

Science and Engineering

*Anatomist, Biomedical Engineer, Biomedical Equipment Technician,
Food Scientist, Health Scientist, Occupational Safety Specialist*



Anatomist, Biomedical Engineer

Anatomist

JOB DESCRIPTION

Anatomists investigate organisms and their structures to discover their form and how they work. Anatomists teach medical, dental, and allied health students about the structure and function of the human body. As researchers, they may be involved in any aspect of biomedical research, from problems at the molecular level to those of the entire body. Their work may involve biomedical imaging as well as the medical fields of neuroanatomical or developmental human anatomy, or the biological fields of anthropology, embryology, genetics, endocrinology and others.

WORK ENVIRONMENT

Anatomists work primarily in the classroom of medical colleges and universities or in research laboratories. Some may be employed in hospitals as physicians or work in veterinary clinics and laboratories. It is not

unusual for an anatomist to work more than 40 hours a week, depending on the place of employment. They may split their time between the classroom and the laboratory.

ANNUAL WAGES

National	\$59,218
New York State	\$62,192

National and New York State median annual earnings for Medical Scientists for 2003. U.S. Department of Labor, Bureau of Labor Statistics.

ACADEMIC REQUIREMENTS

To be a practicing anatomist requires either an MD degree or a PhD. Many anatomists hold doctorate degrees in dental, osteopathic, or veterinary medicine, and most medical, veterinary, and osteopathic training schools have anatomy departments that provide students with instruction and advice on research projects in the field.

PROFESSIONAL ORGANIZATIONS

American Association of Anatomists
 American Association of Clinical Anatomists

For professional organization address and phone information see Appendix B.

EDUCATIONAL INSTITUTIONS

For a listing of educational programs in New York State for Science and Engineering see page 63.

Biomedical Engineer

JOB DESCRIPTION

Biomedical engineers combine their knowledge of science and engineering to design and develop medical equipment and instruments that improve the quality of life of patients. Biomedical engineers have designed devices such as pacemakers, artificial kidneys, heart valves, surgical lasers, and live support equipment. Also, they install, maintain and repair biomedical equipment. Some biomedical engineers teach; others manage laboratories. Biomedical engineers may specialize in bioinstrumentation, biomaterials, biomechanics, clinical engineering, computers, rehabilitation engineering, systems physiology, telemedicine, and teleradiology.

WORK ENVIRONMENT

The biomedical engineer may work in a variety of medical and technical settings. Most jobs are in hospitals, industrial manufacturing companies, private and university-level research facilities,

medical schools, and the government. Depending upon the work setting, hours may vary, although the 40-hour workweek is a typical option.

ANNUAL WAGES

National	\$63,669
New York State	\$65,187

National and New York State median annual earnings for 2003. U.S. Department of Labor, Bureau of Labor Statistics.

ACADEMIC REQUIREMENTS

All biomedical engineers have at least a bachelor's degree in engineering. Many have advanced graduate degrees as well. The doctoral degree is typically required for a teaching or administrative position at the university level. Courses of study include a sound background in mechanical, chemical, or industrial engineering, and specialized biomedical training. Most programs last from four to six years, and all states require biomedical engineers to pass examinations and be licensed.

PROFESSIONAL ORGANIZATIONS

Biomedical Engineering Society
 Junior Engineering Technical Society

For professional organization address and phone information see Appendix B.

EDUCATIONAL INSTITUTIONS

For a listing of educational programs in New York State for Science and Engineering see page 63.

Biomedical Equipment Technician, Food Scientist

Biomedical Equipment Technician

JOB DESCRIPTION

Biomedical equipment technicians install, operate, repair, and maintain equipment such as X-ray machines, incubators, electronic thermometers, dental equipment, cardiac pressure monitors, and sterilizers. The biomedical equipment technician also instructs other healthcare personnel in the correct use of the equipment and assists in the evaluation of new devices.

WORK ENVIRONMENT

Some biomedical equipment technicians work in hospitals and large clinics. Others work on teams with biomedical or clinical engineers, medical personnel and scientists, or for manufacturers of biomedical equipment. These technicians often work a standard 40-hour week, but occasionally are on-call around the clock to attend to emergency situations.

ANNUAL WAGES

National\$37,960
 New York State\$39,062

National and New York State median annual earnings for Medical Equipment Repairs for 2003. U.S. Department of Labor, Bureau of Labor Statistics.

ACADEMIC REQUIREMENTS

Biomedical equipment technicians are not required to be certified. Employers may hire individuals who have a background in electronics and train them on the job. However, most prefer graduates of formal biomedical equipment technology programs. Training in these programs usually takes two years at a community college. Certification is available after appropriate training and /or experience from the International Commission for Clinical Engineering and Biomedical Technology.

PROFESSIONAL ORGANIZATIONS

Association for the Advancement of Medical Instrumentation

For professional organization address and phone information see Appendix B.

EDUCATIONAL INSTITUTIONS

For a listing of educational programs in New York State for Science and Engineering see page 63.

Food Scientist

JOB DESCRIPTION

Food scientists, also referred to as food technologists and food engineers, apply science to the selection, preservation, processing, packaging, distribution, and use of safe, nutritious, and wholesome food. They may develop new foods or new ways to make them, check the safety of food additives and ingredients, or investigate the effects of processing and packaging methods. Food scientists may assist developing countries suffering from a shortage of nutritious food because of famine, poor sanitation and food preservation, or insufficient processing. They may also serve as researchers dedicated to improving current food science practices or as teachers of food science.

WORK ENVIRONMENT

Food scientists are employed throughout the United States in a variety of capacities. Many jobs are available through governmental agencies, such as the Department of Agriculture, Department of Health and Human Services, and even the World Health Organization or United Nations. Most food scientists are employed in private industry and the food manufacturing, processing and distribution sectors. There are many job opportunities in research and academia. The typical workweek is 40 hours for most food scientists, but this may vary by employer or by work setting.

ANNUAL WAGES

National\$49,504
 New York State\$47,923

National and New York State median annual earnings for 2003. U.S. Department of Labor, Bureau of Labor Statistics.

ACADEMIC REQUIREMENTS

Most jobs in food science require at least a four-year bachelor's degree in food science or a related field. Many institutions offer master's and doctoral level programs for students interested in furthering their education or specializing within food science. Upper level research and teaching positions are often only open to candidates with their doctorate.

PROFESSIONAL ORGANIZATIONS

Institute of Food Technologist

For professional organization address and phone information see Appendix B.

EDUCATIONAL INSTITUTIONS

For a listing of educational programs in New York State for Science and Engineering see page 63.

Health Scientist, Occupational Safety Specialist

Health Scientist

JOB DESCRIPTION

The term health scientist refers to all biological, medical, and non-biological scientists who work to promote health and study health issues. These scientists are predominantly researchers, but may also teach or work in an industrial capacity.

AREAS OF SPECIALIZATION

Biochemists – study the inherent chemical processes that are responsible for such things as sustaining life, governing metabolism, and controlling reproduction in living organisms.

Botanists – are biologists who specialize in all forms of plant life, including plant disease, photosynthesis, and plant identification.

Chemists – help develop drugs, sterile synthetic products, and other items that aid the advancement of medicine.

Ecologists – study the relationships between organisms and their environment.

Geneticists – are medical doctors who track genetic disease, study inheritance and multiple births, pioneer

genetic testing, and work at the molecular level to map genes and investigate chromosomal abnormalities.

Health Physicists – study the effects of radiation on living things and expose the hazards of nuclear and radioactive waste.

Microbiologist – study microscopic organisms and may specialize in the areas of bacteriology, immunology, microbial physiology, mycology, parasitology, or virology.

ANNUAL WAGES

National	\$48,797
New York State	\$52,104

National and New York State median annual earnings for 2003. U.S. Department of Labor, Bureau of Labor Statistics.

WORK ENVIRONMENT

Depending on the specific field in which a health scientist is employed, the work setting will vary. Most health scientists work in laboratories or in academics. Medical scientists may work in hospitals or in the drug industry, and some are licensed medical doctors. Government agencies such as the Department of Agriculture, Department of Health and Human Services, and Centers for Disease Control often hire health scientists. The medical research conducted by health

scientists is often of prime interest to voluntary health agencies. While traditional academic or laboratory scientists work standard office hours, those engaged in non-traditional projects may have a modified schedule.

ACADEMIC REQUIREMENTS

Virtually every college and university offers bachelor's degree programs in biological or related sciences. While a bachelor's degree qualifies an individual for employment in non-research, technical and assistant capacities, all other positions are generally reserved for those with a master's or doctoral degree. These upper level programs are generally specialized to a single scientific discipline. A master's degree qualifies one to perform applied research or assume jobs at the management level, and all college-level teaching and independent research jobs require a PhD.

PROFESSIONAL ORGANIZATIONS

American Association of Anatomists
American Association for Clinical Chemistry
American Society for Microbiology

For professional organization address and phone information see Appendix B.

EDUCATIONAL INSTITUTIONS

For a listing of educational programs in New York State for Science and Engineering see page 63.

Occupational Safety Specialist

JOB DESCRIPTION

The broad title of occupational safety specialist includes all occupational health and safety professionals who detect and identify accident-producing or hazardous conditions. They evaluate and communicate the severity of the hazards, and develop systems to control or eliminate them. Occupational health specialists may detect and correct industrial hazards such as radiation or pollution, redesign machinery to protect against worker injury, and investigate on-the-job psychological factors which may threaten employee health. Once a hazard control program is in place, occupational safety and health specialists monitor its effectiveness by observing the modified job site and analyzing statistical data on worker health. These professionals encompass many different occupational groups and job titles, including industrial hygienists,

safety engineers, occupational health and safety technologists, and risk managers.

WORK ENVIRONMENT

Occupational Safety and Health Specialists work with government agencies, private industry, environmental groups, and labor groups when designing and developing systems for a healthy work environment.

ANNUAL WAGES

National	\$47,590
New York State	\$49,962

National and New York State median annual earnings for 2003. U.S. Department of Labor, Bureau of Labor Statistics.

ACADEMIC REQUIREMENTS

Colleges and universities nationwide offer programs that qualify graduates to enter the occupational safety field. At the undergraduate level, students typically seek a degree in science or engineering. While a bachelor's degree may be sufficient for some entry-level positions, a master's degree increases the

likelihood of securing a job. Graduate degrees are offered in more specialized fields such as occupational health and/or safety technology, safety engineering, and industrial hygiene. There are master's level programs in industrial hygiene that are accredited by the Accreditation Board for Engineering and Technology. The American Board of Industrial Hygiene certifies safety professionals who have completed the necessary training and experience in occupational safety at an advanced level.

PROFESSIONAL ORGANIZATIONS

American Industrial Hygiene Association
American Society of Safety Engineers
National Environmental Health Association

For professional organization address and phone information see Appendix B.

EDUCATIONAL INSTITUTIONS

For a listing of educational programs in New York State for Science and Engineering see page 63.

New York State Educational Institutions

NEW YORK STATE EDUCATIONAL INSTITUTIONS WITH PROGRAMS IN SCIENCE AND ENGINEERING

(For New York State educational institution address and phone informations, see Appendix A.)

Adelphi University
 Barnard College
 Canisius College
 Clarkson University
 Colgate University
 College of Mount Saint Vincent
 Columbia University in the City of New York
 Concordia College
 Cornell University-Endowed Colleges
 Cornell University-New York State Statutory Colleges
 City University of New York Brooklyn College
 City University of New York City College
 City University of New York College of Staten Island
 City University of New York Graduate School and University Center
 City University of New York Hunter College
 City University of New York Kingsborough Community College
 City University of New York Lehman College
 City University of New York Medgar Evers College
 City University of New York Queens College
 City University of New York York College
 Daemen College
 Dominican College of Blauvelt
 Dowling College
 D'Youville College
 Elmira College
 Erie Community College
 Farmingdale-State University of New York
 Fordham University
 Hamilton College
 Hobart William Smith Colleges
 Hofstra University
 Houghton College

Iona College
 Ithaca College
 Keuka College
 Le Moyne College
 Long Island University-Brooklyn Campus
 Long Island University-C W Post Campus
 Manhattan College
 Manhattanville College
 Marist College
 Marymount College of Fordham University
 Marymount Manhattan College
 Medaille College
 Mercy College-Main Campus
 Molloy College
 Mount Saint Mary College
 Nazareth College of Rochester
 New York Institute of Technology-Manhattan Campus
 New York Institute of Technology-Old Westbury
 New York Medical College
 New York University
 Niagara University
 Pace University-New York
 Polytechnic University
 Rensselaer Polytechnic Institute
 Roberts Wesleyan College
 Rochester Institute of Technology
 Saint Bonaventure University
 Saint John Fisher College
 Saint Josephs College-Main Campus
 Saint Josephs College-Suffolk Campus
 Saint Thomas Aquinas College
 Siena College
 Skidmore College
 Southampton College of Long Island University
 St Francis College
 St John's University-New York
 St Lawrence University
 State University of New York at Albany

State University of New York at Binghamton
 State University of New York at Buffalo
 State University of New York at Stony Brook
 State University of New York College at Brockport
 State University of New York College at Buffalo
 State University of New York College at Cortland
 State University of New York College at Fredonia
 State University of New York College at Geneseo
 State University of New York College at New Paltz
 State University of New York College at Old Westbury
 State University of New York College at Oneonta
 State University of New York College at Oswego
 State University of New York College at Plattsburgh
 State University of New York College at Potsdam
 State University of New York College at Purchase
 State University of New York Health Science Center at Syracuse
 Syracuse University
 Teachers College at Columbia University
 The College of New Rochelle
 The College of Saint Rose
 The Sage Colleges-Albany Campus
 The Sage Colleges-Troy Campus
 Touro College
 Union College
 University of Rochester
 Utica College
 Vassar College
 Wagner College
 Wells College
 Yeshiva University

Source: U.S. Department of Education – Integrated Postsecondary Education Data System (www.nces.ed.gov/ipeds/) and the New York State Area Health Education Center System Data Resource Center, September 2003.