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Military Science and Technology

Opportunities

- Military research spans a wide range of topics and stages of development
- Late-stage research focuses on addressing operational needs and solving problems stated by the branches of the service in their strategic plans
- Basic research can reach into areas where the need is less immediate or well-defined, but there must be a tie-in with some future application or anticipated need

Education

- Fellowships and internships are available to undergraduates, graduates, and postdocs
- Technician-level jobs require a bachelor's degree in the relevant scientific field
- Research and program leadership positions require a Ph.D. (or M.D.) and postdoctoral work
- Medical workers may need training as first responders or in medical field laboratory procedures

Salaries

- New college graduates make \$30,000 to \$50,000 per year
- Supervisory-level technologists make \$50,000 to \$70,000
- Scientific without advanced degree make \$70,000 to \$100,000
- Scientists with advanced degrees make \$100,000 to \$125,000
- Senior Executive Service (SES) make \$120,000 and \$180,000 per year



Overview

Military research involves developing new weapons and protective gear, but it delves into a wider range of topics as well. Scientists and engineers working for the military develop pharmaceuticals and medical treatments; combat corrosion and microbial contamination; preserve food supplies for soldiers in remote locations; and work on portable energy sources to power equipment and vehicles. Much of the research funded by the military is designated as "dual use", with both military and civilian applications in mind.

Typical Work Duties

- Conduct laboratory research in military or academic laboratories, as an active military member or reservist, civilian government employee or contractor, or grant recipient
- Develop a product, piece of equipment, or method as a part of a funded program or contract
- Perform environmental and field studies to assess pollution levels at ordnance dumpsites, design protective clothing for use in extreme weather or hostile environments, or test new materials under realistic conditions
- Interact with officers and enlisted persons to learn about their daily operations and identify areas that could be addressed using technological improvements
- Contribute to educational programs for college and pre-college students, often as a condition of an academic grant, and sometimes focused on underserved and disadvantaged communities



Education

Undergraduates, graduates, and postdocs can work on military-funded research while they are still in school. Technicians and analysts require a bachelor's degree in a relevant scientific field. Research and program leadership positions require a Ph.D. (or M.D.) and postdoctoral work.

For some positions, additional specialized training is required. This could include CBRN defense procedures and toxic agent training or a HAZMAT Operations Certification. Medical workers may need training as first responders or in medical field laboratory procedures.

Program managers for the military's grants and contracts usually have an advanced degree in a relevant scientific field. Some managerial positions require master's degrees, others may require only a bachelor's degree.

High-level positions as program directors or executives may require specialized knowledge of a specific field, such as medicine, environmental science, or alternative energy sources. Additional experience in managing projects and people, budgeting, and speaking with members of the media or government is required for high-level positions. Knowledge of how to work with government agencies, legislative bodies, academic institutions, and grant-making agencies is helpful.



Licenses

Professional licenses may be required for certain specialties, but are not a general requirement. Scientists working at military facilities or on sensitive or classified projects may be required to maintain an active security clearance. U.S. citizenship is required for some types of work. Owners of small businesses wishing to obtain government contracts must go through a credentialing process. (Government agencies provide information on registering to do business with them on their websites.)



Workspace

Work environments vary widely, depending on the field of specialization and the specific project. Many military scientists work in a typical laboratory environment, often located on a military facility. Academic grant recipients and contract recipients may work in laboratories at their sponsoring university or company.

Some specializations, such as environmental monitoring and geoscience, require working in the field, including on board ships or onsite during military operations. Some (not all) military research facilities are in remote locations or on military bases.

Some scientists visit military installations and field locations to observe current conditions and technologies and to assess needs and requirements of the operational military units. Other military workers with science backgrounds work on-site during military operations, often in remote or dangerous locations.

The Office of Naval Research sponsors a program called Scientists to Sea, in which scientists spend time with Naval operational units on board ships to understand better how their research is being used, and to gain ideas on directions and needs for future research. The Army Research Laboratory sponsors consortia that partner academic researchers with those at military laboratories to foster collaboration and the exchange of ideas for specific research initiatives.



Is This Career a Good Fit for You?

Military research, even at the most basic level, focuses on solving specific problems and addressing

specific needs of the military forces. Military grants and other funding vehicles often have stringent reporting requirements, and funding recipients must show steady progress toward specific goals.

Military field work often involves travel to distant, and sometimes remote, locations and living and working under primitive conditions and extreme weather. Working in a hostile location may involve physical hardship or danger. Foreign operations may require an ability to interact constructively with people of other cultures. An ability to make intelligent decisions quickly under stress is important.

Small businesses that hope to work on military-funded project or provide a product or service must register and provide credentials. This ensures that your business meets the requirements for doing business with the military, and ensures that your business is entered into the proper category in various databases (this is important for getting repeat business or partnering with other businesses on large projects).

Submitting proposals requires you to provide a clear description of the product or service you are offering (often using a code number for your industry sector classification), and you must describe explicitly how your proposal addresses a stated need. Military agencies receive thousands of proposals, and a poorly developed or vaguely described idea generally doesn't get very far.

Often, accepting military funding will place restrictions on how and where a scientist can communicate the results of his or her research. Classified research is one obvious example, but research articles and conference presentations on unclassified research may also be required to pass through a security review before publication. Students working on classified projects will not be able to discuss their work except in the most general terms when they are applying for jobs.



Technical Skills

Military research and other science-related work takes many forms. Each type of job function requires its own set of skills, and no one position requires a person to be good at everything.

- Problem-solving skills and an interest in solving applied research problems
- Critical thinking and analytical skills to design experiments, troubleshoot processes, and analyze data collected
- Written and oral communication skills to explain findings and share results with scientists and nonscientists in the military and civilian sectors
- Computer skills, including familiarity with computer modeling and data analysis
- Organizational, budgeting, and record-keeping skills. An ability to fulfill government reporting and documentation requirements.



Career Path

Career paths vary widely. Scientists enter the field of military research with military or civilian backgrounds. They might work full-time on military projects, or have a military grant as one component of their funding portfolio.

One possible career path begins with participation in a military-funded summer program for high school students. This might lead to acceptance to a summer workshop program for college undergraduates and an undergraduate research project. A summer internship at a military laboratory could lead to a graduate research program, followed by a postdoctoral fellowship working on a military project. This would be good preparation for a staff research position at a military laboratory. This could lead to a position managing a research program or consortium, which could then lead to an executive position at a laboratory or research funding agency.



Salary

Civil-service (government employee) positions follow a pay scale specified by the job description and level of experience required. New college graduates (bachelor's degree) may start at about \$30,000 per year, while supervisory-level technologists make \$50,000 to \$70,000. Scientific positions that do not require an advanced degree, including managerial positions, pay \$70,000 to \$100,000. Research scientists with advanced degrees make an average of \$100,000 to \$125,000. Senior research scientists or those in the Senior Executive Service (SES) can make more than \$150,000 per year.

Researchers employed by the private sector and academia are generally paid whatever is typical for their industrial sector or type of academic institution and their level of education and experience.



Future Employment Trends

As with all areas of the Federal Government, the military is experiencing budget cuts and effects of the budget sequestration. This is expected to affect the number and types of research projects that can be funded. Funds previously used to support active troops in Afghanistan may become available for other purposes, but this is not guaranteed. Department of Defense civilian employee levels (overall) are being frozen at government fiscal year (GFY) 2010 levels through GFY2013, as is civilian pay through the end of calendar 2012.

Related Resources

- [Air Force Research Laboratory](#) (AFRL)
 - [Educational outreach](#)
 - [Internship program](#)
- [Army High Performance Computing Research Center \(AHPCRC\) Summer Institute for Undergraduates](#)
- [Army Research Laboratory](#) (ARL)
 - [Careers and outreach programs](#)
- Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2012-13 Edition, Military Careers
- [Department of Defense](#) (DOD) listing of registered websites
- [FedBizOpps](#) (Federal Business Opportunities)
- [John Keller, The incredible shrinking budget for U.S. military technology research.](#) *Military & Aerospace Electronics*. March 1, 2012
- [Naval Research Laboratory](#) (NRL)
 - [Programs for students and postdocs](#)
 - [Career opportunities](#)
- [Office of Naval Research](#) (ONR)
 - [Education and outreach:](#)
 - [Careers](#)
 - [Scientists to Sea program](#)
- [Philpott Ball & Werner, Investment Bankers. U.S. Department of Defense Procurement and RDT&E Report GFY 2013](#)
- [Salary and educational requirements for military careers](#)
- [U.S. DoD Defense Spending.](#) *Aeroweb*
- [U.S. Office of Personnel Management.](#) Compensation rates for GS levels and Senior Executive Service:

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