

BIOCHEMISTRY

What can I do with this major?

AREAS

EMPLOYERS

STRATEGIES

RESEARCH

Basic Research

Applied Research

Grant Writing

Administration

Some areas of specialization:

Healthcare: clinical research (i.e., virology, immunology, enzymology), medical devices, and equipment

Pharmacology: drug properties, interactions, application, and development

Environmental: testing, air, water, and waste management, regulation, bio-remediation, biofuels

Agricultural: crop production/storage, herbicide/pesticide development and application

Food science: preservation, nutrition

Cosmeceutical: development and application

Forensic: toxicology, DNA analysis, scientific instrumentation

University laboratories

Federal government:

National Science Foundation

National Institutes of Health

Food and Drug Administration

Environmental Protection Agency

Department of Agriculture

Department of Energy

Department of Defense

State and local government

Public health departments

Hospital laboratories

Commercial medical laboratories

Private testing laboratories including forensics

Independent research foundations

Industries:

Biotechnology/Synthetic biology:

pharmaceutical and medical device/equipment

Food processing

Cosmetic

Chemical

Petroleum

Agricultural

Plan to take coursework in biology, chemistry, mathematics, and physics and demonstrate proficiency.

Choose courses with laboratory components to build experimental and instrumentation skills.

Gain experience in area of interest through internships, research with professors and/or complete a senior research project.

Complete a certificate training program, usually one year, to learn specialized laboratory techniques. Certification requirements vary by state.

Develop strong communication and interpersonal skills for sharing data as well as collaborating with multi-disciplinary teams of scientists.

Take a course in grant writing, as many scientists and professors seek funding to support their research and teaching.

Earn a master's degree or Ph.D. to advance into college or university teaching or for directing scientific research in government laboratories or industry.

Consider pursuing a postdoctoral fellowship, generally two-three years, after earning a Ph.D. to gain additional research experience.

AREAS

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HEALTHCARE

See also *What can I do with this major in medical fields?*

Medicine
Dentistry
Optometry
Podiatry
Pharmacy
Chiropracty
Veterinary Medicine
Occupational Therapy
Physical Therapy
Public Health

Hospitals
Colleges or universities
Medical centers and clinics
Private and group practice
Health networks
Nursing homes
Rehabilitation centers
Correctional facilities
Large corporations
Armed services
Government agencies
State and local public health departments

Plan to attend medical school or other related graduate program.

Research accredited institutions. Check graduation rates, success rates on licensing exams, cost, location, etc. Speak with current students.

Maintain an outstanding grade point average, particularly in the sciences. Meet with a pre-health advisor periodically to discuss curricular decisions and admissions test preparation.

Join related student organizations (i.e., student chapters of the American Medical Association, Academy of Student Pharmacists, Health Occupations Students of America, etc.). Demonstrate leadership abilities.

Volunteer or intern in a healthcare setting such as a hospital, rehabilitation facility, pharmacy, etc. based on your interests. Graduate and professional schools seek students with tested experience.

Consider pursuing certification as a medical laboratory technologist or technician. Licensure varies by state.

Secure strong faculty recommendations who will attest to your interest in the healthcare field as well as your academic ability and work ethic.

Research the various fields within healthcare to determine a particular career goal.

Develop a parallel plan in case medical/graduate school admission is denied.

AREAS

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STRATEGIES

BIOINFORMATICS

Algorithm and statistical techniques
Data analysis and interpretation
Information management
Organization and retrieval

Colleges and universities
Private research foundations
Software development firms
Biotechnology companies:
 Agricultural chemicals
 Pharmaceutical
 Medical device and equipment
 Research and testing
Federal laboratories and regulatory agencies:
 National Institutes of Health
 Food and Drug Administration
 Environmental Protection Agency
 Department of Agriculture

Develop multiple areas of specialization through coursework, minors, double-majors in molecular biology, mathematics, statistics, computer science, or machine learning.
Develop strong programming and database management skills; fluency in several programming languages is helpful.
Learn biological software systems.
Complete an internship in the areas of tool building, usage, or maintenance.
Seek master's or Ph.D. degree for increased advancement opportunities.

BIOTECHNOLOGY

Medicine
Agriculture
Food science
Biological engineering
Bioremediation
Environmental protection/Regulation
Synthetic biology

Biotechnology companies:
 Agricultural chemicals
 Food safety
 Pharmaceutical
 Medical device and equipment
 Research and testing
Federal government:
 National Institutes of Health
 Centers for Disease Control
 Food and Drug Administration
 Environmental Protection Agency
 Department of Agriculture
Plant propagation and production businesses
Colleges and universities

Gain practical experience conducting research, collecting and analyzing data, and using laboratory/field techniques in collaboration with professors and through internships.
Hone your ability to gather, assess, evaluate, interpret, and share technical and scientific information.
Seek current knowledge of medical, agricultural, pharmaceutical, or environmental issues, trends, and regulations.
Join horticultural, agronomy, biotechnology clubs or other student professional associations to network and cultivate related academic interests.
Pursue a master's or doctoral degree to specialize and for advancement in the field.
Some federal and private agency and research positions require a graduate degree.
Maintain a strong grade point average to be competitive for graduate school admission.

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OTHER PROFESSIONAL OPPORTUNITIES

Sales/Marketing
Technical writing
Scientific journalism
Scientific illustration
Regulatory affairs
Administration/Management
Scientific/Technical recruiting
Intellectual property/Patent law

Biotechnology industry
Pharmaceutical and chemical companies
Publishers:
 Textbook, magazine, newspaper, book
Software firms
Regulatory agencies
Search firms
Law firms
Legal departments of corporations

Supplement biochemistry degree with either additional coursework or a minor in a specialty area such as journalism, technical writing, business, or mathematics.
Become familiar with desktop publishing and other software packages particularly for communications-related positions.
Gain experience through internships, part-time work, or summer jobs to test interest in a field and network. According to your goal, consider writing for the school newspaper, working at your campus computer lab, or pursuing sales/marketing opportunities.
Develop strong written and oral communication skills which are necessary across industries.
Be prepared to start in entry-level business positions such as management trainee programs.
Obtain an MBA or Ph.D. to reach high levels of management and administration.
To pursue a J.D., participate in mock trial and pre-law associations and research the law school admissions process.

TEACHING

Elementary
Secondary
Post-secondary
Non-classroom settings

Public and private schools, K-12
Two-year community colleges/technical institutes
Four-year institutions
Professional schools:
 Pharmacy, dentistry, medicine, veterinary medicine, and agriculture
Museums
Zoos
Nature centers and parks

Develop excellent communication skills, verbal and written, for interacting with students, colleagues, and parents.
Gain experience working with age group of interest through volunteering and tutoring.
Become skilled in the use of computers and laboratory equipment.
Considering joining a professional teaching association such as the National Science Teachers Association or the National Association of Biology Teachers for current information on the field and for networking opportunities.
Acquire appropriate certification for K-12 teaching opportunities.

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TEACHING CONTINUED

Due to science teacher shortages in some areas, consider researching alternative certification programs which may offer a faster route to secondary teaching opportunities.

Seek advanced degree required for specialists, education administration, college teaching, and other professional positions.

Prepare to attend graduate school by maintaining a high grade point average and securing strong faculty recommendations for post-secondary teaching. A master's degree is sufficient for teaching at some two year-institutions.

Complete Ph.D. for college or university teaching.

GENERAL INFORMATION

- A bachelor's degree will qualify one for work as a laboratory assistant, technician, technologist, or research assistant in education, industry, government, museums, parks, and gardens.
- Biochemists are typically curious and creative with strong observational and analytical skills as well as the ability to persevere through lengthy research projects. They demonstrate competence in laboratory methods, computer science, and mathematics.
- As an undergraduate, seek laboratory experiences such as research projects, volunteering with professors, summer jobs, or internships.
- Develop the ability to communicate effectively to compile and share results in oral and written forms.
- Biochemists often interact with scientists from other disciplines. Learn to work independently and as part of a team.
- Read scientific journals to stay current on relevant issues in the field and join related professional organizations to network and build contacts.
- Visit government laboratories or research centers to learn more about opportunities in biochemistry. Schedule informational interviews to learn about the profession and specific career paths.
- Participate in research programs sponsored by organizations like the National Science Foundation and the National Institutes of Health.
- Become familiar with the specific entrance exam for graduate or professional schools in your area of interest.
- Maintain a high grade point average and secure strong faculty recommendations.
- Earn a master's degree to specialize in a particular research area and to teach at some two- and four-year institutions.
- Earn a Ph.D. to direct to direct research projects, to enter high levels of administration, and to teach at four-year post-secondary institutions. Postdoctoral fellowships may also be required.
- Combine an undergraduate degree in biochemistry with a degree in law, computer programming, business, education, information science, or other discipline to expand career opportunities.
- Research the job application process for government positions. Seek guidance from career center staff for assistance.