or institutions to whom letters should be submitted/sent
 - b. clearly indicated deadlines for each letter, as well as the format in which the letter should be sent (by email? by online submission site? by regular mail?)
 - c. recommendation forms, if required*

*In these cases, please fill out applicant sections on these forms before giving them to the recommender. Do not overlook spaces for your signature. Most recommendation forms require that you sign a waiver that guarantees confidentiality of the recommendation. In general, it is good to waive your right to see a recommendation letter written on your behalf because the recipient of the letter will have greater confidence that the letter was written candidly.
 - d. current resume or curriculum vitae
 - e. copy of relevant application essay and/or letter of application
 - f. current external or internal transcript
 - g. if available/applicable, your scores on the GRE, MCAT, etc.
 - h. any additional information (job description, work experience, extra-curricular activities) that may be relevant to the position you are seeking
4. **Follow up.** If you wish to be notified when the letter you have requested has been sent, you should tell your recommender and perhaps ask that they notify you by email. Recommenders are generally eager to find out whether or not their recommendation has helped you, so it is a nice touch to let them know what happened.

Biology Department Course Transfer Guidelines

Please consult with the Biology Department Chair to pre-approve your course before you commit to taking it!

Primary criteria for counting transfer courses through the Oberlin Biology Department:

1. The depth and breadth of material covered in the course is at a level commensurate with that of similar courses at Oberlin.
2. Topics covered by the course must predominantly center on biological principles or applications.
3. If a transfer course is to be used to replace BIOL 100, BIOL 210/211, or BIOL 223/224, the topics, core concepts, and competencies covered in the transfer course must closely match those of the relevant Oberlin course, including the laboratory component.

Transferring a course to count toward general graduation credit at Oberlin, but not to the Oberlin Biology major or related majors?

Submit the following items from the institution offering the course you want to take to the Oberlin Biology Department Chair:

1. Course syllabus.
2. Catalog description.
3. Documentation listing prerequisites for the course (this information may appear on the syllabus or course description, but if it does not, please submit other documentation verifying the prerequisites).

Transferring a course to count toward the Oberlin Biology major or related majors?

Submit the following items from the institution offering the course you want to take to the Oberlin Biology Department Chair:

1. Course syllabus.
2. Catalog description.
3. Documentation listing prerequisites for the course (this information may appear on the syllabus or course description, but if it does not, please submit other documentation verifying the prerequisites).
4. Documentation addressing how the course applies to the biology or related major at the home institution. If the course is from a community college, provide documentation addressing how the course may be counted toward a biology or related major at 4-year institutions in the home state.

NOTE: The Biology Department Chair may request additional information about the course beyond that described above.

If you get a course pre-approved, be sure to save a copy of the form so you can present it to the chair after you complete the course.