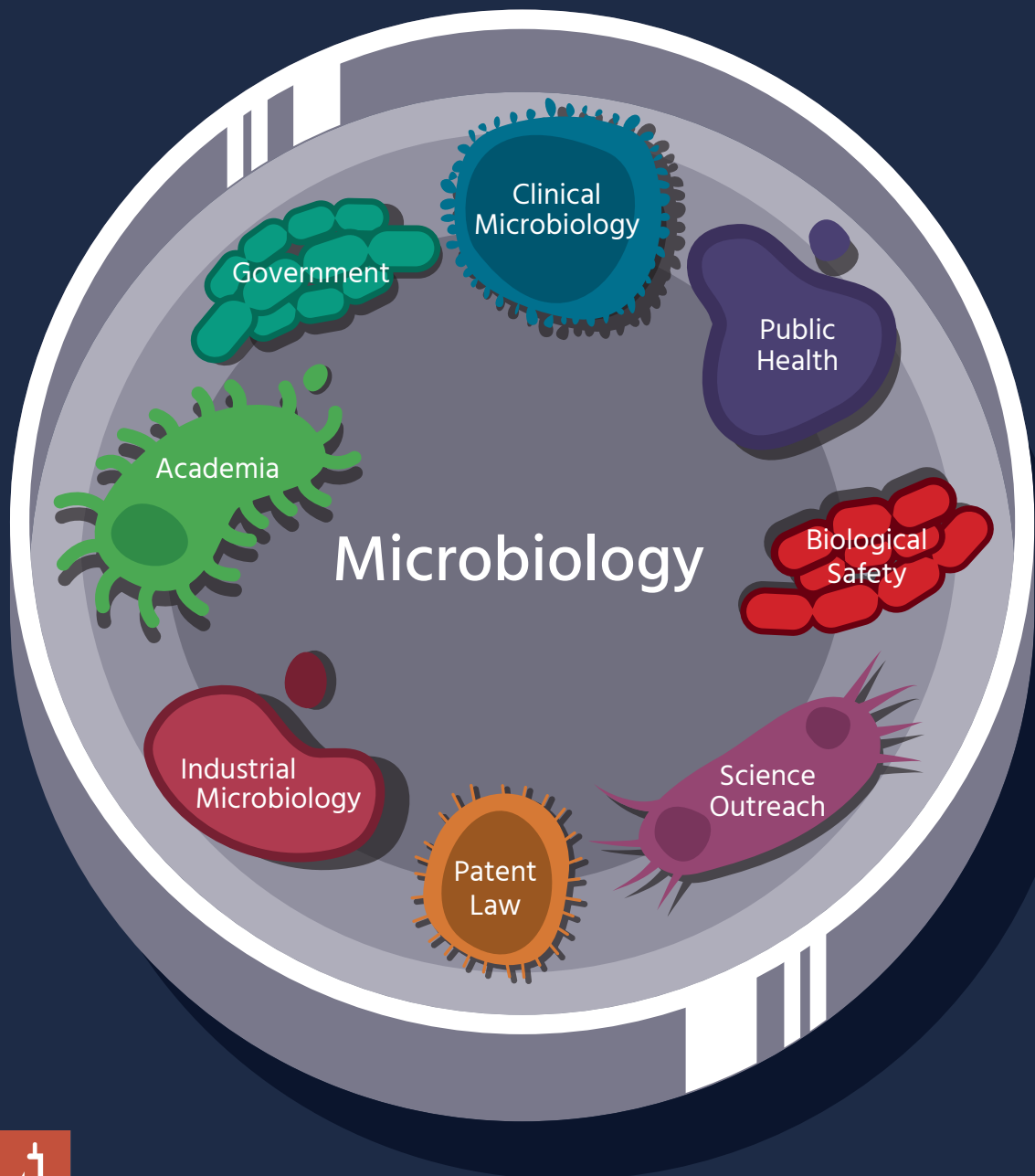


# Careers in Microbiology



AMERICAN  
SOCIETY FOR  
MICROBIOLOGY



[asm.org/careers](http://asm.org/careers)

## **A NEW CAREER WEBSITE FROM ASM**

Visit the one-stop shop for all ASM career-related materials. Find resources from across the Society and browse sections about skill building, funding, volunteer opportunities within ASM, and multiple resources to learn and plan for different careers.



# Academia

A woman with dark hair tied back, wearing a white textured sweater, is seen from behind, gesturing with her right hand while speaking to a classroom of students. The students are seated at desks in the background, some looking towards her. The image is partially covered by a green diagonal overlay on the left side.

## **What does this person do?**

- Teaches lecture and/or laboratory courses to undergraduate and/or graduate students
- Writes grants to obtain money for labs or training programs
- Reads literature, identifies gaps, develops hypotheses, conducts protocols to test hypotheses, analyzes data, presents major findings at national and international meetings, and publishes findings in scientific journals
- Manages a budget and the scientists and trainees in a research lab
- Sits on committees pertaining to graduate recruitment, curriculum, and training

## **Where does this person work?**

- Community Colleges
- Private and Public Universities (these can be designated as primarily undergraduate universities or research intensive universities)

## **What to Consider before Entering the Profession:**

- How much do you like teaching?
- Do you like writing grants and managing a budget?
- Do you thrive on conducting research and coming up with ideas?
- Do you like having flexibility with schedules and research topics?

## **Other Information:**

- Teaching and research loads will vary depending on the type of college/university. At community colleges, teaching is the only activity, there is no research. At primarily undergraduate universities, you will mostly teach and do a little research. This is the inverse for research intensive universities.
- With an MD or MD/PhD, a person will spend time doing research, teaching, or seeing patients in the hospital. The amount spent on these tasks differs according to the job description.

## Education and Experience Requirements

Position	Education and Experience
<b>Lab Technician</b>	<ul style="list-style-type: none"><li>• Associate's, BS, or MS in science-related fields</li><li>• Some research experience</li></ul>
<b>Postdoctoral Fellow</b>	<ul style="list-style-type: none"><li>• PhD in science-related fields</li></ul>
<b>Research Scientist</b>	<ul style="list-style-type: none"><li>• MD, PhD, or MD/PhD in science-related fields</li><li>• Postdoc experience</li></ul>
<b>Tenure Professorship</b>	<ul style="list-style-type: none"><li>• MD, PhD, or MD/PhD in science-related fields</li><li>• Postdoc or research scientist experience</li></ul>
<b>Instructor</b>	<ul style="list-style-type: none"><li>• PhD in science-related fields</li><li>• MS or BS in science-related fields for community college positions</li><li>• Experience varies by college/university</li></ul>

### ASM and Other Resources:

#### Courses:

- ASM Biology Scholars Program
- ASM Scientific Writing and Publishing Course
- ASM Scientific Writing and Publishing Online Course
- ASM Grant Writing Course
- ASM Grant Writing Online Course
- ASM Science Teaching Fellows Course

#### Funding:

- ASM Robert D. Watkins Graduate Research Fellowship
- ASM Career Development Grant for Postdoctoral Women
- ASM Undergraduate Research Fellowship
- ASM Undergraduate Research Capstone Program

#### Postdoctoral Fellowships:

- Institutional Research and Academic Career Development Awards (IRACDA) Teaching Postdocs

#### Conferences/Meetings:

- ASM Conference for Undergraduate Educator (ASMCUE)
- ASM Microbe
- Annual Biomedical Research Conference for Minority Students (ABRCMS)

# Government



## **What does this person do?**

- Research: reads literature, identifies gaps, develops hypotheses, conducts protocols to test hypotheses, analyzes data, presents major findings at national and international meetings, and publishes findings in scientific journals
- Science Writing: writes content for specialists/non-specialists and presents it online or in-print in the format of articles, videos, podcasts, pamphlets, and magazines
- Program Officer: collects incoming grants/applications, organizes reviewers based on expertise to assess the grants/applications, and identifies large areas in science that need to be funded and researched to advance society
- Regulatory Affairs: reviews and approves new drug/medical device applications for clinical studies and marketing

## **Where does this person work?**

- National Institutes of Health (NIH)
- Food and Drug Administration (FDA)
- United States Department of Agriculture (USDA)
- Centers for Disease Control and Prevention (CDC)

## **What to Consider before Entering the Profession:**

- Teaching may be limited to small groups of trainees who are learning specific scientific methods/protocols
- You may conduct research and/or manage a team that does research
- There may be more administrative duties like scheduling, organizing, and leading meetings based on your position
- There are a lot more rules and regulations in government positions to ensure that the ethical and legal requirements are followed



## Education and Experience Requirements

Position	Education and Experience
<b>Lab Technician</b>	<ul style="list-style-type: none"><li>• Associate's, BS, or MS in science-related fields</li><li>• Some research experience</li></ul>
<b>Postdoctoral Fellow</b>	<ul style="list-style-type: none"><li>• PhD in science-related fields</li></ul>
<b>Research Scientists</b>	<ul style="list-style-type: none"><li>• MD, PhD, or MD/PhD in science-related fields</li><li>• Postdoc experience</li></ul>
<b>Science Writer</b>	<ul style="list-style-type: none"><li>• BS, MS, or PhD in science-related fields</li><li>• Experience varies</li><li>• Some positions may require a journalism degree</li></ul>
<b>Grant Administration/Program Officer</b>	<ul style="list-style-type: none"><li>• MD, PhD, or MD/PhD in science-related fields</li><li>• Some administrative experience</li></ul>
<b>Regulatory Affairs</b>	<ul style="list-style-type: none"><li>• MS, MD, PhD, or MD/PhD in science-related fields</li><li>• Experience that complements education</li></ul>

### Other Information:

- If you work at the FDA, you spend 50% of your time doing research and the other 50% doing regulatory work, i.e., reviewing applications.
- Grant writing is optional; you can write grants so that you can obtain funding to do the research of your choice. Otherwise, if your research is funded by the government, you may be assigned projects by department heads.

### ASM and Other Resources:

#### Internships:

FDA Regulatory Science Student Internship Program

#### Postdoctoral Fellowships:

- ASM/CDC Program in Infectious Disease and Public Health Microbiology
- ASM Congressional Science Fellowship
- Epidemic Intelligence Service CDC Fellowship
- NIH Recent Graduates Program

#### Other Programs:

- Oak Ridge Institute for Science and Education (ORISE) Research Programs
- FDA Commissioner's Fellowship Program
- FDA Postgraduate Research Program



# Clinical Microbiology

## **What does this person do?**

- Recommends methods for obtaining and transporting clinical specimens that would be most helpful in diagnosing infectious diseases
- Selects the most appropriate tests and identifies bacterial, viral, fungal, and parasitic agents that are likely to be contributing to infectious processes
- Determines the susceptibility of microorganisms to various antimicrobial agents that could be used to treat infections caused by the microorganisms
- Reports results to healthcare providers caring for patients in a clear, concise, and clinically relevant manner
- Works with healthcare teams, including public health officials, to improve processes to diagnose and control infectious diseases with a strong emphasis on effective communication at all levels
- Works with pharmaceutical and medical device manufacturers to develop new and improved technologies to confront emerging infectious diseases

## **Where does this person work?**

- Hospital Laboratories
- Commercial and Reference Laboratories (where more complex lab tests are often performed)
- Federal and State Government Laboratories
- State and Local Public Health Laboratories
- Hospital laboratories affiliated with Universities and Medical Schools
- Pharmaceutical and Diagnostic Instrument Companies

## **What to Consider before Entering the Profession:**

- Do you want to use your science knowledge in a healthcare environment?
- Would you prefer to stay “behind the scenes” rather than work directly with patients?
- Are you interested in helping to determine the causes of infections?
- Are you willing to at times work or be available to work weekends, evenings, and holidays?
- Are you organized and able to multitask in a high-workload environment?

## Education and Experience Requirements

Position	Education and Experience
<b>Medical Laboratory Technician (MLT)</b>	<ul style="list-style-type: none"> <li>• Associate's Degree</li> <li>• Completion of an accredited MLT program</li> <li>• ASCP certification (optional)</li> </ul>
<b>Medical Technologist (MT)</b> <b>Medical Laboratory Scientist (MLS)</b> <b>Clinical Laboratory Scientist (CLS)</b> Note: All designations describe the same position	<ul style="list-style-type: none"> <li>• BS in the biology/health-related sciences</li> <li>• Completion of an accredited MT program</li> <li>• ASCP certification (optional)</li> </ul>
<b>Clinical Microbiology Laboratory Director</b>	<ul style="list-style-type: none"> <li>• MD, PhD, or MD/PhD in Microbiology/Molecular Biology/Clinical Laboratory Science</li> <li>• Postdoc through ASM's CPEP training (optional but desirable), OR training for 3 years in a clinical microbiology lab, OR MD Clinical Microbiology Postgraduate Fellowship</li> <li>• Certified by: ABMM (American Board of Medical Microbiology) or American Board of Pathology - Medical Microbiology</li> </ul>

### Other Information:

- As a MLT, you analyze specimens and report results. MLS' have an added responsibility to perform more complex testing than MLTs.
- After several years of experience "on the bench" as an MLS, you can become a supervisor or manager.
- As a director of a clinical microbiology lab, you are responsible for tests performed in your laboratory, advise clinicians on test selection and interpretation, and serve as a microbiology resource for your health system beyond the laboratory.
- Most laboratory personnel in the clinical microbiology field are also qualified to work in public health laboratories.

### ASM and Other Resources:

#### Postdoctoral Fellowships:

- Committee on Postgraduate Education Programs (CPEP) training

#### Websites:

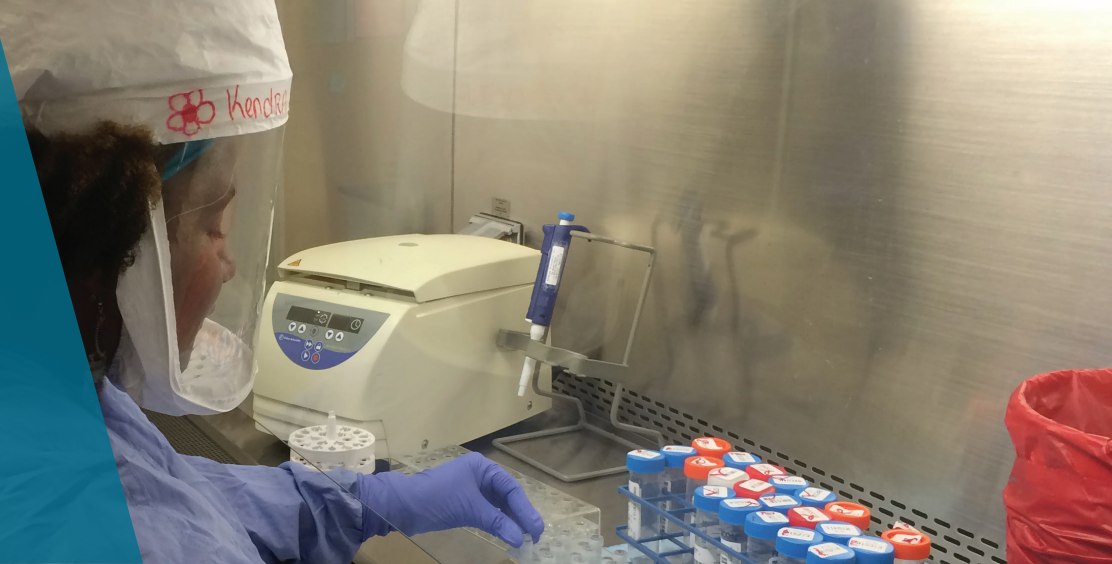
- National Accrediting Agency for Clinical Laboratory Sciences (NAACLS)
- Clinical Laboratory Improvement Amendments (CLIA)

#### Certifications:

- American Board of Medical Microbiology (ABMM) Certification
- American Society for Clinical Pathology (ASCP) Certification
- American Board of Pathology - Medical Microbiology



# Public Health



## What does this person do?

- Performs clinical diagnostic testing on patients to identify agents
- Tests animal and environmental samples to identify agents
- Communicates scientific information to government officials, epidemiologists, clinicians, and to the public
- Conducts disease surveillance and transmits the data to local, state, federal and international agencies
- Investigates infectious disease outbreaks and determines the modes of disease transmission
- Analyzes public health threats and provide information for effective responses
- Performs research and development for diagnostic test methods not available in clinical labs
- Develops policies, guidelines, and regulations related to public health and best laboratory practices
- Provides training and continuing education to clinical labs and medical providers

## Where does this person work?

- Local, State, or Federal Government Public Health Laboratories

## What to Consider before Entering the Profession:

- You will need to know the basics of infectious disease agents, transmission and diagnostics, and be prepared for a very steep learning curve when a new disease arises.
- Training in epidemiology principles and concepts is important
- The work load becomes high and fast-paced during times of an outbreak and emergencies.

## ASM and Other Resources:

### Fellowships:

- ASM/CDC Program in Infectious Disease and Public Health Microbiology Postdoctoral Fellowship
- Committee on Postgraduate Education Programs (CPEP) training
- US Agency for International Development (USAID) Global Health Fellows Program
- Association of Public Health Laboratories (APHL) Emerging Infectious Diseases Laboratory Fellowship Program

## Education and Experience Requirements

\*Note - Some states have specific requirements such as licensure. Also, requirements may vary depending on the level of Clinical Laboratory Improvement Amendments (CLIA) testing being performed.

Position	Education and Experience
Laboratory Aide/Assistant	<ul style="list-style-type: none"><li>High school diploma</li></ul>
Laboratory Technician or equivalent	<ul style="list-style-type: none"><li>Associate's Degree</li><li>Completion of an accredited MLT program (optional)</li><li>ASCP certification (optional)</li></ul>
Public Health Laboratory Scientist (Entry, Intermediate, Senior, Lead)	<ul style="list-style-type: none"><li>BS or MS in the biological sciences/health-related sciences, or MPH</li><li>Years of experience reflects position (Entry:0-1, Intermediate:1-3, Senior:5-7, Lead:10+)</li><li>Completion of an accredited MT program (optional)</li><li>ASCP certification (optional)</li></ul>
Public Health Laboratory Director	<ul style="list-style-type: none"><li>PhD (in some cases an MS with several years of experience) in Microbiology/Molecular Biology/Clinical Laboratory Science/Biological Science</li><li>If overseeing clinical testing you will need to comply with CLIA guidelines, which are:<ul style="list-style-type: none"><li>MD, PhD, or MD/PhD in Microbiology/Molecular Biology/Clinical Laboratory Science/Biological Science</li><li>Certified by: ABMM (American Board of Medical Microbiology) or ABB (American Association of Bioanalysis) Directors that oversee diagnostics and/or environmental testing laboratories need to meet federal and state qualifications for experience, education, and licensure</li></ul></li></ul>

### Websites:

- Learn about careers in public health from Association of Public Health Laboratories (APHL): [www.thatssick.org](http://www.thatssick.org)
- Clinical Laboratory Improvement Amendments (CLIA)

### Certifications:

- American Board of Medical Microbiology (ABMM) Certification
- American Society for Clinical Pathology (ASCP) Certification
- American Association of Bioanalysis (ABB) Certification

# Biological Safety



## What does this person do?

- Implements a successful Biological Safety Management Program - this is a framework comprised of organizational structure, policies, practices, and biosafety guidance instituted and supported by management that provides procedures and accountability for preventing occupationally-acquired infections or release of harmful organisms to the environment
- Promotes and enforces evidence-based safe laboratory practices, procedures, and proper use of containment equipment and facilities in order to (a) prevent injury, infection, and death of employees and the public, (b) prevent environmental contamination, and (c) comply with Federal, State, and Local regulations and guidelines
- Emphasizes that safety is a shared responsibility (shared accountability) among the institution and its workers by promoting a “culture of safety” within the organization and encouraging responsible activities among laboratory workers
- Builds relationships with leadership to ensure commitment to safety and an atmosphere of trust
- Works directly with appropriate personnel to provide advice on laboratory design

## Where does this person work?

- Research and development facilities like academia and industry
- Private and hospital clinical laboratories
- Veterinary diagnostic and research facilities
- Government agencies
- Manufacturing facilities

### **What to consider before entering the Profession:**

- The biological safety career path focuses on laboratory technical skills, the practice of positive interpersonal relationships, and a genuine interest in providing a safe working environment for employees
- It is important to realize that as a Biosafety Officer you may encounter work involving potentially dangerous microbial pathogens and toxins, animals, plants, hospital patients, clinical specimens and industrial and manufacturing facilities
- The facilities may be small or large and may involve various levels of biocontainment
- As a Biosafety Officer, you must display a passion for your profession

### **Education and Experience Requirements:**

- A strong background in the biological sciences is recommended.
- Entry level positions require a BS or MS degree with emphasis on biology and chemistry
- Laboratory experience is optional but strongly recommended because it facilitates communication with laboratory workers and serves as an aid to earn the trust and respect from your peers, staff, and management and builds upon your credibility foundation
- Different positions within the biosafety discipline are predicated upon education, experience and perhaps documentation of registration or certification as a biosafety officer or Specialist Microbiologist (Biological Safety)
- Continuing education throughout an individual's career is a must as the biosafety professional must adapt to changes in the life sciences.

### **Other Information**

- The titles in biosafety are dependent upon the function and mission of employment venues (i.e., Government, pharmaceutical, research and development) – some titles include Director of Safety (or similar title), Senior Biosafety Officer and Assistant Biosafety Officer

### **ASM and Other Resources:**

#### **Program:**

- National Biosafety and Biocontainment Training Program (NBBTP)

#### **Website:**

- American Biological Safety Association (ABSA) International

#### **Certification:**

- National Registry of Certified Microbiologists (NRCM)-Specialist Microbiologist in Biological Safety Certification



A photograph of two women sitting at a table in a meeting or conference setting. The woman on the left is looking towards the woman on the right, who is speaking. They are both wearing lanyards. The background is slightly blurred, showing other people and tables.

# Science Outreach

## **What does this person do?**

- Organize activities that promote communication and training of science students
- Conduct needs-based assessments from the serving population
- Initiate new programs to cover gaps in communication and training
- Lobby/search for money to fund programs
- Create relationships with potential volunteers/vendors to assist in programs
- Created marketing materials and promotes programs

## **Where does this person work?**

- Nonprofit agencies
- Universities and colleges

## **Education and Experience Requirements**

The degrees and experience for this position vary:

- Positions focused on science communication require a BS, MS, or PhD in science fields and journalism experience or degree
- Positions focused on training of science students require a BS, MS, or PhD in science, higher education, or career advising
- Director-level positions require a BS, MS, or PhD with many years of relevant experience

## **What to Consider before Entering the Profession:**

- Do you like traveling and meeting people? At nonprofits, you attend conferences to recruit volunteers for programs and promote your activities.
- The work you do stands behind the company's name, not yours, i.e., there is no publication credit.

## **ASM and Other Resources:**

### **Fellowships:**

- American Association for the Advancement of Science (AAAS) Mass Media Science and Engineering Fellows Program
- ASM Congressional Science Fellowship
- National Cancer Institute (NCI) Health Communications Internship Program





# Patent Law

## What does this person do?

- Researches whether the idea/product from a scientist is patentable
- Applies for patents on the behalf of a scientist and guides them through the legal process
- Handles the rights of the patent by deciding whether someone is infringing on the patent and representing the patent in the court of law

## Where does this person work?

- US Patent and Trademark Office
- Private Law Practice

## What to Consider before Entering the Profession:

- Do you like to read and write? Every time you apply or receive a patent, you must do your own research to determine whether the invention/idea is patentable, so you spend about 90% of your time reading and writing.

## Other Information:

In the US Patent and Trademark Office:

- A patent examiner evaluates patent application

In a private law practice:

- A technical specialist acts as a consultant to explain the science of a patent application to patent agents that file the application
- A patent agent writes and submits patent applications & relays application information to inventors
- A patent attorney represents the owners of the patent in the court of law

## Education and Experience Requirements

Position	Education and Experience
Patent Examiner	<ul style="list-style-type: none"><li>• BS, MS, or PhD in the science fields</li></ul>
Technical Specialist	<ul style="list-style-type: none"><li>• BS, MS, or PhD in the science fields</li><li>• No law degree required</li></ul>
Patent Agent	<ul style="list-style-type: none"><li>• BS, MS, or PhD in the science fields</li><li>• Pass the USPTO patent exam</li></ul>
Patent Attorney	<ul style="list-style-type: none"><li>• BS, MS, or PhD in the science fields</li><li>• Law degree required</li><li>• Pass the USPTO patent exam and state bar</li></ul>



# Industrial Microbiology

## What does this person do?

- Food production: understands and develops the standards for microorganism content food production, like yogurt, beer, or wine
- Bioremediation: cleans up waste or toxic chemicals with organisms
- Wastewater management: studies the wastewater systems to understand optimum conditions to prevent microbial growth
- Microbial control: evaluates existing microbial control techniques and creates new products/methods
- Fermentation and Cell Culture: optimizes the machines and conditions used to grow microorganisms and cells in large quantities during product development
- Metabolic Engineering: creates tools to increase the expression of natural and synthetic products
- Biotechnology: develops large molecular tools, like reagents and instruments
- Pharmaceutical: develops novel, small-molecule drugs and medical devices

## Where does this person work?

- Biotechnology companies
- Pharmaceutical companies
- Food manufacturing/production companies
- Skin care product development/manufacturing companies
- Contracting companies that offer specific services

## Education and Experience Requirements

Varies based on positions:

- Most research and project manager positions require a PhD with relevant industry experience
- Research on the preclinical and clinical studies require a PhD or MD with relevant industry experience

- For sales and marketing positions, companies favor science undergraduate degrees and an MBA, some have advanced degrees
- Any positions in regulatory affairs favors science undergraduate degrees, some have advanced degrees
- For quality assurance and control, you need a science undergraduate degree, some have advanced degrees

### **What to Consider before Entering the Profession:**

- Do you like to explore projects or stick with the goals/vision of the company? When working in industry, your research has to fit within the goals/vision of the company—therefore, there is little room for exploratory research.
- Do you like to overcome the barriers in research or your experiments? Sometimes in industry, projects don't work and they get terminated.
- Do you like seeing projects from start to finish? In industry, each person does their part and hands the project to someone else.
- Do you like conducting your work under strict rules and regulations? Because of the strict guidelines from the government, industries have to follow protocols for their products/drugs.

### **Other Information:**

- Once you get into the research side of industry, there are many opportunities to move up the ladder and/or laterally into different business aspects of the company.

### **ASM and Other Resources:**

#### **Course:**

- ASM Turning your Science into a Company

#### **Certification:**

- National Registry of Certified Microbiologists (NRCM):
  - Registered Microbiologist in Food Safety and Quality Certification
  - Registered Microbiologist in Pharmaceutical and Medical Device Certification
  - Specialist Microbiologist in Pharmaceutical and Medical Device Certification



# CONNECT

ASMCareerConnections.org

**AN ASM MICROBIOLOGY JOBS WEBSITE**

Finding that new job just got a little easier. ASM Career Connections is the go to source for jobs in all areas of microbiology—academia, clinical, industry, government, and more. Find your future today.





# Build Your Science Career!

Sign up to receive ASM's monthly career newsletter with information on your career options, career tips, and the latest job openings.

[asm.org/career-talk](http://asm.org/career-talk)

How do I network effectively?

What's the difference between a CV and resume?

How do I get into a non-research career?

What are the steps to interviewing?

What should I do next in my career?

How do I write a grant application?





[asm.org](http://asm.org)

[asm.org/careers](http://asm.org/careers)