SCIENCE•TECHNOLOGY•ENGINEERING•MATHEMATICS

STEM PROFESSIONS HANDBOOK 2008–2009

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INTRODUCTION

STEM (Science, Technology, Engineering, and Mathematics) may best be defined as a large grouping of related and inter-related professions and fields that serve as the imaginative foundation for our innate human ability to affect evolution. STEM professionals are needed in every phase and facet of industry on the planet. They are the navigators and explorers of our last frontiers: ocean and space; the eradicators of devastating diseases, such as tuberculosis and polio; and the thinkers, designers, inventors, and developers of machines, tools, medicines, gadgets, and gizmos that influence every aspect of our existence. One need only consider what life would be like without a bridge, airplane, road, or tunnel, or what the world would be like without the computer, laser, or mobile phone, to realize the impact of STEM professions and professionals' contributions to mankind and society.

Further, STEM professions provide unique opportunities to confront important ethical questions and considerations as they pertain to our values, desires, and vision for the human race. These professions, while charting new frontiers, enlivening the job market, and improving our way of life, are faced with innovations that are paradoxically detrimental to society. New technolgies render certain jobs and workers obsolete. Similarly, the very technologies which help us to live more efficiently and effectively, often cause significant pressures on the environment.

This ever-shifting amalgam that is human advancement requires of its constituents a habit of constant learning, drive, and curiosity in order to keep up with the increasingly difficult challenges to society and the environment. However, it is the STEM professionals, more than any other group, that stand to make the most significant impact in reversing our seemingly, headlong rush into environmental disaster.

What follows is a breakdown of the STEM professions by field.

ACTUARIAL SCIENCE

"Actuaries are the brains behind the financial safeguards we have implemented in our personal lives, so we can go about our daily lives without worrying too much about what the future may hold for us."
— Unknown

DEFINITION OF PROFESSION

Actuarial science applies mathematics and statistic in an interdisciplinary approach of risk assessment, finance, economics, statistics, and probability.

An actuary is a professional who assesses the risk of certain financial and economic events for businesses, and who formulates policies that minimize the cost of that risk. In the insurance industry, actuaries assemble and analyze data to estimate cost and probability of the occurrence of an event, such as death, sickness, injury, disability, and loss of property. Additionally, professionals in this field address financial questions, including pension contributions related to retirement income, and return on investments in light of potential risk. Actuaries also design insurance policies, pension plans, and other financial strategies for sound financial planning and maintenance.

ABOUT THE FIELD

Actuaries are the leading professionals in helping others find ways to manage risk. They evaluate the likelihood of future events, and design creative ways to reduce the likelihood of undesirable events.

HOW TO GET THERE

Actuaries need a Bachelor's degree in mathematics, actuarial science, statistics, or in business-related disciplines, such as economics, finance, or accounting.

ON THE JOB

Actuaries are usually employed in the insurance industry where they specialize in life and health insurance or property and casualty insurance. Day-to-day activities include production of probability tables to determine the likelihood of potential future events with regards to claims. From these tables, actuaries estimate companies' expense on claims resulting, for example, from automobile accidents. They gauge this cost based on a variety of factors, including the insured person's age, sex, driving history, type of car, and other factors to ensure that the price or premium charged for such insurance will enable the company to cover claims and other expenses.

Within the life and health insurance fields, actuaries develop long-term-care insurance and annuity policies. In other financial services industries, professionals in this field manage credit and price corporate security offerings, and devise new investment tools to help your firms compete with other financial services companies.
Under the provisions of the Employee Retirement Income Security Act (ERISA) of 1974, actuaries evaluate pension plans covered by the Act, and report on the plans' financial soundness to participants, sponsors, and federal regulators. As government personnel, an actuary may help

to manage social programs, such as social security and Medicare.

SALARY RANGE
$52,741 to $107,650

TOOLS OF THE TRADE/LIFESTYLE
Actuaries often work at least 40 hours per week. Consulting actuaries travel to meet with clients and may experience erratic employment and increased weekly work hours. This desk job requires skill with statistical software, accounting software, and spreadsheets.

YOU ARE
Actuaries are detail oriented, good with numbers and mathematics, and enjoy mathematical modeling.

RELATED PROFESSIONS
Actuary professionals work with accountants and auditors, budget analysts, economists, market and survey researchers, financial analysts and personal financial advisors, insurance underwriters, mathematicians, and statisticians.

ANALYTICAL CHEMISTRY

"At the beginning of all experimental work stands the choice of the appropriate technique of investigation." — Walter Rudolf Hess

DEFINITION OF PROFESSION
Analytical Chemistry is the branch of chemistry that deals with chemical systems. Analytical Chemists are involved with making measurements using sophisticated state-of-the-art computer-controlled instrumentation in government laboratories, and in laboratories in the chemical, pharmaceutical, biotechnology, and food industries. These chemists are also suited for positions as quality assurance specialists. Analytical Chemistry is considered a service discipline.

ABOUT THE FIELD
The fundamental nature of elements and chemicals present in the world have been the subject of much early chemistry (1661–1900 AD), and can be identified as analytical chemistry. However, most of the major developments in analytical chemistry have taken place after 1900.

Since the 1970s, the field has become more inclusive of biological questions (bioanalytical chemistry), whereas prior to the '70s, the field focused primarily on inorganic or small organic molecules.

HOW TO GET THERE
- PhD in Analytical Chemistry.

- Solid background in chemistry and good laboratory, computer, and communication skills—essential for handling a wide variety of chemical measurements.
- Skilled as a chemical analyst with knowledge of the unique problems of other chemical disciplines (such as organic, polymer, inorganic, and environmental chemistries).
- Course work in advanced instrumental methods.
- Customer service, business, and management skills.

ON THE JOB
Analytical chemists perform qualitative and quantitative analysis, set error limits, validate/verify results through calibration and standardization, perform separations based on differential chemical properties, create new ways to make measurements, interpret data in proper context, and communicate results.

SALARY RANGE
$65,000 to $91,600

TOOLS OF THE TRADE/LIFESTYLE
Analytical chemists typically work 40 hours per week with some overtime. They leave work at the office because much of their work involves chemical laboratory equipment.

YOU ARE
Analytical chemists have a solid background in chemistry, a propensity toward detail, good computer skills, good laboratory and problem-solving skills, as well as good oral and written communication skills. You present reports, and must have the patience to perform often tedious procedures necessary for precise and accurate measurements. The ability to keep up with new techniques, instrumentation and technology are essential for troubleshooting and problem solving.

RELATED PROFESSIONS
Similar professions include biochemist and microbiologist

APPLIED MATHEMATICS

"A mathematician, like a painter or a poet, is a maker of patterns." — G.H. Hardy

DEFINITION OF PROFESSION
Applied Mathematics is a branch of mathematics involved with biological, sociological, or physical realms.

Applied mathematicians apply mathematical theories and techniques, such as mathematical modeling and computational methods, to formulate and solve practical problems in business, government, and engineering as well as in the physical, life, and social sciences.

ABOUT THE FIELD

Historically, applied mathematics consisted principally of applied analysis, most notably differential equations, approximation theory (broadly construed to include representations, asymptotic methods, variational methods, and numerical analysis), and applied probability. These areas of mathematics were intimately tied to the development of Newtonian Physics. Today, the term applied mathematics is used in a broader sense including the classical areas above, as well as other areas that have become increasingly important in applications, such as number theory or cryptology.

HOW TO GET THERE

- Ph.D. degree in mathematics

ON THE JOB

Applied mathematicians are part of interdisciplinary teams that may include economists, engineers, computer scientists, physicists, technicians, and others providing information and analysis on a variety of topics including scientific phenomena, insurance, and risk.

SALARY RANGE

$62,000 to $81,240

TOOLS OF THE TRADE/LIFESTYLE

Applied mathematicians typically work 40 hours per week, with special projects sometimes requiring extended hours. They use computer technology, including the Internet, e-mail, CD-ROMs, and software programs such as statistical packages.

YOU ARE

As an applied mathematicians you have good reasoning ability and staying power in order to identify, analyze, and apply basic principles to technical problems. Also important are communication skills in order to interact and discuss proposed solutions with people who may not have extensive knowledge of mathematics.

RELATED PROFESSIONS

Other occupations that require extensive knowledge of mathematics, or in some cases, a degree in mathematics, include: actuaries, statisticians, computer programmers, computer systems analysts, computer scientists and database administrators, computer software engineers, and operations research analysts, engineers, economists, market and survey researchers, financial analysts and personal financial advisors, and physicists and astronomers.

ASTROPHYSICS

"My goal is simple. It is complete understanding of the universe, why it is as it is and why it exists at all." — Stephen Hawking

DEFINITION OF PROFESSION

Astrophysics deals with stellar phenomena. Astrophysicists study objects in the universe, including galaxies and stars, in order to understand what they are made of, their surface features, and how they were formed.

ABOUT THE FIELD

Because astrophysicists study how the universe was formed and developed over time, the field is similar to anthropology. 3 out of 5 physicists and astronomers are employed by scientific research firms, development services firms, and the Federal Government.

HOW TO GET THERE

- PhD in Astrophysics.
- Bachelor's degree in Physics, Mathematics, Astrophysics, Astronomy, or a related subject from an accredited college or university. This study must include one physics or engineering lab in aerospace instrumentation.

ON THE JOB

Astrophysicists travel often in order to maximize the viewing time of various stellar events, conduct research, and test various types of scientific instruments and software. They are expected to analyze data, apply statistics, plotting, logging, archiving, evaluating and reporting of results, teach (at observatories, universities, and museums), educate the public and other professionals, publish, coordinate data from observations made by satellites and ground-based telescopes, calibrate sets of data, use different theoretical models to align images and compare data, and develop the written procedures and standards for analyzing data sets.

SALARY RANGE

$66,190 to $120,350

TOOLS OF THE TRADE/LIFESTYLE

Astrophysicists work 40 hours per week and travel approximately 40% of the time, using computers, sophisticated high-powered telescopes, astromaps, and planetaria.

YOU ARE

Becoming an astrophysicist requires patience, curiosity, good problem solving abilities, a good background in astronomy and physics, mathematics and chemistry, computer skills, art skills, the ability to work effectively as a member of a team in a scientific environment, and the skills to continue independent research along with skill in oral and written communication.

RELATED PROFESSIONS

Space scientist, astronomer, research scientist, physicist, planetary scientist, space physicist, dynamicist, planetary spectroscopist, galactic astronomer, and stellar spectroscopist.

AUTHORING/THEORIST/SCIENCE JOURNALISM

"Rather than the accumulation of theoretical tools and materials, models of analysis, perspectives and positions, the work of theory is to unravel the very ground on which it stands." — Unknown

DEFINITION OF PROFESSION

Authors/theorists/science journalists write nonfiction, theoretical, scientific educational articles for magazines, trade journals, online publications, or publish books in specialized areas. They are expected to establish credibility with editors and readers through strong research and the use of appropriate sources and citations. Sustaining high ethical standards and meeting publication deadlines are essential.

ABOUT THE FIELD

In academic publishing, authorship of a work is claimed by those making intellectual contributions to the completion of the research described in the work; therefore, theorists and scientific journalists are also authors. Scientific journalists generally review or critique exisitng research or theories.

HOW TO GET THERE

This is a very broad category. Professionals in this field have PhDs in an area of science or mathematics. Bachelor's degree vary as well, but it is beneficial to supplement with journalism and writing classes.

ON THE JOB

These professionals write on significantly relevant scientific findings published in popular and academic journals, and network with colleagues in the field.

SALARY RANGE

$44,350 to $60,000

TOOLS OF THE TRADE/LIFESTYLE

These professionals keep regular office hours, either to maintain contact with sources and editors or to establish a writing routine. Working evenings, nights, and weekends are common in order to produce acceptable copy for editors and clients, by publication deadlines. Authors/theorists/science journalists use computers, word processing programs, Internet, e-mail, CD-ROMs, journals and books.

YOU ARE

Authors/theorists/science journalists love writing and are able to express carefully researced ideas clearly and logically. Creativity, curiosity, a broad range of knowledge, self-motivation, and perseverance also are valuable. Good judgment and a strong sense of ethics are paramount, particularly in regards to publishing.

RELATED PROFESSIONS

Reporters, journalists, non-fiction writers, professors

BEHAVIORAL PHARMACOLOGY

"Over the past 30 years, behavioral pharmacology has grown from a discipline content to show . . . a drug['s] . . . behavioral effect . . . to a refined science widely used to evaluate mechanisms of drug action in both laboratory animals and human populations." — Developmental and Behavioral Pharmacology, vol. 5

DEFINITION OF PROFESSION

Behavioral pharmacology is a fusion of two fields: pharmacology and experimental psychology. The field focuses on the behavioral actions of drugs, rather than on mental or neural events.

Behavioral Pharmacologists study the impact of drugs on animal and human behavior.

ABOUT THE FIELD

Behavioral pharmacologists examine drugs with an emphasis on effects to the whole organism, taking into account the considerable influence of environmental variables on drug action.

Areas of interest in this field include the effects of centrally active drugs on conditional and unconditional behavior, application of receptor theory to behavioral pharmacology, pharmacological aspects of drug abuse, use of animal models to aid in the discovery and development of new pharmacological agents that treat psychiatric disorders, drug interactions, the effects of repeated and chronic exposures to drugs, and the use of pharmacological tools in the analysis of behavior.

HOW TO GET THERE

Behavioralpharmacologists need a minimum of a Bachelor's degree with courses in statistics, biology, biochemistry, organic chemistry, anatomy, and physiology. Laboratory experience is required, and a Master's degree psychopharmacology is preferred.

ON THE JOB

Behavioral pharmacologists conduct experiments on animals in order to trace potential effects and drug interactions in human beings. Professionals in this field write reports and assist the lead investigator with assigned tasks.

SALARY RANGE
$56,000 to $80,000

TOOLS OF THE TRADE/LIFESTYLE
Behavioral pharmacologists work 40 hours per week, but may incur overtime in order to meet deadline. The specific nature of experiments requires all duties to be performed in an laboratory setting. Personnel must be prepared to handle rodents, and exhibit manual dexterity with regard to lab equipment and chemicals agents.

YOU ARE
Attention to detail is important; as well as analytic abilities, and a lack of moral objections to experimenting on animals.

RELATED PROFESSION
Behavioral pharmacologists may work directly with biochemists.

BIOMEDICAL ENGINEERING

"Science is developed by man, and man is helped by developments in science." — Yuan-Cheng Fung

DEFINITION OF PROFESSION
Biomedical Engineering applies engineering practices to the medical field.

Biomedical Engineers develop devices and procedures that solve medical and health-related problems by combining biology and medicine with engineering principles and practices.

ABOUT THE FIELD
One of the goals of tissue engineering is to create artificial organs for patients that need organ transplants. Biomedical engineers are currently researching methods of creating organs. For example, bladders have been grown in labs and transplanted successfully into patients. In the United States, biomedical engineers may operate under two different regulatory frameworks: the Food and Drug Administration (FDA) or the Consumer Product Safety Commission.

HOW TO GET THERE
To become a biomedical engineer, a solid high school background in mathematics (algebra, geometry, trigonometry, and calculus) and science (biology, chemistry, and physics), with courses in English, social studies, and humanities are requisites. Further, a Bachelor's degree in biomedical engineering is required, and a graduate degree is highly recommended. Most engineers in this specialty need a sound background in another engineering specialty, such as mechanical or electronics engineering, in addition to specialized biomedical training.

ON THE JOB
Biomedical engineers research, develop and evaluate systems and products such as artificial organs, prostheses (artificial devices that replace missing body parts), instrumentation, medical information systems, and health management and care delivery systems. They work along with life scientists, chemists, and medical scientists, and design devices used in various medical procedures, imaging systems such as magnetic resonance imaging (MRI), and devices for automating insulin injections and controlling body functions.

SALARY RANGE
$48,503 to $107,530

TOOLS OF THE TRADE/LIFESTYLE
Professionals in this field work 40 hours per week with occasional overtime, and use computers, lab equipment, electronics, mechanical equipment, and biomechanical materials.

YOU ARE
Biomedical engineers are detail oriented, interested in technology and biological systems, and have good communication skills.

RELATED PROFESSIONS
Related professionals include biological scientists, medical scientists, and chemists and materials scientists.

BIOMIMICRY RESEARCH

"The conscious emulation of life's genius is a survival strategy for the human race, a path to a sustainable future. The more our world functions like the natural world, the more likely we are to endure on this home that is ours, but not ours alone." — Janine Benyus

DEFINITION OF PROFESSION
Biomimicry research professionals study the function and performance of biological organisms to determine potential human gain by mimicking their natural processes.

ABOUT THE FIELD
Biomimicry is a very new field that intersects life sciences, social sciences, and engineering. Its core philosophy rests on the premise that nature has already solved many of the problems with which humans are grappling.

HOW TO GET THERE
Because biomimicry requires advanced research skills. The average employee must have a PhD in wildlife biology, ecology, botany, or the environmental sciences with courses taken in biology, ecology, botany, environmental science, physics, chemistry, zoology, civil engineering, mechanical engineering, architecture, urban planning.

ON THE JOB
In collaboration with a team of researchers and policy analysts, biomimicry professionals identify and study naturally occurring processes, designs and phenomena that may be adapted to solve human problems. Daily activities include research, the writing and critiquing of research reports, communication with policy makers, grant writing, and meetings focused on research agendas.

SALARY RANGE
$60,000-$80,000

TOOLS OF THE TRADE/LIFESTYLE
As with most research professions, hours and working conditions vary in conjunction with type of research and environment. In most cases personnel work over 40 hours per week. Laboratory equipment will vary by project, but computers, cell phones and field equipment are generally office essentials. Expect to travel to conduct field research.

YOU ARE
Biomimicry researchers are interested in nature and solving human problems. The ability to see connections, associations and relationships at both the macro and micro level are key to solving complex problems associated with this field.

RELATED PROFESSIONS
Similar professions include consultant, sustainable development advocate, policy analyst, and life sciences researcher.

BROADCAST AND SOUND ENGINEERING

"A sound is something that you receive, but when you put sounds together, they are in a context. I smile when the sound is singing through the space." — David Tudor

DEFINITION OF PROFESSION
Broadcast and Sound Engineering is a specialized field dealing with the set up, operation, and maintenance of a wide variety of electrical and electronic equipment involved in radio and television broadcasts, theatre, musical recordings, television shows, and film-making.

Broadcast and Sound Engineering Technicians work in conjunction with a production team.

ABOUT THE FIELD
The profession is highly competitive, particularly in major metropolitan areas where salary rates are higher. About 30% of broadcast and sound engineering technicians work in radio and

television broadcasting. 17% are employed in the motion picture, video, and sound recording industries. Job growth in radio and television broadcasting dependent on factors such as the consolidation of ownership of radio and television stations, and labor-saving technical advances such as computer-controlled programming and remotely controlled transmitters.

HOW TO GET THERE

Professionals in this field start early. Usually in high school on a theatre set or school concert. Courses in math, physics, and electronics are important. There are many ways to enter this field, including: technical school, community college, and college training in broadcast technology, electronics, or computer networking. On the job training and apprenticeship are also key factors. A college degree in engineering is needed in order to become chief engineer at a large television station.

ON THE JOB

Technicians set up and operate a variety of audio and video equipment, including: microphones, sound speakers, video screens, projectors, video monitors, recording equipment, connecting wires and cables, sound and mixing boards, and related electronic equipment. The field can be very exciting as technicians often work in the proximity of celebrities and often in exotic locations. The field can also be a rewarding one creatively, as assessment of signal strength, clarity and range of sounds and colors, recording, synchronizing, mixing, and reproducing music, voices, and sound effects are inherent parts of the job.

SALARY RANGE

$56,320 to $80,450

TOOLS OF THE TRADE/LIFESTYLE

Broadcast and sound engineering technicians usually work a 40-hour week under great pressure to meet broadcast deadlines, and may occasionally work overtime. However, technicians who work for famous music performers are generally on-call at all times. Equipment include sound engineering equipment and computers.

YOU ARE

Technicians need manual dexterity and an aptitude for working with electrical, electronic, and mechanical systems and equipment.

RELATED PROFESSIONS

Broadcast and sound engineering technicians, in general, have aptitude for the following professions often becoming: engineering technicians, science technicians, electrical and electronics installers and repairers, computer support specialists and systems administrators, and communications equipment operators.

CLIMATOLOGY

"Look deep into nature, and then you will understand everything better." — Albert Einstein

DEFINITION OF PROFESSION

Climatology is the study of the climate. Climatologists study long-term trends in the climate in order to forecast major long-term changes.

ABOUT THE FIELD

Climatologists have analyzed the global warming that has occurred since the late 1800's. A majority of climatologists have concluded that human activities are responsible for most of the warming. The main human activities that contribute to global warming are the burning of fossil fuels (coal, oil, and natural gas) and the clearing of land. Most of the burning occurs in automobiles, factories, and electric power plants that provide energy for houses and office buildings.

HOW TO GET THERE

PhD in Atmospheric Sciences

ON THE JOB

Climatologists use GIS to conduct climate studies, and generate computer models that predict climate change based on data collected. They work in a variety of environments collecting data, from arctic regions to deep ocean terrain to the tops of mountains. Professionals in this field write computer programs to model changes in climate, develop new ways of taking the earth's temperature, fit sensors to marine animals, maintain sensor buoys out in the middle of the oceans, sample plankton, fish, and insects, and place sensors on the tops of mountains to measure snow depth.

SALARY RANGE

$48,880 to $86,610

TOOLS OF THE TRADE/LIFESTYLE

Work hours and variable and flexible. Climatologists use computers for computer modeling, data analysis and integration, digital mapping, remote sensing, and geographic information systems such as Geographic Information System (GIS) and Global Positioning System (GPS).

YOU ARE

Someone with excellent interpersonal skills, as climatologists usually work as part of a team with other scientists, engineers, and technicians. Strong oral and written communication skills also are essential for the writing of technical reports and research proposals, and the communication of technical and research results to company managers, regulators, and public. If involved in fieldwork, you have physical stamina.

RELATED PROFESSIONS

Atmospheric, environmental or geoscientists, physicists and astronomers, mathematicians, and

civil, chemical, and environmental engineers.

COGNITIVE SCIENCE RESEARCH

"To categorize is human, to distribute, divine." — Terrence Sejnowksi

DEFINITION OF PROFESSION

Cognitive science research combines the study of complex information processing in humans and machines with multidisciplinary study of biological and artificial systems.

Cognitive scientists research information processors, intelligence systems, and the mind.

ABOUT THE FIELD

Cognitive science research involves findings that help us understand how human beings learn. For example, we know now that babies raised in bilingual homes learn new words differently than infants of single-language homes. Another new study found that, when compared to boys and men, young girls and women are more likely to believe that negative past events predict future events. Recently, researchers have also found that music and language are processed by the same brain systems.

HOW TO GET THERE

Cognitive science researchers have PhDs in Cognitive Science. A Bachelor's degree in cognitive science with specializations in human computer interactions, intelligent systems, or cognition and neuroscience is also helpful.

ON THE JOB

Cognitive science researchers design research studies, supervise pre-doctoral researchers, write scientific articles, present at scientific conferences, and evaluate research findings.

SALARY RANGE

$60,000 to $80,000

TOOLS OF THE TRADE/LIFESTYLE

Cognitive science researchers work 40 hours per week using computers and sophisticated laboratory equipment.

YOU ARE

Cognitive science researchers ar able to communicate and write clearly and effectively, critically evaluate evidence and data, program and use computers, conduct mathematical analyses, and apply conceptual, analytical, and interpersonal skills to a variety of situations.

RELATED PROFESSIONS
Behavioral neuroscientist, neuroimmunologist, biomedical science journalist, neuroimaging technician, child psychologist, neuropharmacologist, counseling psychologist, neurophysiologist, neuropsychologist, neuroscientist, and neurochemist.

COLLEGE PROFESSOR IN MATH & SCIENCE

"We cannot teach people anything; we can only help [them] discover . . . within themselves.
— Galileo Galilei

DEFINITION OF PROFESSION
College professors instruct students in a wide variety of academic subjects that may lead to a degree, or create awareness of theories and practices of disciplines that may improve overall knowledge and enhance career skills.

ABOUT THE FIELD
College professors are usually organized into faculty departments or divisions based on academic subject or field. They usually teach several different related courses in their subject. They may also conduct research to expand the parameters of their field.

HOW TO GET THERE
Apart from attaining the PhD in a science or mathematics field, college professors, as with any other profession, have distinct paths to full professorship. They are adjunct professors, assistant professors, associate professors, and full professors. The responsibilities vary with the position, but the main differences between the titles are salary, teaching experience, and publications.

ON THE JOB
College professors teach assigned classes, mentor students, create curriculum, research and publish.

SALARY RANGE
$54,571 to $91,548

TOOLS OF THE TRADE/LIFESTYLE
College professors teach 12 to 16 hours per week, attend faculty and committee meetings, and are available during office hours for student consultations, usually 3 to 6 hours per week. In general, college professors have a considerable amount flexibility and independence in the preparaion of syllabi, supervision, grading, and research. They use computer technology, including the Internet, e-mail, CD-ROMs, and software programs such as statistical packages.

YOU ARE
As a professionals in this field, you have a strong desire to pursue and disseminate knowledge, have exceptional communication skills, and relate well with students. You are self-motivated

and able to work in an environment in which you receive little supervision.

RELATED PROFESSIONS

Teachers: preschool, kindergarten, elementary, middle, and secondary; education administrators; librarians; counselors; writers and editors.

COMPUTER SOFTWARE ENGINEERING

"At the end of the day the Internet is still all about Software." — Marc Andreessen, co-founder of Netscape

DEFINITION OF PROFESSION

Computer Software Engineering is a branch of engineering that applies the principles and techniques of computer science, engineering, and mathematical analysis in the creation of software and systems.

A computer software engineer applies these principle and techniques to design, develop, test, and evaluate the software and systems, which enable computers to execute commands in a given application.

ABOUT THE FIELD

Computer software engineering is a fast growing field with great potential for upward mobility and versatility. New developments in technology render the profession a creative and exciting field with interdisciplinary collaborative potential. The field is a forerunner in the creation of new languages that allow humans to interact with machines. A wide knowledge base coupled with experience in a variety of computer systems and technologies are advantageous in this competitive arena, where ideas and creativity play an important role in day-to-day activities.

HOW TO GET THERE

Computer software engineers need at least a Bachelor's degree for entry-level positions. The usual degree concentration for applications software engineers is computer science or software engineering. Systems software engineers' concentrations are usually computer science or computer information systems. Graduate degrees are preferred for some of the more complex positions.

ON THE JOB

Computer software engineers work in applications and systems development, analyze users' needs and design, and construct, test, and maintain computer applications software and systems. These engineers are involved in the design and development of many types of software, operating systems and network distributions, and compilers, which convert programs for execution on a computer. They use programming languages, or coding, to instruct a computer to perform a given function in order to solve technical problems.

SALARY RANGE

$63,250 to $92,750

TOOLS OF THE TRADE/LIFESTYLE

Due to the project-oriented nature of the profession, computer software engineers may work evenings and weekends to meet deadlines, and to solve unexpected technical problems. These personnel sit for many hours at the computer and are susceptible to eyestrain, back discomfort, and carpal tunnel syndrome.

Essential programming languages include mastery of C, C++, and Java.

YOU ARE

Computer software engineers have strong problem solving, communication, and analytical skills, and can work independently as well as within a team. These professionals must be able to multi-task and be detail oriented. Additionally, computer software professionals must keep abreast of new technologies in the rapidly changing field.

RELATED PROFESSIONS

Other workers supporting computer systems engineers are computer systems analysts, computer scientists and database administrators, computer programmers, computer hardware engineers, computer support specialists and systems administrators, engineers, statisticians, and mathematicians.

COMPUTER SYSTEMS ANALYSIS

"Computing is not about computers any more. It is about living." -—Nicholas Negropont

DEFINITION OF PROFESSION

Computer Systems Analysis, as it pertains to computer systems analysts, is a branch of Information Technology dealing with the diagnoses and creation of cost effective solutions to computer problems in organizations.

A computer systems analyst researches, plans, and recommends software and systems choices for companies.

ABOUT THE FIELD

Computer systems analysts usually specialize in business, scientific, or engineering applications. Often, they have training or experience in the field in which they develop computer systems.

Employment in this field is expected to increase more rapidly than other occupations as organizations continue to adopt and integrate increasingly sophisticated technologies.

HOW TO GET THERE

Computer systems analysts need a minimum of the Bachelor's degree in computer science, information science, or management information systems (MIS). Courses in financial services,

banking, and accounting have been proven to be beneficial in this competitive market. Because of constant changes in the field due to new discoveries, early involvement at the high school level in the computer sciences, math and science is encouraged.

ON THE JOB

Computer systems analysts liaise extensively with external or internal clients, produce project feasibility reports, translate client requirements into highly specified project briefs, and identify and assess options for potential solutions for both technical and business suitability. They create logical and innovative solutions to complex problems and present proposals to clients.

Working closely with developers and a variety of end users to ensure technical compatibility, budgetary constraints, deadlines, and user satisfaction, they oversee the implementation of new systems, write user manuals, and provide training to users of new systems. Additionally, an analyst must keep abreast of technical and industry developments.

SALARY RANGE

$61,500 to $82,500

TOOLS OF THE TRADE/LIFESTYLE

Due to the importance of computers in modern business making, computer systems analysts will work some weekends and evenings, and are usually on call. They live and work in any area with a corporate presence, and live comfortably.

YOU ARE

Computer systems analysts are detail oriented, analytical, have good visual-spatial abilities, and are independent as well as team players. Your desire to solve complex problems and the ability to communicate abstract ideas in a down-to-earth way are important to success.

RELATED PROFESSIONS

Computer systems analysts are also suited to computer programming, computer software engineering, computer and information systems managing, engineering, mathematics, statistics, operations research analysis, and management analysis.

CONSERVATION POLICY ADVOCATE

"Never doubt that a small group of thoughtful, committed people can change the world. Indeed, it is the only thing that ever has." — Margaret Mead

DEFINITION OF PROFESSION

You advocate for conservation policies consistent with the theories and values of environmental sustainability and ecological balance.

ABOUT THE FIELD

Climate change is among the greatest threats to biodiversity today. Few people realize that deforestation and land-use changes—such as slash-and-burn farming, soil degradation and

loss, road building, and urban sprawl—account for as much as 20 percent of global greenhouse gas emissions. As Earth's temperature rises, wildlife moves to more suitable habitat northward and to higher elevations.

HOW TO GET THERE
Bachelor's degree in environmental science with additional courses in public administration, public policy, political science.

ON THE JOB
Conservation policy advocates identify and understand key conservation and environmental issues in the developed and developing world; develop and sustain contact with government officials and industry sponsors and other policy leaders in government, industry, and the non-governmental sector who are addressing these issues; provide ongoing insight to conservation scientists on the key questions facing decision makers; and communicate formal and informal results of conservation scientist's work to decision makers and other stakeholders.

SALARY RANGE
$41,712 to $67,001

TOOLS OF THE TRADE/LIFESTYLE
- Computer, blackberries, cell phone
- Work 40 hours per week
- Travel up to 60% of the time to meet with stakeholders, policymakers, and other advocates

YOU ARE
Conservation policy advocates translate complex scientific information into a form comprehensible by a select audience, have excellent communication skills, charm, and the ability to create models that illustrate complex ideas. You are well-organized, self-motivated, and able to work independently. Likewise you are passionate about protecting public health and the environment, and tenacious when facing challenges.

RELATED PROFESSIONS
Engineer, lawyer, and grassroots organizer.

CONSTRUCTION AND BUILDING INSPECTION

"It is not the beauty of a building you should look at; its the construction of the foundation that will stand the test of time." — David Allan Coe

DEFINITION OF PROFESSION
Construction and Building Inspection is the practice of examining buildings, highways and streets, sewer and water systems, dams, bridges, and other structures to ensure that their construction, alteration, or repair complies with building codes and ordinances, zoning

regulations, and contract specifications.

ABOUT THE FIELD

About 45 percent of inspectors work for local governments, municipal or county building departments. Many home inspectors are self-employed. Home inspection has become a standard practice in the real estate process, creating more opportunities for home inspectors.

HOW TO GET THERE

A construction and building inspector has a thorough knowledge of construction materials and practices in either a general area, such as structural or heavy construction, or a specialized area, such as electrical or plumbing systems, reinforced concrete, or structural steel. Professionals in this field have studied engineering or architecture; or have either a community college/junior college degree with courses in building inspection, home inspection, construction technology, drafting, and mathematics. Courses in blueprint reading, algebra, geometry, and English also are very useful.

Thought most professionals in this field receive much of their training on the job, an engineering or architectural degree often is required for advancement to supervisory positions. Construction and building inspectors are required to learn building codes, standards, inspection techniques, ordinances, regulations, contract specifications, recordkeeping, and reporting duties. The work involves above average physical activity, and successful personnel are usually in good physical condition. A construction and building inspector should have a driver's license, as appointments may involve driving to a variety of onsite locations.

Most states and local jurisdictions require some type of certification for employment. Even if not required, certification can enhance your opportunities for employment and advancement to more responsible positions.

ON THE JOB

Construction and building inspectors inspect the structural quality and general safety of buildings, and examine the installation of electrical systems and equipment to ensure functionality and compliance with electrical codes and standards. They also examine lifting and conveying devices, such as elevators, escalators, moving sidewalks, etc., conduct inspections of newly built or previously owned homes, condominiums, commercial buildings, etc., and inspect the installation of the mechanical components of commercial kitchen appliances, heating and air-conditioning equipment, gasoline and butane tanks, gas and oil piping, plumbing, water supply and distribution systems, waste, and vent lines to ensure Federal, State, and local government construction of these systems conform to detailed contract specifications.

SALARY RANGE

$54,970 to $67,380

TOOLS OF THE TRADE/LIFESTYLE

Many construction sites are dirty and may be cluttered with tools, materials, or debris. Equally, professionals in this field sometimes work in hazardous situations. Precaution is necessary at all times, and a full knowledge of safety requirements is imperative. Hours of operation are normal business hours with the addition of overtime on time-sensitive projects. Non-government

inspectors, particularly those who are self-employed, may have a varied work schedule, sometimes times working evenings and weekends.

Hardhats must be worn onsite. Further necessary tools include, tape measures, survey instruments, metering devices, and equipment such as concrete strength measurers, laptops, and other portable electronic devices to facilitate the accuracy of written reports.

YOU ARE

Construction and building inspectors have keen observational skills, are detail oriented, and must be able to communicate clearly.

RELATED PROFESSIONS

A typical day in this profession involves coordination with multiple professionals from other fields, such as carpenters, plumbers, electricians, architects, appraisers and assessors, construction managers, civil engineers, cost estimators, surveyors, cartographers, photogrammetrists, and engineering and surveying technicians.

CONSULTING

"The job of the consultant, therefore, isn't just about knowing what's wrong; it's about figuring out how to make it right." — Unkown

DEFINITION OF PROFESSION

Consulting, in general, is the providing of information, advice, and analysis to a client. The consulting field encompass the entire breath of industries, organizations, companies, and fields.

Consultants are professionals who provide advice in a particular area of expertise such as accountancy, the environment, technology, law, human resources, marketing, medicine, finance, public affairs, communication, engineering or waste management. They are generally self-employed or work for a consulting firm, usually with multiple and changing clients.

ABOUT THE FIELD

Salaries vary with the client field, professional's aptitude, business savvy, and skill. Consultants often work many hours above 40 hour per week, and are responsible for self-reporting income tax to the government.

HOW TO GET THERE

PhD in a related science field coupled with years of professional experience in a particular field or industry.

ON THE JOB

Consultant duties include creating reports, designing and implementing studies, evaluating research, programs, and projects, writing op-ed articles, writing books, professional

manuscripts.

SALARY RANGE
$60,000 to $87,675

TOOLS OF THE TRADE/LIFESTYLE
Flexible work hours are dependent on clients' needs and availability. Consultants use computers and software, e.g., Word, Project, Excel, and PowerPoint. They can also be quite sophisticated, even creating their own software for client use.

YOU ARE
As a consultant you have a record of academic achievement and a pattern of leadership, good problem solving skills, logical reasoning, and business acumen. You also have the ability to cultivate relationships, facility with computer software, and quantitative statistical skills.

RELATED PROFESSIONS
Policy analysts

COSMETIC CHEMISTRY

"I entered the cosmetics industry because I wanted more women to use cosmetics made with safe, healthful ingredients." — Gloria Swanson, Actress

DEFINITION OF PROFESSION
Cosmetic Chemistry is said to have first started with the Egyptians who used various herbs, potions, concoctions and natural materials to create cosmetic skin care. The field constantly researches better ways to slow down the aging process.

Cosmetic chemists spend a lot of your time in the lab mixing chemicals, testing mixtures, and developing formulas for cosmetic products.

ABOUT THE FIELD
Cosmetics formulas must meet standards set by the FDA. Cosmetic chemists are required to stay abreast of these standards. The European Union's cosmetic industry has standards similar to the United States.

The 7th Amendment of the Cosmetic Directive calls for the ban of the use of animals in the testing of cosmetic products.

HOW TO GET THERE
Cosmetic chemists hold Bachelor's degrees in chemistry with courses in chemistry, microbiology, statistics, and product development; and specialty courses in aroma and flavor chemistry, aerosols, and cosmetic formulations.

ON THE JOB
These professionals formulate new products with emphasis on creativity and innovation. They manage product testing, both in-house and at outside testing labs, assure product development compliance of regulatory requirements, undertake business development activities with customers, source new, innovative raw materials for product development, and write manufacturing procedures.

SALARY RANGE
$30,000 to $68,000

TOOLS OF THE TRADE/LIFESTYLE
A typical workweek is 40 hours, in the lab. As with all other professions, deadlines often require overtime commitments. However, in general, this field does not require personnel to take work home. Cosmetics chemists use chemicals, botanicals, lab equipment, and computers.

YOU ARE
Cosmetics chemists have an entrepreneurial spirit, critical & creative thinking skills, and a roll-up-your-sleeves type of attitude.

RELATED PROFESSIONS
Related professionals are fashion designers, buyers, chefs, chemical engineers, and stylists.

DIAGNOSTIC MEDICAL SONOGRAPHERS

"Quality patient care is provided by competent, well-trained professionals."—CAAHEP

DEFINITION OF PROFESSION
Diagnostic imaging embraces several procedures that aid in diagnosing ailments. Besides the familiar x-ray, another common diagnostic imaging method is magnetic resonance imaging, which uses giant magnets that create radio waves to form an image. Not all imaging technologies use ionizing radiation or radio waves, however. Sonography, or ultrasonography, uses sound waves to generate an image for the assessment and diagnosis of various medical conditions. Sonography is most associated with obstetrics in the use of ultrasound imaging during pregnancy; but this technology has many other applications in the diagnosis and treatment of medical conditions.

Diagnostic medical sonographers use special equipment to direct non-ionizing, high frequency sound waves into areas of a patient's body. They operate equipment, which collects reflected echoes, and forms an image that may be videotaped, transmitted, or photographed for interpretation and diagnosis by a physician.

ABOUT THE FIELD
Sonography is becoming an increasingly attractive alternative to radiologic procedures as patients seek safer treatment methods. Unlike most diagnostic imaging methods, sonography

does not involve radiation; reducing, for both the patient and the sonographer, the harmful side effects and complications from repeated use and exposure.

Sonographic technology is expected to evolve rapidly, and to spawn many new sonography procedures, such as 3D- and 4D-sonography for use in obstetric and ophthalmologic diagnosis.

HOW TO GET THERE

Sonographers need either an associates or Bachelor's degree. Course work includes classes in anatomy, physiology, instrumentation, basic physics, patient care, and medical ethics.

ON THE JOB

Sonographers explain the procedures of the test to patients and record any medical history that may be relevant to the patient being viewed. Sonographers then select appropriate equipment settings and direct the patient to move into positions that will provide the best view. A transducer, used to perform the exam, transmits sound waves in a cone-shaped or rectangular-shaped beam. Although techniques vary with the area being examined, sonographers usually administer a special gel to the skin to aid the transmission of sound waves. Viewing the screen during the scan, they look for subtle visual cues that contrast healthy areas with unhealthy ones. They also screen the images for diagnostic purposes, passing on the satisfactory ones to the physician. Additionally, sonographers take measurements, calculate values, and analyze the results in preliminary reports for the physicians.

SALARY RANGE

$44,720 to $61,360

TOOLS OF THE TRADE/LIFESTYLE

Diagnostic medical sonographers work 40 hours per week, typically in a clean and well-lit healthcare facility. Occassionally, evening and weekend on-call hours are required, and sonographers must be ready to report to work on short notice. They use diagnostic imaging machines such as X-ray, sonogram, and magnetic resonance machines.

YOU ARE

It helps to be a compassionate person as often patients present with life-threatening conditions. You are a generous communicator, interpersonal, and have an acuity for mathematics and science.

RELATED PROFESSIONS

Cardiovascular technologists and technicians, clinical laboratory technologists and technicians, nuclear medicine technologists, radiologic technologists and technicians, and respiratory therapists.

ENGINEERING GEOLOGIST

"We learn geology the morning after the earthquake."— Ralph Waldo Emerson

DEFINITION OF PROFESSION

You apply geologic principles to the fields of civil and environmental engineering, offering advice on major construction projects and assisting in environmental remediation and natural hazard-reduction projects.

ABOUT THE FIELD

Engineering geologic studies may be performed during the planning, environmental impact analysis, civil engineering design, value engineering and construction phases of public and private works projects, and during post-construction and forensic phases of projects.

Works completed by engineering geologists include: geologic hazards, geotechnical, material properties, landslide and slope stability, erosion, flooding, dewatering, and seismic investigations.

Engineering geologic studies are performed with the overall objective of the protection of life and property against damage, and the solution of geologic problems.

HOW TO GET THERE

Master's degree in engineering geology. Bachelor's degree in civil engineering, geology, or related discipline.

ON THE JOB

Office-based activities, including:

- Consulting geological maps and aerial photographs to advise on site selection
- Undertaking desk studies and assessing sources of site information prior to field investigations
- Assisting with the design of built structures, using specialized computer software or calculations
- Assessing findings for construction engineers
- Collating data and producing reports
- Undertaking additional project management duties
- Overseeing the progress of specific contracts

Site-based activities, including:

- Planning detailed field investigations by drilling and analyzing samples of deposits/bedrock
- Supervising site/ground investigations
- Maintaining technical control of a site
- Making visits to new project sites.

Liaising with staff and clients, including:

- Advising on and testing a range of construction materials, for example sand, gravel, bricks

and clay
- Making recommendations on the proposed use of a site
- Advising on problems such as subsidence
- Providing information and advice to clients as required
- Ensuring that a site investigation progresses to budget
- Managing staff, including other engineering geologists, geotechnical engineers, consultants and contractors
- Attending professional conferences and representing the company or organization at other events.

SALARY RANGE
$50,482 to $100,950

TOOLS OF THE TRADE/LIFESTYLE
Geological maps, soil sampling equipment, surveying equipment, drilling equipment. Work 40 hours per week in the field and in the office.

YOU ARE
Engineering geologists are great at teamwork, interpersonal skills, report writing ability, presentation skills; have a flexible approach to work, and a willingness to accept responsibility.

RELATED PROFESSIONS
Geotechnical engineers or geological engineers, architects, developers and planners, geological mapper, geoscientist, hydrogeologist, hydrologist, research scientist (physical sciences), soil scientist .

EPIDEMIOLOGIST

"Every human being is the author of his own health or disease." — Buddha

DEFINITION OF PROFESSION
Epidemiologists conduct research in an effort to eradicate or control infectious diseases that affect the entire body, such as AIDS, typhus, and localized infections of the brain, lungs, or digestive tract.

ABOUT THE FIELD
The Greek physician Hippocrates is said to be the "father of epidemiology." He coined the terms endemic and epidemic, and is the first person known to have examined the relationships between the occurrence of disease and environmental influences.

HOW TO GET THERE
PhD in a biological science and Master of Public Health (MPH) is required for independent

research. The minimum educational requirement for epidemiology is a Master's degree from a school of public health. Undergraduates should study biological sciences, and have a solid background in chemistry, mathematics, and computer science.

ON THE JOB

Epidemiologists typically work regular hours in offices or laboratories, and usually are not exposed to hazardous or unhealthy conditions. If working in such conditions, strict safety procedures are maintained to avoid contamination. Epidemiologists also spend time working in clinics and hospitals, administering drugs and treatments to patients in clinical trials. They work at colleges and universities, schools of public health, medical schools, or research and development services firms.

SALARY RANGE

$44,120 to $86,830

TOOLS OF THE TRADE/LIFESTYLE

Epidemiologists typically work 40 hours per week, and on occasion, work evenings and weekends to attend meetings and hearings for medical investigations. They use computers and sophisticated laboratory equipment.

YOU ARE

As an epidemiologist, you are able to work independently or as part of a team, and can communicate clearly and concisely. You possess strong communication skills in order to provide instruction and advice to physicians and other health care professionals.

RELATED PROFESSIONS

Biological scientists, agricultural and food scientists, and health occupations such as physicians and surgeons, dentists, and veterinarians

FORENSIC SCIENCE

"A true forensic scientist is not a policeman, nor [is he] partial [to] the outcome of…examinations. [He is an] objective investigator of fact." — Unknown

DEFINITION OF PROFESSION

Forensic Science, or Forensics, uses a wide array of sciences to answer questions of interest to the legal system.

Forensic scientists are involved in all aspects of criminal cases, and the result of their work may serve either the defense or the prosecution in a legal case. A forensic scientist's goal is the evenhanded use of all available evidence to determine facts.

ABOUT THE FIELD

The beginnings of forensic science can be traced back to ancient Babylon where fingerprints

were used on clay tablets to conduct business transactions. Additionally, Erasistratus, the ancient Greek physician, observed that his patients' pulse rates increased when telling lies. His observation is considered the first lie detection test. In 1912, Masaeo Takayama developed another lie detection test, which utilized hemoglobin in hemochromogen crystals.

HOW TO GET THERE

The field of forensics requires a Bachelor's degree, preferably in a science. Some forensic sciences require advanced degrees. Typical courses include chemistry, biology, biochemistry, botany, textiles, soil science, criminology, statistics, trigonometry, and English composition.

ON THE JOB

Forensic scientists collect, test, and analyze samples taken at a crime scene for the purpose of determining the circumstances of a crime.

SALARY RANGE

$40,000 to $85,000

TOOLS OF THE TRADE/LIFESTYLE

Forensic scientists work both in laboratories and out in the field. Hours vary by necessity, and most personnel in this field are usually on call. More often than not, forensics scientists are found in urban environments and large suburbs with resources and need of their expertise. These personnel use lab equipment and field study equipment daily.

YOU ARE

The ability to take notes, be intuitive and discerning in asking questions, as well as being personable, are essential to success in this field. Writing is also very important, particularly as it relates to scientific reporting. Forensic scientists need to have the ability to be impartial under pressure and convincing conjecture, and possess intellectual curiosity and integrity.

RELATED PROFESSION

Forensic professionals work in tandem with police officers, and sometimes, with the government.

FORENSIC TOXICOLOGY

"All substances are poisons; there is none which is not a poison. The right dose differentiates a poison and a remedy." — Paracelsus

DEFINITION OF PROFESSION

Toxicology and other disciplines such as analytical chemistry, pharmacology, and clinical

chemistry aid medicolegal investigation of death, poisoning, and drug use.

ABOUT THE FIELD

The forensic taxologist is entirely responsible for the work he performs; no one else can write his report nor testify to his opinion. However, it takes teamwork to solve a crime. These scientists work closely with police officers, sheriff's deputies, prosecuting and defense attorneys, DEA, CIA, and FBI agents, immigration workers, and crime scene investigators.

HOW TO GET THERE

- PhD in biochemistry, chemistry, or toxicology.
- Bachelor's degree in any science; some forensic sciences require advanced degrees
- Suggested coursework includes chemistry, biology, math, and English composition

ON THE JOB

Forensic toxicologists perform a full range toxicological examination for drugs and alcohol including all high usage illegal and prescription drugs and other selected poisonous substances; perform complete and definitive toxicological analysis of body tissues/fluids to determine the existence of substances that cause toxicity or changes human performance; may testify in court as an expert witness regarding analytical results, methodology, and interpretation of results; perform quality control assurance such as visual checks, data analysis, and test duplication to provide definitive support for test findings; and prepare reagents for examinations.

SALARY RANGE

$44,120 to $86,830

TOOLS OF THE TRADE/LIFESTYLE

Forensic toxicologists work 40 hours per week in laboratory/office with some irregular hours to monitor experiments that cannot be completed during regular office hours. They use laboratory analyses equipment, computers and software.

YOU ARE

As a forensic toxologist you have high standards of personal integrity, intellectual curiousity, excellent communication skills and note-taking skills, and are able to write clear, scientific reports.

RELATED PROFESSIONS

Forensic pathology, forensic psychology, forensic anthropology, criminologist.

GAMING ENGINEER/PROGRAMMER

"Imagination is more improtant than knowledge. Knowledge is limited. Imagination encircles the world." — Albert Einstein

DEFINITION OF PROFESSION

Gaming Engineering/Programming involves the development of coding languages in the production of user interfaces for video games.

Gaming engineers/programmers write code for video games and related software with game development tools. They develop various aspects of video games including the user interface, artificial intelligence, graphics, and game physics.

ABOUT THE FIELD

A game engineer/programmer should not be confused with a game designer. Many designers are also programmers; but not all are, and it is rare for one person to serve both roles. The field utilizes technological advances.

HOW TO GET THERE

Although many gaming engineers/programmers have been hobbyists who developed requisite skills over time, a Bachelor's degree is the desired qualification. The Bachelor's degree should be in mathematics, physics, or computer science/engineering with supplemental courses in game programming.

ON THE JOB

Gaming engineers/programmers focus on building the gameplay and user interface (UI) for the game. They coordinate with designers, artists, and animators to prototype, implement, and polish the gameplay and UI features, and use creative problem solving and a strong understanding of the Tools pipeline to find ways to implement desired gameplay features quickly and robustly. Programmers also actively gather feedback from the entire game team, and translate it into improved gameplay.

SALARY RANGE

$55,000 to $125,000

TOOLS OF THE TRADE/LIFESTYLE

Gaming engineers/programmers work in a very creative environment with high-pressure deadlines. They may work numerous hours of unpaid overtime during "crunch time" to meet certain milestones in the development process. Dress is casual. Gaming engineers/programmers use computers, video games, game players, and programming languages such as C, C++, C#, Lua, and Java.

YOU ARE

These professionals must be able to work for long periods of time on solitary projects while being able to engage other team members in clear, concise, and inspiring ways. The ability to translate abstract thoughts into concrete models, to see the big picture while working on discreet segments, and creatively problem solve are essential.

RELATED PROFESSIONS

Gaming engineers/programmers work closely with game designers, game producers, game artists, game testers, and level designers.

GENETECIST

"We went to DNA because it was the obvious choice. DNA contains our genetic code and is the master blueprint for our biology. It literally creates us through a protein-assembly process known as transcription . . . To transcribe can be defined as to copy in writing, to produce in written form, or to arrange music for a different instrument. In other words, as the above suggests, we come into being, at our molecular level, through a process with striking affinities to composition." — Sol Luckman

DEFINITION OF PROFESSION

Geneticists study inheritance and variation of characteristics in forms of life.

ABOUT THE FIELD

There are many emerging disciplines within genetics. Human behavioral genetics, a relatively new field, seeks to understand both the genetic and environmental contributions to individual variations in human behavior. Genetic anthropology combines DNA and physical evidence to reveal the history of ancient human migration. It seeks to answer the questions, "Where did we come from, and how did we get here?" Pharmacogenomics is the study of how an individual's genetic inheritance affects the body's response to drugs. The term comes from the words "pharmacology" and "genomics," and is thus the intersection of pharmaceuticals and genetics.

HOW TO GET THERE

- PhD in genetics or biology.
- Coursework should include math, biology, chemistry and physics in high school and college. At the university level, students major in biology or genetics.

ON THE JOB

Geneticists perform experiments to determine laws, mechanisms, and environmental factors in the origin, transmission, and development of inherited traits; analyze determinants responsible for specific inherited traits, such as color differences, size, and disease resistance to improve or to understand relationship of heredity to maturity, fertility, or other factors; devise methods for altering or producing new traits, making use of chemicals, heat, light, or other means.

SALARY RANGE

$67,850 to $86,020

TOOLS OF THE TRADE/LIFESTYLE

Geneticists typically work 40 hours or more per week, sometimes working evenings and weekends in order to meet project deadlines. They use high-powered Computers, sophisticated laboratory equipment, gene splicers, and DNA sorting equipment.

YOU ARE

Detail-oriented, able to work independently, able to think about and envision things that are very small while also comprehend theories of large scale proportions.

RELATED PROFESSIONS
Biologist, biochemist.

GEODESY

"Science does not know its debt to imagination." —Ralph Waldo Emerson

DEFINITION OF PROFESSION
Geodesy, also called geodetics, a branch of earth sciences, is the scientific discipline that deals with the measurement and representation of the Earth, including its gravity field, in a three-dimensional time varying space.[1] They also study crustal motion, tides, and polar motion.

Geodetics technicians supervise and perform technical work in the analysis, evaluation, processing, computation, and selection of geodetic survey data. These positions require a practical knowledge of theories and techniques of geodesy particularly as they relate to the identity, reliability, and usefulness of geodetic control data, but not a full professional knowledge of geodesy as required in the execution and adjustment of geodetic surveys or the mathematical transformation of geodetic datum systems.

ABOUT THE FIELD
The geoid is essentially the figure of the Earth abstracted from its topographic features. The study of the Earth's gravity field, called physical geodesy, is seen as a part of geodesy.

HOW TO GET THERE
Geodetic technicians hold Bachelor's degrees, and take courses in geodesy, geography, cartography, physical science, engineering science, forest mensuration, surveying, and any branch of mathematics except financial or commercial mathematics.

ON THE JOB
In the office, geodetics technicians process projects for data base entry; assure consistency of observation files, Global Positioning Satellite (GPS) files and description files; maintain archival system of geodetic records; assure all incoming GPS projects are logged in and archived; maintain reference library; coordinate the collection, indexing and distribution of books, periodicals, subscriptions and other published documents housed in the reference library; assist with the publication and uploading of professional papers onto web site; support in-house and private sector development through transfer of science and technology and promotion of business growth by responding to public requests for geodetic data in an accurate and timely manner. In the field, these professionals work with GPS and survey equipment to take measurements.

SALARY RANGE
$30,386 to $60,194

TOOLS OF THE TRADE/LIFESTYLE

A typical workweek is 40 hours in an urban or suburban environment. Technicians travel to and from the office and field, and use computers, global positioning satellite (GPS) equipment, and surveying equipment.

YOU ARE
Geodetic technicians are detail orientated, able to digest and convert large amounts of data into usable, concise information for scientists, policy-makers, and the general public. Accuracy in conjunction with good communication and computational skills are required.

RELATED PROFESSIONS
Geologist

GEOPHYSICS

"Being a scientist allows me to learn answers for myself, to satisfy this basic curiosity that is just in me about everything in the natural world." — Amy Bower, WHOI Oceanographer

DEFINITION OF PROFESSION
Geophysics is the study of the physics of the earth and its environments. It includes fields such as oceanography, meteorology and seismology.

Geophysicists apply their knowledge of physics, chemistry and mathematics to study the earth's interior forces and exterior characteristics.

ABOUT THE FIELD
Shallow land geophysical techniques have been adapted to survey beneath rivers and harbors to profile bedrock and overburden characteristics. Seismic refraction is used as a method to investigate geological structure and rock properties.

HOW TO GET THERE
PhD in geophysics. A Bachelor's degree in geology or physics. Coursework should include a basic geological core curriculum (structural geography and mineralogy), and basic physics curriculum (quantum mechanics, classical physics, electromagnetism, and gravity). It should also include logic, mathematics, and ecological science.

ON THE JOB
Daily duties include studying readouts of measurement equipment, examining natural phenomena (such as tidal waves and electromagnetic fields), and writing reports that correlate the two.

SALARY RANGE
$67,160 to $82,310

TOOLS OF THE TRADE/LIFESTYLE

Work hours are varied and flexible. Geophysicists use computers and geographic information systems (GIS).

YOU ARE

As a geophysicist, you have excellent interpersonal skills, and strong oral and written communication skills (especially in writing technical reports for company managers, regulators, and the public). Physical stamina is also essential out in the field.

RELATED PROFESSIONS

Atmospheric, environmental or geoscientists, physicists and astronomers, mathematicians, and civil, chemical and environmental engineers.

HEALTH POLICY ADVOCATE

"On the ground floor, we see the inequalities in health care delivery. The effects of limited access, mental illness, chronic disease and violence touch us daily. Inequality exists in our system. Patients are negatively affected. As patient advocates, we can step forward and tell their stories. Stories have tremendous power to bring to life a message that transcends the complicated maze of policy and politics."
— James S. Eadie, MD, Mass General Hospital

DEFINITION OF PROFESSION

You advocate for health policies that foster healthy individuals and communities, educate the general public and policymakers on the results of pertinent science studies, and help organize health promotion programs.

ABOUT THE FIELD

Health Policy Advocacy encompasses direct service to the individual or family as well as activities that promote health and access to health care in communities and the larger public. Advocates support and promote the rights of the patient in the health care arena, help build capacity to improve community health and enhance health policy initiatives focused on available, safe and quality care.

HOW TO GET THERE

Master's degree in public health; Bachelor's degree health, health education, psychology, sociology, or public administration with courses in biology, psychology, sociology, marketing, epidemiology, statistics and medicine.

ON THE JOB

Health policy advocates identify and understand key health issues in a particular community; develop and sustain contact with government officials and other policy leaders in government, industry, and the non-governmental sector who are addressing these issues; provide ongoing insight to medical scientists on the key questions facing decision makers, and communicate the results of medical scientist's work to decision makers and other stakeholders.

SALARY RANGE
$40,000 to $60,000

TOOLS OF THE TRADE/LIFESTYLE
Health policy advocates work 40 hours per week, are often in the field and may work some weekends. Primary tools include the computer and cell phone.

YOU ARE
As a health policy advoate you are interested in health and healing, and making a sociological contribution to society.

RELATED PROFESSIONS
Doctor, epidemiologist.

HYDROLOGY

"We do not need to invent sustainable human communities. We can learn from societies that have lived sustainably for centuries. We can also model communities after nature's ecosystems, which are sustainable communities of plants, animals, and microorganisms. Since the outstanding characteristic of the biosphere is its inherent ability to sustain life, a sustainable human community must be designed in such a manner that its technologies and social institutions honor, support, and cooperate with nature's inherent ability to sustain life." — Fritjof Capra

DEFINITION OF PROFESSION
Hydrology is the "study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere." (Answers.com)

Hydrologists study the quantity, distribution, circulation, and physical properties of underground and surface waters. They examine the form and intensity of precipitation, its rate of infiltration into the soil, its movement through the earth, and its return to the ocean and atmosphere.

ABOUT THE FIELD
Hydrology has been a subject of investigation and engineering for millennia. We can trace its origins as far back as 4000 B.C. to the first dam on the Nile—used to improve agricultural productivity on previously barren lands. Mesopotamia/Mesopotamian towns were protected from flooding with high earthen walls. We have remnants today of the aqueducts built by the ancient Greeks and Romans, while in China ruins of irrigation and flood control systems have been unearthed. Further, the ancient Sinhalese used hydrology to build complex irrigation works of ancient Sri Lanka. They are known for the invention of the valve pit (still functioning today) which allows construction of large reservoirs, anicuts and canals.

HOW TO GET THERE
PhD in geological sciences

ON THE JOB
Hydrologists use remote sensing technology, data assimilation, and numerical modeling to monitor the change in regional and global water cycles. They also use sensitive stream-measuring devices to assess flow rates and quality of water, and their work is particularly important in flood control and environmental preservation such as ground-water decontamination.

SALARY RANGE
$61,510 to $85,000

TOOLS OF THE TRADE/LIFESTYLE
Hydrologists work 40 hours per week with extended hours on evenings and weekends depending on project demands. These professionals use computers, digital mapping equipment, remote sensing technology, and geographic information systems as well as Global Positioning System (GPS).

YOU ARE
As an hydrologist you have excellent interpersonal skills, strong oral and written communication skills, as well as technical writing skills. Physical stamina is important to field work.

RELATED PROFESSIONS
Conservation scientists and foresters, atmospheric scientists, geoscientists, and some biological scientists.

MANAGEMENT INFORMATION SYSTEMS (MIS)

"Chaos reigns within. Reflect, repent, and reboot. Order shall return." —Suzie Wagner, 1998

DEFINITION OF PROFESSION
The broad field of Management Information Systems (MIS), or Information Systems Management, covers the application of people, technologies and procedures in the field of Information Systems.

Technologists, or information systems managers, plan, coordinate, direct research, and facilitate all computer-related activities within a firm. They determine both technical and business goals in consultation with top management, and create detailed plans for the accomplishment of these goals.

ABOUT THE FIELD
Computer-based information systems have become a critical part of the products, services, and management of all organizations. The effectiveness and efficiency of information systems managers can be significant factors in an organization's ability to achieve critical competitive advantage. According to the U.S. Department of Labor, the role of computer and information systems managers will continue to evolve due to explosive growth in electronic commerce, and the capacity of the Internet to create new relationships with customers. Additionally, the emergence of cybersecurity as a key issue facing most organizations should lead to strong

growth for computer managers.

HOW TO GET THERE

Information systems managers need a minimum of a high school diploma with technical training and experience in computer systems and networks. However, obtaining a Bachelor's degree in computer science increases marketability and salary potential. For leadership positions, an MBA with a concentration in technology, information systems, or computer science is essential.

ON THE JOB

Information systems managers direct the work of systems analysts, computer programmers, support specialists, and other computer-related workers. They plan and coordinate activities, such as installation and upgrading of hardware and software, programming and systems design, development of computer networks, and implementation of Internet and intranet sites. Additionally, managers are involved with the upkeep, maintenance, and security of networks, and devote a significant amount of time to analysis of the computer and informational needs of organizations from an operational and strategic perspective. Further, systems managers determine immediate and long-range personnel and equipment requirements, and assign and review the work of subordinates while ensure organizational competitiveness by keeping abreast of the latest technology.

SALARY RANGE

$52,300 to $80,350

TOOLS OF THE TRADE/LIFESTYLE

Information systems managers need to be available for emergencies as business' stand to lose a considerable amount of revenue when computer systems fail. A typical workweek may include weekends and require over time. Managers may experience pressure to meet technical deadlines over a short timeframe, tight budgets, and are susceptible to eyestrain, back discomfort, and hand and wrist problems, inducing carpal tunnel syndrome.

However, there is no shortage of need in this field, and an information systems manager may live comfortably anywhere there is a business with computer needs. Most information systems managers work in a corporate or large non-profit environment. They use computers, Blackberries, Ethernet and fire optic cable, routers, switches, and hubs on a daily basis.

YOU ARE

Information systems managers must be solution-oriented, enjoy working on complex problems that may require very tedious heuristics, such as working with the interface of software and hardware. The ability to communicate the technical to the layman is a necessary skill.

RELATED PROFESSIONS

Information systems managers are suited to other professions, including computer programming, computer software engineering, computer systems analysis, computer science and database administration, and computer support and systems administration.

MEDICAL SCIENCE RESEARCH

"Research teaches a man to admit he is wrong and to be proud of the fact that he does so, rather than try with all his energy to defend an unsound plan because he is afraid that admission of error is a confession of weakness when rather it is a sign of strength." — Prof. H. E. Stocher

DEFINITION OF PROFESSION

Medical Science Research is a field that uses research to advance life processes of living organisms by creating methodologies for counteracting disease.

Medical science researchers research human diseases in order to improve human health, and conduct and develop biomedical research to advance knowledge of life processes and living organisms such as viruses, bacteria, and other infectious agents.

ABOUT THE FIELD

A researcher in this field looks for answers to more general questions behind the mechanics of life systems. These researchers' experiments add pieces to the immensely complex life puzzle. The process is slow as diseases and other infectious agents evolve rapidly making the ability to understand them difficult. From the body of knowledge amassed by medical science researchers, clinical investigators are able to construct more rational and systematic ways to approach the problems presented by the ever-shifting presence of disease.

HOW TO GET THERE

- PhD in a biological science with several years spent in a postdoctoral position.
- Laboratory experience, including experience in specific processes and techniques transferable to other research projects.

ON THE JOB

Medical science researchers engage in clinical investigation, technical writing, drug application review, patent examination, and related activities. They study biological systems to understand the causes of disease and other health problems to develop treatments and research tools and techniques. Results of clinical trials are examined, and if necessary, adjustments to dosage levels are made to try to induce even better results. In addition to developing treatments for health problems, medical science researchers attempt to discover ways to prevent health problems.

SALARY RANGE

$67,160 to $82,310

TOOLS OF THE TRADE/LIFESTYLE

Medical science researchers work 40 hours per week in a laboratory/office. If working with dangerous organisms or toxic substances in the laboratory, strict safety procedures are followed to avoid contamination. They often use computers, laboratory equipment, biological organisms (virulent and non-virulent), electron microscopes, and thermal cyclers.

YOU ARE

Medical science researchers are able to work independently and as part of a team, and can

communicate clearly and concisely, both orally and in writing. Exceptional laboratory skills and a keen eye for detail are also important.

RELATED PROFESSIONS
Biological scientists, agricultural and food scientists, and health occupations such as physicians and surgeons, dentists, and veterinarians.

MICRO DEVICES GROUP MANAGER

"Any sufficiently advanced technology is indistinguishable from magic." —Arthur C. Clark

DEFINITION OF PROFESSION
Micro devices group managers are members of lab leadership teams responsible for overseeing, envisioning, and generating new ideas, and supporting the execution of programs in Micro-Electro-Mechanical Systems (MEMS), Microsystems, nano-enabled micro-instruments, and the development of smart nanomaterials.

ABOUT THE FIELD
Micro Devices are used in telecommunications, aerospace, homeland security, computers and biomedical equipment to name a few.

HOW TO GET THERE
PhD in Physics, Electrical Engineering, Mechanical Engineering or Material Science.

ON THE JOB
Micro devices group managers support the execution of programs in MEMS, Microsystems, nano-enabled micro-instruments, and the development of smart nanomaterials; align the project portfolio of the group with your company's strategic goals for technology development; provide reports to senior leadership; drive strong program management while communicating with marketing and manufacturing teams, at all stages of the R&D process.

LIFESTYLE
Micro devices group managers work 40+ hours per week in a high stakes environment, and live in developed communities.

SALARY RANGE
$100,000+

TOOLS OF THE TRADE/LIFESTYLE
Computers, extremely expensive and sensitive laboratory equipment, cell phone, BlackBerry.

YOU ARE
- Strong leadership experience with breadth of research experience in multi-disciplinary fields, and some experience in winning US government R&D contracts.

- Solid foundation and technical understanding of Sensors and MEMS.
- Demonstrated ability in bringing complex systems to market. Moving them from concept all the way to production is a plus.
- Ability to identify strategic opportunities and use sound decision making to translate opportunities into value-added work.
- Clear evidence of leadership, and the ability to produce in a matrix environment.
- Excellent project management and organizational skills
- Strong supervisory skills with an ability to work across organizational and international boundaries, and to lead change and foster teamwork and diversity across functional boundaries.
- Must be able to think critically, solve problems, and be a strong team player.
- A track record of being independently responsible, self-generating and entrepreneurial.
- Strong process and process documentation skills.
- Good verbal communication skills

RELATED PROFESSIONS
Research and Development group leader, experimental physicist.

MOLECULAR BIOLOGIST

"Nature is flexible and resilient. Nature likes redundancy and dispersion. It is approximate and deals in gradients. All boundaries are permeable. Nature nests small systems like molecules within larger systems like cells, which in turn are nested in systems called organs, organisms, ecosystems." — Robert Frenay

DEFINITION OF PROFESSIONS
Molecular biologists study life processes and components at the molecular level; of particular interest are DNA, genes, and information-processing at the molecular level.

ABOUT THE FIELD
Molecular Biology covers many areas of genetics in all animal life; as well as the areas of research and clinical genetics.

Molecular biologists do most of their work in biotechnology, which involves understanding the complex chemistry of life.

HOW TO GET THERE
Molecular biologists must have a Doctoral degree with the prerequisite Bachelor's degree in a life science, such as biochemistry, genetics, or microbiology. College science lab experience and high school courses in math, life science, and science lab are also important.

ON THE JOB
Molecular biologists work in laboratories with sophisticated and sensitive equipment, and high performance computers. They teach both undergraduate and/or graduate classes, and the profession requires a fair amount of unpaid hours spent on project deadlines. Molecular biologists work on teams of researchers/scientists. In addition to research and teaching

responsibilities, they write grant proposals, present at conferences, and write research-based articles for both popular and academic journals.

SALARY RANGE
$56,111 to $100,198

TOOLS OF THE TRADE/LIFESTYLE
High performing computers, gene sequencing machines, high powered microscopes, centrifuges, radioactive tracing materials.

YOU ARE
Molecular biologists are detal-oriented, analytical, interested in how things work, interested in studying things at the molecular level, enjoy using the scientific method, and like working independently for long periods as well as on a team.

RELATED PROFESSIONS
Biochemist, geneticist, and microbiologist.

NANOTECHNOLOGY RESEARCH

"Nanotechnology will let us build computers that are incredibly powerful. We'll have more power in the volume of a sugar cube than exists in the entire world today." — Ralph Merkle

DEFINITION OF PROFESSION
Nanotechnology Research is a multidisciplinary cutting edge field, and refers to the manipulation and study of atomic level particles in order to create nano-sized devices to aid humans.

Nanotechnology researchers are scientists that work with particles that are 1 billionth of a meter in size, or 100,000 times thinner than the width of a strand of human hair.

ABOUT THE FIELD
The root of nanotechnology has been around for hundreds of years, and can be traced to the making of colors for stain glass windows. Now, nano research involves the customization of nanomaterials, and the attempt to codify or normalize particles' unique behaviors at the atomic level.

There is much enthusiasm and promise around this field as the ability to control atomic particles could lead to potential cures for cancer, faster computer chips, cleaner water filtration systems, and the creation of tiny medical devices that can assist in surgeries. Further, nanotechnology could be the solution to global warming concerns with the creation of sustainable energy options.

The problems that nanotechnology researchers face are based on quantum mechanics, and the discovery that the smaller a particle becomes, the more unstable and predictable its behavior. This poses many substantial hurdles to creating reliable nanotechnology. "Materials reduced to the nanoscale can suddenly show very different properties compared to what they exhibit on a macroscale, enabling unique applications. For instance, opaque substances become transparent (copper); inert materials become catalysts (platinum); stable materials turn combustible (aluminum); solids turn into liquids at room temperature (gold); insulators become conductors (silicon). A material such as gold, which is chemically inert at normal scales, can serve as a potent chemical catalyst at nanoscales." (Wikipedia) Further, nanotechnology poses a potential human threat with regard to toxicity as smaller particles can infiltrate larger particle—like blood cells, for instance.

HOW TO GET THERE

Though nanotechnology requires advanced research skills, entry-level professionals need only have a Bachelor's degree in nanotechnology. However, most professionals are either pursuing a PhD, or are already doctors in the field. As this is a multi-disciplinary career, researchers may have Bachelor's and Master's degrees in a variety of science-driven fields with specializations in applied physics, materials science, interface and colloid science, device physics, supramolecular chemistry, and chemical, mechanical, and electrical engineering. High school students should have an interest and strong grades in chemistry, biology, calculus, and physics.

ON THE JOB

In collaboration with a team of researchers, nanotechnology researchers may spend months to years working on the same assignment. Professionals are in a laboratory environment, which can often have a sterile ambiance. Because these researchers are scientist interested in discoveries and new territories of perception, the environment at times can be quiet and solitary. But, the groundbreaking nature of discovery makes it all worthwhile.

SALARY RANGE

$85,000-$100,000

TOOLS OF THE TRADE/LIFESTYLE

Nanotechnology researchers use highly sophisticated equipment on a daily basis, and deal with often-volatile chemicals. They use highly insulating nano-porous materials in a clean, organized and safe environment.

As with most research professions, hours and working conditions vary in conjunction with type of research and environment. In most cases personnel work over 40 hours per week.

YOU ARE

A professional in this field should have stable, dexterous hands, and be patient, inventive, far thinking, and inquisitive. Nanotechnology researchers should communicate well with team members, and are detail oriented and accurate. A strong ethical standard is important as the drawbacks and potential harm to humans increases.

RELATED PROFESSIONS
Nanotechnology professionals are found in all fields, from textiles to aerospace industries. Related professions are biomedical, quantum, and molecular nanotechnology, engineering and the physical sciences.

NEUROSCIENTIST

"The last frontier of the biological sciences—their ultimate challenge—is to understand the biological basis of consciousness and the mental processes by which we perceive, act, learn, and remember."— Eric Kandel

DEFINITION OF PROFESSION
Neuroscientists study the structure, function, development, genetics, biochemistry, physiology, pharmacology and pathology of the nervous system including topics such as sleep, thoughts and perceptions, bodily functions, and movement.

ABOUT THE FIELD
Brain and central nervous system disorders are the nations leading cause of disability, and account for more hospitalizations and prolonged care than almost all other diseases combined. Neuroscientists seek to be able to cure or prevent the diseases of the nervous system, and as such it is necessary to have a good understanding of how the brain and the nervous system work. Some examples of diseases and disorders of the nervous system include Alzheimer's disease, addiction, anxiety disorders, head injury, Huntington's disease, stroke, multiple sclerosis, pain, learning disorders, attention deficit disorder, depression, and epilepsy.

HOW TO GET THERE
- PhD in neuroscience, experimental psychology, or other related science field.
- Advanced degrees in such areas as psychology, biology, biochemistry, medicine, biotechnology, pharmacology, bioengineering, or behavioral genetics are required for specialization.

ON THE JOB
Neuroscientists design and implement studies of the nervous system and report their findings in academic and popular journals. They also supervise pre-doctoral researchers and present findings at professional conferences.

SALARY RANGE
$68,900 to $75,000

TOOLS OF THE TRADE/LIFESTYLE
Neuroscientists typically work 40 or more hours per week, sometimes evenings and weekends They use computers, laboratory equipment, and special dyes to examine the behavior of molecules, nerve cells, networks, and brain systems.

YOU ARE

Neuroscientists have an aptitude for electronics and computing, and are able to approach problems in an innovative manner, work as part of a team, and present research findings to colleagues.

RELATED PROFESSIONS

Apasiology, Cognitive Science, Generative Grammar, Machine Learning, Neural, Networks, Evolutionary neuroscience. Neural engineering, Neuroanatomy, Neurobiology, Neurochemistry, Neuroeconomics, Neuroergonomics, Neuroendocrinology, Neuroesthetics, Neuroethics, Neuroethology, Neurogenetics, Neurogenomics, Neuroheuristic, Neuroimaging, Neurolinguistics, Neuromarketing, Neuropharmacology, Neurophenomenology, Neurophilosophy, Neurophysiology, Neuroproteomics, Neuroprosthetics, Neuropsychiatry, Neuropsychology, Neuropsychopharmacology, Neurotheology (also Biotheology), Psychiatry, Psychoneuroimmunology, Psychopharmacology, Psychobiology (also Biopsychology & Biological Psychology).

POLICY ANALYSIS

"The way we live our daily lives is what most effects the situation of the world. If we can change our daily lives, then we can change our governments and can change the world. Our president and governments are us. They reflect our lifestyle and our way of thinking. The way we hold a cup of tea, pick up the newspaper or even use toilet paper are directly related to peace."
— Thich Nhat Hanh

DEFINITION OF PROFESSION

Policy analysts gather and analyze information to assist in the planning, development, interpretation and review of government or industrial policy.

ABOUT THE FIELD

Policy analysts working for large corporations and wealthy industries often act as lobbyists. With the rise in the amount of capital spent in political campaigns, policy analysts are being challenged to find more effective, efficient, and cost-effective ways of influencing policymakers.

HOW TO GET THERE

- PhD in a relevant science field.
- Graduate and undergraduate course work in political science, public policy, or business.

ON THE JOB

Policy analysts produce original research, analysis, and commentary on a specific issues, identify promising new reform ideas, conduct analysis of research data and programs, design and implement research projects, and develop and write compelling policy papers in a variety of lengths and formats, work with a diverse array of outside experts, researchers, and freelance writers, along with key policymakers at the federal, state, and local level, and execute strategies to effectively communicate ideas to policy makers, educators, the media, and other key

audiences.

SALARY RANGE
$60,000 to $80,000

TOOLS OF THE TRADE/LIFESTYLE
Policy analysts typically work 40 hours per week or more, depending on project deadlines. They use computers and software programs including Word, Excel, PowerPoint, project management software, and statistical modeling.

YOU ARE
As a policy analyst you are analytical, and can interpret and communicate data effectively. Strong planning skills and the ability to think strategically are also expected. You possess excellent project management skills, the ability to provide direction and leadership to administrative staff, the ability to establish and maintain effective working relationships with board members, officials, physicians, contractors, and the general public. Additionally, you can work independently as well as part of a team in a demanding environment, and can handle multiple priorities. Strong proficiency in MS Office software products (Word, Access, Excel, etc.).

RELATED PROFESSIONS
Consultant.

ROBOTICS

"…Transformers, robots in disguise." — Transformers Movie

DEFINITION OF PROFESSION
Robotics is the science of the design, manufacturing, and application of robots and robotics technology. A person working in the field is called a roboticist. Robotics technicians (also a roboticists) install, maintain, repair, and/or use robots and related equipment.

ABOUT THE FIELD
Robotics technicians are experts in the use of complex electronic equipment, which have become central to virtually every facet of modern life. The work of these professionals can be found in a variety of environments, including military industrial complexes, universities, and the average suburban home.

Robots, machines designed to perform tasks in lieu of a living agent, are built in varying sizes. Some of the smallest robots can fit on the face of dime, while the largest fill an entire room. As of a recent article on Physorg.com, the smallest robot is the size of the width of a strand of hair. Research is being conducted in the area of nanorobotics and medicine.

Robots make it possible and/or easier for humans to engage in certain kinds of physical labor, which require great strength, long periods of repetitive motion, or are hazardous.

HOW TO GET THERE
A Bachelor's degree is required for most entry-level positions. The curriculum emphasizes courses in electronics, mechanics, mathematics, and related sciences.

ON THE JOB
Robotics technicians work as part of a team. They assist manufacturing, mechanical, and electronics engineers in all phases of robotic design, development, production, testing, and operations.

SALARY RANGE
$30,400 to $67,000

TOOLS OF THE TRADE/LIFESTYLE
Robotics technicians work in factories and laboratories. They use "walking" machines or teleoperators, remote control or sensory manipulators, and microprocessors in day-to-day activities. In general, technicians work 40 hours per week, and do not have take work home.

YOU ARE
Robotics requires dexterity in fixing intricate devices, an intuitive understanding of how things work, strong communication skills, and the ability to work efficiently while maintaining precision and accuracy.

RELATED PROFESSIONS
Robotics technicians are well-suited to other fields such as audio & video equipment technician, customer service representative, electrical/electronic assembler, electrical/electronic installer, electrical/electronic repair technician, field service technician, industrial maintenance repair technician, biomedical electronics service technician, electrical/electronics engineering technician, electrical/electronics systems designer, field service representative, instrumentation/control systems technician, and research and development technician.

SENIOR ENVIRONMENTAL CONSULTING

"The ultimate test of man's conscience may be his willingness to sacrifice something today for future generations whose words of thanks will not be heard." — Gaylord Nelson, co-founder of Earth Day

DEFINITION OF PROFESSION
Senior Environmental Consulting is a field that provides scientific and engineering solutions to environmental challenges.

Senior environmental consultants perform research to identify, abate and eliminate sources of pollutants and hazardous materials that affect people, wildlife, and the environment. They analyze and report measurements, make observations and recommendations on preservation and cleanliness of air, food, water, soil, and other factors that affect the earth and

its inhabitants.

ABOUT THE FIELD

Environmental consultants mobilize in emergencies to carry out damage assessments and environmental impact evaluations. They also work with other related professionals to assess environmental needs, such as the extensive assessment that is being done on the world's coral colonies.

Many events utilize the services of these professionals. Following the devastating events of the Tsunami in 2004, for example, environmental consultants performed an Environmental Impact Assessment for a USAID-funded reconstruction of 240 km of highway and 110 bridges along the Western coast of Sumatra, from Banda Aceh at the Northern tip of the island.

HOW TO GET THERE

PhD in life science, chemistry, geology, geophysics, atmospheric science, or physics.

ON THE JOB

Environmental consultants spend the majority of their time in the field early in their career, but as they gain more experience they generally devote more time to office and laboratory work. Research involves digging, and assessing collected soil, water, waste, etc. In laboratories, these professional conduct tests, run experiments, record results, and compile data.

SALARY RANGE

$51,080 to $70,000

TOOLS OF THE TRADE/LIFESTYLE

Environmental consultants work 40 hours per week and travel often to meet with prospective clients and investors. These personnel use computer modeling, data analysis and integration, digital mapping, remote sensing, and geographic information systems such as Geographic Information System (GIS) and Global Positioning System (GPS).

YOU ARE

As an environmental consultant you possess excellent interpersonal skills, strong oral and written communication skills in order to present technical reports and research proposals. You are also able to communicate technical materials on research to company managers, regulators, and the public. Physical stamina is a plus.

RELATED PROFESSIONS

Conservation scientists and foresters, atmospheric scientists, geoscientists, and some biological scientists.

THEORETICAL PHYSICS RESEARCHERS

"One of the principal objects of theoretical research in my department of knowledge is to find the point of view from which the subject appears in its greatest simplicity." — Willard Gibbs

DEFINITION OF PROFESSION

Theoretical physics researchers employ mathematical models and abstractions of physics (as opposed to experimental processes) in an attempt to understand nature, and rationalize, explain and predict physical phenomena.

ABOUT THE FIELD

Theoretical physics is the branch of physics pertaining to developing and evolving theories to explain the fundamental nature of the universe. Recently, the field of theoretical physics has received greater attention by people interested in philosophy, science of the mind, consciousness studies, and religious science. This is in part the result of the emergence of theoretical physicists who are willing to talk about these topics and how their field influences and makes meaning of these issues.

HOW TO GET THERE

- PhD in theoretical physics.
- Graduate and undergraduate degrees in physics with courses in calculus, differential equations, and other mathematics.

ON THE JOB

Theoretical physics researchers design research studies, supervise pre-doctoral researchers, write scientific articles, present at scientific conferences, and evaluate research findings.

SALARY RANGE

$60,000 to $104,917

TOOLS OF THE TRADE/LIFESTYLE

Theoretical physics researchers work 40 hours per week, using computers, a white board and markers, and a scientific calculator.

YOU ARE

Theoretical physicists are problem-solvers with exceptional analytical skills, inquisitive minds, imaginations, and initiative.

RELATED PROFESSIONS

Engineers, chemists and materials scientists, atmospheric scientists, environmental scientists, geoscientists, and mathematicians.

URBAN AND REGIONAL PLANNING

"Planning is bringing the future into the present so that you can do something about it now."
— Alan Lakein, writer

DEFINITION OF PROFESSION

Urban and Regional Planning is a vital aspect of the development of civilization. The greatest dynasties, countries, and monarchies all had urban and regional planners. The field bridges societal, economic and environmental concerns, and is significant when considering the progress and organization models of civilization.

Urban and regional planners develop short and long-term plans for lands. They are instrumental in the growth and revitalization of urban, suburban, and rural communities.

ABOUT THE FIELD

Urban and regional planners analyze trends in population and economic growth, estimate long-range needs for residential, commercial, and industrial development, and investigate property availability.

Planners also consider social and economic factors affecting land use changes. Planners are concerned with all aspects of the environment, including the location and design of buildings, transportation systems, and the protection of natural resources, such as air, water quality, and population density.

HOW TO GET THERE

A Master's degree from an accredited program in urban or regional planning or a Master's degree in a related field, such as urban design or geography is required. A Bachelor's degree from an accredited planning program, coupled with a Master's degree in architecture, landscape architecture, or civil engineering, is good preparation for entry-level planning jobs in various areas, such as urban design, transportation, and the environment. Courses in related disciplines, such as architecture, law, earth sciences, demography, economics, finance, health administration, geographic information systems, and management, are highly recommended. Because familiarity with computer models and statistical techniques is important, courses in statistics and computer science are also recommended.

ON THE JOB

Urban and regional planners confer with land developers, civic leaders, and public officials, and function as mediators in community disputes, presenting acceptable alternatives to opposing parties. Planners prepare material for community relations programs, speak at civic meetings, and defend proposals before legislative committees and elected officials. They also provide information on the best uses of a community's land and resources for residential, commercial, institutional, and recreational purposes.

SALARY RANGE

$41,950 to $82,610

TOOLS OF THE TRADE/LIFESTYLE

Urban and regional planners have a scheduled 40-hour work week, but must frequently attend evening or weekend meetings, or public hearings with citizens' groups. They often have deadlines, tight work schedules, and face political pressures generated by interest groups. Typical tools include: spreadsheets, databases, and computerized geographic information systems.

YOU ARE

Urban and regional planners are flexible and objective. They are able to reconcile differring viewpoints, make constructive policy recommendations, think in terms of spatial relationships, visualize the effects of plans and designs, and speak and write effectively.

RELATED PROFESSIONS

Planners often work in conjunction with architects, civil engineers, environmental engineers, landscape architects, and geographers.

VIDEO AND FILM EDITING

"The essence of cinema is editing. It's the combination of what can be extraordinary images of people during emotional moments, or images in a general sense, put together in a kind of alchemy." — Francis Ford Coppola

DEFINITION OF PROFESSION

Video and Film Editing is a specialized field in the production of video and film. Video and Film Editors edit soundtracks, film, and video for the motion picture, cable, and broadcast television industries.

ABOUT THE FIELD

Most film and video editors belong to one of several unions: Motion Picture and Videotape Editors Guild of the International Alliance of Theatrical Stage Employees (IATSE), National Association of Broadcast Employees and Technicians (NABET), International Brotherhood of Electrical Workers (IBEW), or are covered by an industrial union agreement. Film and video editors usually find work through registration with a union, but direct application to employers remains one of the most effective job search methods. DVD, streaming media, interactive television, and evolving film and video editing software have transformed the profession. It is important to keep up with these advances in order to remain marketable.

HOW TO GET THERE

Film and video editors acquire skills through on-the-job training, formal postsecondary training at vocational schools, colleges, universities, and photographic institutes in videography/cinematography. The ability to network is key to this family-oriented profession.

ON THE JOB

Film and video editors cut and paste film and video segments into an ordered cohesive story. Communication, style, and a certain amount of self-awareness is key as professionals in this

field must meet with directors and producers, and contribute in the decision making process.

SALARY RANGE
$44,710 to $76,100

TOOLS OF THE TRADE/LIFESTYLE
Work hours vary with company and timelines. Usually, film and video editors are passionate about their work, and long hours are more the rule than the exception. The benefit to this is that often projects in this field can be entertaining and inspiring. Film and video editors are experts in their field and must be masters in the use of editing software, such as Finalcut Pro or Avid.

YOU ARE
Successful editors have a strong design sense, imagination, and can think outside the box creatively. In addition, technical mastery and inventiveness is paramount.

RELATED PROFESSIONS
Artists and related workers, broadcast and sound engineering technicians, and radio operators, designers, and photographers.

WILDLIFE FORENSIC SPECIALIST

"Anybody who has tuned into the popular CSI television series knows that law enforcement officials today can only often answer such questions with the help of forensic scientists. Were it not for their detailed scientific and technical work – and their increasingly sophisticated tools – all sorts of crimes would never get solved." — Unknown

DEFINITION OF PROFESSION
Wildlife Forensics pertains to the conservation, protectioin, and enhancement of fish, wildlife, and plants, and their habitats.

Wildlife forensics specialists conduct complex technical laboratory analyses with respect to the identification of criminals and investigations of crimes involving wildlife. These specialists testify, supervise, and provide training in connection with these analyses.

ABOUT THE FIELD
The Wyoming Game and Fish Department's Laboratory has earned national recognition for its work in helping solve wildlife-related crimes. A number of other state wildlife agencies, as well as the U.S. Fish and Wildlife Service, regularly rely on the Wyoming Game and Fish Department's lab for forensic analysis.

HOW TO GET THERE
Bachelor's degree in one of the biological sciences, including the equivalent of eight semester hours of general chemistry, four semester hours of biochemistry, six semester hours of organic chemistry (or three semester hours of quantitative analysis), and three semester hours of

genetics or molecular biology.

ON THE JOB

A wildlife forensic specialist conducts and/or instructs wardens in the examinations of crime scenes for physical evidence; examine, analyze, and interpret biological evidence; make difficult chemical, serological, and genetic tests on tissue, blood, and other physiological fluid stains; morphologically identify and compare hair, feathers, scales, fibers, skulls, bones, and other animal parts in forensic cases; perform necropsies on a variety of different wildlife to examine wounds, recover bullets, projectiles and trace evidence, determine the method of kill, and answer depredation concerns including predator attacks on humans; make macroscopic, microscopic, and other technical examinations and comparisons of tissue; make photographs and photomicrographs using black and white and color films; use complex measuring, recording, and testing of instruments and devices; prepare evidence and exhibits and testify in court as expert witnesses; assist wardens and other wildlife law enforcement officers and prosecutors in understanding and interpreting forensic evidence; write reports and correspondence and give instructions in this field at warden training schools; and provide forensic research, application, advanced casework, methodology development, and training to state and/or local wildlife forensic scientists and wildlife law enforcement agencies.

SALARY RANGE

$41,712 to $67,001

TOOLS OF THE TRADE/LIFESTYLE

Wildlife forensic specialists work 40 hours per week in the field and in laboratory/office, and use microscopes, spectrographs, spectrophotometers, chromatographs, and electrophoretic equipment on a daily basis.

YOU ARE

Wildlife forensic specialists are interested in making extensive use of scientific methods and techniques, and exhibit strong analytical and communication skills.

RELATED PROFESSIONS

Zoologist, forensic archeologist, and wildlife specialist.