

## MICROBIOLOGY... NOW WHAT?

Quick Facts: Microbiologists	
<b>2020 Median Pay</b>	\$ 84,400 per year
<b>Entry-Level Education</b>	Bachelor's degree
<b>Work Experience in a Related Occupation</b>	None
<b>On-the-job Training</b>	None
<b>Number of Jobs, 2019</b>	20,200
<b>Job Outlook, 2019-29</b>	3% (Average)
<b>Employment Change, 2019-29</b>	600

[Found on the Occupational Outlook Handbook <https://www.bls.gov/ooh/life-physical-and-social-science/microbiologists.htm>]

### What is Microbiology?

Microbiology is the study of organisms, most of which are too small to be seen with the naked eye, including bacteria, algae, protozoa, and fungi, as well as acellular agents, such as viruses and prions. Microbiologists study the interaction of microorganisms with people and how they affect our lives, as well as the roles these organisms play in the environment. Aspiring microbiologists acquire knowledge and laboratory skill in the structure, physiology, genetics, pathogenicity, ecology, and taxonomy of microorganisms. Specialties are sometimes pursued in human and animal infectious diseases, immunology, bacteriology, virology, molecular genetics, and environmental and industrial processes. Microbiologists work in hospitals, universities, medical schools, government laboratories, and almost every industry, specializing in a variety of areas, from agriculture to the space industry. About 40% of microbiology majors continue on to graduate, professional, or medical school.

### What Does A Microbiologist Typically Do?

- Plan and conduct complex research projects, such as developing new drugs to combat infectious diseases
- Supervise the work of biological technicians and other workers and evaluate the accuracy of their results
- Isolate and maintain cultures of bacteria or other microorganisms for future study
- Identify and classify microorganisms found in specimens collected from humans, water, food, and other sources
- Monitor the effect of microorganisms on plants, animals, and other microorganisms and on the environment
- Keep up with findings from other research groups by reading research reports and attending conferences
- Prepare technical reports, research papers, and recommendations based on their research findings
- Present research findings to scientists, non-scientist executives, engineers, other colleagues, and the public

Microbiologists study microorganisms such as bacteria, viruses, algae, fungi, and some types of parasites. Microbiologists work in laboratories and offices, where they conduct scientific experiments and analyze the results. Most microbiologists work full time and keep regular hours. Most

microbiologists work in research and development. Many conduct basic research with the aim of increasing scientific knowledge. Others conduct applied research, using knowledge from basic research to develop new products or solve particular problems.

### **What Can I Do With A Bachelor's Degree in Microbiology?**

Quality Assurance Analyst	Pharmaceutical Sales Rep
Technical Sales Representative	Brewmaster
Water Quality Inspector	Laboratory Technician
Fermentation Plant Biologist	Forensic Document Examiner
Plant Tissue Culture Technician	Pest Control Consultant
Environmental Technician	Associate Scientist
Diagnostic Account Specialist	Fish and Wildlife Technician
Research Assistant	Technical Analyst or Writer
Photomicrographer	Microbiologist

### **Where Might I Do An Internship?**

*UMass Amherst Microbiology Majors Have Done Internships At The Following Sites:*

Alnylam Pharmaceuticals	Merck & Co.
Amgen Scholars Program/Yale School of Med Amherst (Town of)	Natick Soldier Research Development
ARIAD Pharmaceuticals, Inc	MicroTest Laboratories
BTF Biomériux	Northeast Sustainable Energy Association
Brigham and Women's Hospital	SABIC Innovative Plastics
Concord Health Care Center	Sanofi Group: Pasteur, & Genzyme
EcoOrganics	Schepens Research Institute
Experium Science Academy	St. Mary's Hospital
Genocea Biosciences	Tufts University-Microbial Community Assembly
Giner, Inc	UMass Amherst
Glaxo Smith Kline (SmithKline Beecham)	UMass Amherst Emergency Medical Services
Harvard Medical School	UMass Amherst Environmental Health & Safety
Henry Gets Moving	UMass Medical School
Hertz Corporation (The)	University Health Services
Holobiome, Inc.	Verax Biomedical
	Wyeth Biotech

### **Career Planning Resources & Websites**

UMass Amherst Career Services Events Calendar	<a href="http://www.umass.edu/careers">www.umass.edu/careers</a>
FOCUS2 Career and Education Planning	<a href="http://www.umass.edu/careers/planning">www.umass.edu/careers/planning</a> to sign-in
What Can I Do With This Major?	<a href="https://www.umass.edu/careers/planning">https://www.umass.edu/careers/planning</a>

*(Click on "What Can I do with this Major" icon on the right-hand column.)*

Bureau of Labor Statistics Occupational Outlook Handbook	<a href="https://www.bls.gov/microbiologists.htm">https://www.bls.gov/microbiologists.htm</a>
O-Net: "Microbiologists"	<a href="https://www.onetonline.org/">https://www.onetonline.org/</a>
O-Net: "Biologists"	<a href="https://www.onetonline.org/link/summary/19-1029.04">https://www.onetonline.org/link/summary/19-1029.04</a>
Massachusetts Career Information System	<a href="http://www.masscis.intocareers.org">www.masscis.intocareers.org</a>
<i>(Click Mass Resident to login with "Amherst/01003" Then click "Occupations" or "Assessments")</i>	
Amer Soc for MicroBio: Careers in Microbiology Blog	<a href="http://www.asm.org/index.php/careers-blog">www.asm.org/index.php/careers-blog</a>

Science.gov Gateway to US Federal Science [www.science.gov](http://www.science.gov)  
Mass Life Sciences Center [www.masslifesciences.com](http://www.masslifesciences.com)  
Biotech Now [www.biotech-now.org](http://www.biotech-now.org)

**Microbiology Job Search Resources** (\* = of particular note)

*UMass Amherst Specific Job Search Resources*

\* UMass Handshake Database of Internships & Jobs <https://umass.joinhandshake.com/>  
\* UMass Microbiology Research Opportunities <https://www.micro.umass.edu/>  
\* Finding Independent Lab Research on Campus [www.umass.edu/biochem/undergraduate/lab](http://www.umass.edu/biochem/undergraduate/lab)  
BioScience Club <http://sites.google.com/site/biosciumass/home>  
BioPharmGuy – Entry-level jobs <https://biopharmguy.com/services/entrylevel.php>

*General Biology And Science Jobs*

\* Mass Bio [www.massbio.org](http://www.massbio.org)  
\* Mass Life Sciences Internship Program [www.masslifesciences.com/programs](http://www.masslifesciences.com/programs)  
\* Life Sciences Recruiters for multiple companies [www.propelcareers.com](http://www.propelcareers.com)  
New Scientist Jobs [jobs.newscientist.com/jobs/microbiology](http://jobs.newscientist.com/jobs/microbiology)  
\* Jobs in MicroBio & Life Sciences <https://jobs.sciencecareers.org/jobs/microbiology/>  
\* MicroBio Jobs at Aerotek (many locations) <https://www.aerotek.com/career-opportunities/clinical-and-scientific-jobs/microbiologist-jobs>  
Bio Space [www.biospace.com/jobs/homepage/](http://www.biospace.com/jobs/homepage/)  
Biology Jobs [www.BiologyJobs.com](http://www.BiologyJobs.com)  
Hire Bio [www.hirebio.com](http://www.hirebio.com)  
\* More sites for Life Science Jobs [www.masslifesciences.com/resources](http://www.masslifesciences.com/resources)  
Forensic Science Jobs [webdata.aafs.org](http://webdata.aafs.org)  
Microbiologist Jobs [environmentalchemistry.com/microbiology](http://environmentalchemistry.com/microbiology)  
\* Amer Soc for Microbio: ASM Career Connections [www.asmcareerconnections.org](http://www.asmcareerconnections.org)

*Bio-Tech*

Mass BioTechnology Council <https://careers.massbio.org/>  
Biotech Careers <https://www.biotech-careers.org/careers>  
Mass Medical Device Industry Council <https://business.massmedic.com/jobs>

*Government Agencies*

National Institutes of Health [www.jobs.nih.gov/vacancies/scientific/](http://www.jobs.nih.gov/vacancies/scientific/)  
Health and Human Services Jobs <https://www.hhs.gov/careers/>  
Food & Drug Administration [www.fda.gov/AboutFDA/WorkingatFDA](http://www.fda.gov/AboutFDA/WorkingatFDA)  
US Navy Microbiology <https://www.navy.com/careers/microbiology>

*Pharmaceuticals*

International Society of Pharmaceutical Engineers [www.ispeboston.org](http://www.ispeboston.org)  
UMass Amherst ISPE chapter! [www.ecs.umass.edu/ispe](http://www.ecs.umass.edu/ispe)  
American Assoc of Pharma Scientists Jobs Board <https://careerfair.aaps.org/>

GET YOUR \$40 AAPS STUDENT MEMBERSHIP!

Current jobs [biopharmguy.com](http://biopharmguy.com)

Sample (expired) entry level job descriptions,  
and a list of New England pharma companies. [biopharmguy.com](http://biopharmguy.com)

### **Who Could I Work For?**

Some of the major industries, companies & government agencies that hire microbiology majors include:

#### *Academic*

Medical, Dental, and Veterinary Schools  
College and University  
Institutes and not-for-profit research centers

#### *Agriculture*

Genetic crop modification  
Biomass production

#### *Energy*

Biofuels production and refinement  
Environmental Remediation

#### *Government*

Centers for Disease Control (CDC)  
National Institutes of Health (NIH)  
Local and state government  
Public health  
Grant management  
Law enforcement and counter-terrorism

Military (all branches)  
Waste and wastewater management  
Food and Drug Administration (FDA)  
US Department of Agriculture (USDA)  
NASA  
Environmental Protection Agency

#### *Health Care*

Medical Technology  
Clinics and Hospitals  
Diagnostic Testing Labs

Health Care Management  
Quality Control

#### *Industry*

Positions include management, quality control, research, and product development. Many know of big pharma and biotechnology but there are numerous other opportunities in the cosmetics, breweries, and oil industries. Identifying such a position may require searching job postings in individual companies.

Industrial Production antibiotics  
Chemical companies  
Cosmetics and toiletries  
Food and beverage research  
Consulting  
Breweries

Biotechnology  
Pharmaceuticals and Vaccines  
Oil industry and mining  
Microbials research  
Sales or technical representative  
Dairies

#### *Legal*

Law firms (Patent Law)  
Technology transfer  
Intellectual property

#### *Scientific Publishing*

Journal Editor  
Academic Journalism  
Popular Press

#### *Teaching*

A microbiology degree combined with instruction in education can lead to a career in teaching.

Primary and Secondary Schools  
 Technical and Specialty Schools

### Professional Organizations in Microbiology

Many professional organization’s websites have career information on them. You can often use them to search for networking events, meet a mentor in your field of study, find current research, search for internships or jobs, and gain insight into what direction within the field you may wish to pursue.

Career Services has additional lists of professional organizations and resources in specialty areas such as animal sciences, health services, ecology, and science communication. Ask your career advisor!

MICROBIOLOGY	
American Microscopical Society	<a href="http://amicros.org">http://amicros.org</a>
American Society for Microbiology	<a href="http://www.asm.org">www.asm.org</a>
Microscopy Society of America	<a href="http://www.microscopy.com">www.microscopy.com</a>
Society for General Microbiology	<a href="http://www.sgm.ac.uk">www.sgm.ac.uk</a>
Society for Industrial Microbiology	<a href="http://www.simbhq.org">www.simbhq.org</a>
CELL BIOLOGY	
American Physiological Society	<a href="http://www.the-aps.org">www.the-aps.org</a>
American Society for Biochem & Molecular Bio	<a href="http://www.asbmb.org">www.asbmb.org</a>
American Society for Cell Biology	<a href="http://www.ascb.org">www.ascb.org</a>
International Cell Death Society	<a href="http://www.celldeath-apoptosis.org">www.celldeath-apoptosis.org</a>
Microbiology Society	<a href="http://www.microbiologysociety.org">www.microbiologysociety.org</a>
Society for In Vitro Biology	<a href="http://www.sivb.org">www.sivb.org</a>
BIO-TECHNOLOGY	
Biotechnology Industry Organization	<a href="http://www.bio.org/">www.bio.org/</a>
Massachusetts Biotechnology Council	<a href="http://www.massbio.org/">www.massbio.org/</a>
Society for Industrial Microbio and Biotech	<a href="http://www.simbhq.org/">www.simbhq.org/</a>
FORENSICS	
American Academy of Forensic Science	<a href="http://www.aafs.org">www.aafs.org</a>
American Academy of Forensic Psychology	<a href="http://aafpforensic.org">http://aafpforensic.org</a>
American Board of Forensic Psychology	<a href="http://abfp.com">http://abfp.com</a>
American Academy of Psychiatry and the Law	<a href="http://www.aapl.org">www.aapl.org</a>
American Board of Criminalistics	<a href="http://www.criminalistics.com">www.criminalistics.com</a>

American Board of Forensic Anthropology	<a href="http://www.theabfa.org">www.theabfa.org</a>
American Board of Forensic Entomology	<a href="http://www.forensicentomologist.org">www.forensicentomologist.org</a>
American Board of Forensic Document Examiners	<a href="http://www.abfde.org">www.abfde.org</a>
American Board of Forensic Toxicology	<a href="http://www.abfo.org">www.abfo.org</a>
American Board of Medico-Legal Death Investigators	<a href="http://www.slu.edu/organizations/abmdi/">www.slu.edu/organizations/abmdi/</a>
American Board of Pathology	<a href="http://www.abpath.org/">www.abpath.org/</a>
American Society of Crime Laboratory Directors	<a href="http://www.asclcd.org/">www.asclcd.org/</a>
American Society of Forensic Odontology	<a href="http://asfo.org">http://asfo.org</a>
American Society of Questioned Document Examiners	<a href="http://www.asqde.org">www.asqde.org</a>
Association of Forensic DNA Analysts and Administrators	<a href="http://www.afdaa.org/">www.afdaa.org/</a>
Association of Forensic Quality Assurance Managers	<a href="http://www.afqam.org/">www.afqam.org/</a>
International Association for Identification	<a href="http://www.theiai.org/">www.theiai.org/</a>
International Association of Forensic Nurses	<a href="http://www.forensicnurses.org/">www.forensicnurses.org/</a>
International Association of Forensic Toxicologist	<a href="http://www.tiaft.org/">www.tiaft.org/</a>
Mid-Atlantic Association of Forensic Scientists	<a href="http://www.maafs.org/">www.maafs.org/</a>
National Association of Medical Examiners	<a href="http://www.thename.org/">www.thename.org/</a>
National Center for Forensic Science	<a href="https://ncfs.ucf.edu">https://ncfs.ucf.edu</a>
National Forensic Science Technology Center	<a href="http://www.nfstc.org/">http://www.nfstc.org/</a>
Society of Forensic Toxicologists	<a href="http://www.soft-tox.org">www.soft-tox.org</a>
Southern Association of Forensic Scientists	<a href="http://www.southernforensic.org/">www.southernforensic.org/</a>
Southern California Association of Fingerprint Officers	<a href="http://www.scafo.org/">www.scafo.org/</a>
Southwest Association of forensic Document Examiners	<a href="http://www.swafde.org/">www.swafde.org/</a>
Technology Programs of the National Institute of Justice	<a href="http://www.ojp.usdoj.gov/nij/sciencetech/">www.ojp.usdoj.gov/nij/sciencetech/</a>
Zeno's Forensic Site	<a href="http://www.forensic.to/forensic.html">www.forensic.to/forensic.html</a>
<b>WOMEN IN BIOLOGY</b>	
Women in Biology	<a href="http://womeninbio.org">womeninbio.org</a>



## Important Transferable Qualities To Include On Your Resume

**Communication skills.** Microbiologists should be able to effectively communicate their research processes and findings so that knowledge may be applied correctly.

**Detail oriented.** Microbiologists must be able to conduct scientific experiments and analyses with accuracy and precision.

**Interpersonal skills.** Microbiologists typically work on research teams and thus must work well with others toward a common goal. Many also lead research teams and must be able to motivate and direct other team members.

**Logical-thinking skills.** Microbiologists draw conclusions from experimental results through sound reasoning and judgment.

**Math skills.** Microbiologists regularly use complex mathematical equations and formulas in their work. Therefore, they need a broad understanding of math, including calculus and statistics.

**Observation skills.** Microbiologists must constantly monitor their experiments. They need to keep a complete, accurate record of their work, noting conditions, procedures, and results.

**Perseverance.** Microbiological research involves substantial trial and error, and microbiologists must not become discouraged in their work.

**Problem-solving skills.** Microbiologists use scientific experiments and analysis to find solutions to complex scientific problems.

**Speaking skills.** Microbiologists frequently give presentations and must be able to explain their research to others.

**Time-management skills.** Microbiologists usually need to meet deadlines when conducting research and laboratory tests. They must be able to manage time and prioritize tasks efficiently while maintaining their quality of work.

**Writing skills.** Microbiologists write memos, reports, and research papers that explain their findings.

## What Do Employers Look For? (NACE 2020 Job Outlook for Students)

