

# CAREERS

at the CSIR



**CSIR**

Touching lives through innovation

# THE CSIR MANDATE

**“**The objects of the CSIR are, through directed and particularly multi-disciplinary research and technological innovation, to foster, in the national interest and in fields which in its opinion should receive preference, industrial and scientific development, either by itself or in co-operation with principals from the private or public sectors, and thereby to contribute to the improvement of the quality of life of the people of the Republic, and to perform any other functions that may be assigned to the CSIR by or under this Act.**”**

*(Scientific Research Council Act 46 of 1988, amended by Act 71 of 1990)*

## OUR VISION

We are accelerators of socio-economic prosperity in South Africa through leading innovation

## OUR MISSION

Collaboratively innovating and localising technologies while providing knowledge solutions for the inclusive and sustainable advancement of industry and society

## OUR VALUES

**EPIC [ep-ik]** adjective

Heroic, majestic, impressively great, ambitious, grand, extraordinary

Our beliefs, principles and the impact we wish to make to improve the quality of life of South Africans are EPIC.  
Team CSIR pursues Excellence, celebrates People, personifies Integrity, and welcomes Collaboration.



# YOUR PASSPORT TO A CAREER AT THE CSIR

The CSIR is a remarkable organisation distinguished for its excellence in research and development, as well as its commitment to making an impact in people's lives. To achieve these goals, highly skilled people are required – which is why we are always looking for bright, passionate people to embark on this journey with us.

By building and investing in a strong core of professionals in research and development, we contribute to the development of a national pool of scientists, engineers and technologists. Young researchers are highly regarded at the CSIR because as the next generation, they will play the biggest role in transforming the science, engineering and technology skills base in South Africa. The CSIR firmly believes in nurturing and developing the expertise of its young researchers, ensuring that they are not only able to independently conduct research, but that they can also be role models for students and learners.

Choosing the right career is a critical step in your life. Your career choice will determine where you go, what you learn and who you meet. It will allow you to unleash your full potential and fulfil your passion. It will determine your legacy for generations to come. It is therefore important to make informed decisions. The more you plan for a successful and fulfilling career, the more opportunities there will be to find a career in which you can grow and reach your full potential. When choosing your career path, you have to ask yourself: What do I want from a career? What do I expect? What is it that I am looking for in an employer?

Career paths within the STEM field are seldom linear. Scientists and researchers are exposed to so many different opportunities, that many choose to grow in a whole new area of interest they had not considered before.

In this career booklet, we highlight some of the careers available at the CSIR and provide some pointers on the academic institutions offering the relevant qualifications, as well as the characteristics you require, ensuring a perfect fit with your chosen career.



CAREER	DESCRIPTION	CHARACTERISTICS	WHERE TO STUDY	RELATED CAREERS
<b>ROBOTICS ENGINEER (ROBOTICIST)</b>	Combines science, engineering and art to design and develop robots for industry and various sectors.	Engineers who work in the field of robotics constantly attempt to break new ground. They need to be resilient, with an ability to solve problems and a willingness to continuously improve the specialist skills needed for their focus area through reading and communication with their peers.	If interested in robotics, start with a degree in mechanical engineering, which is offered by most South African universities. In your Honours year, choose your project topic in robotics and add as many computer programming and mathematical studies during your degree.	Computer scientist, mechanical engineer, electrical engineer, mechatronics engineer and computational neuroscientist
<b>SOFTWARE ENGINEER</b>	Applies engineering principles within a digital space. The work involves design, conceptualisation, creation, innovation and a strong focus on engineering development through coding.	To be a great software engineer, one needs to be passionate, patient, curious, innovative and a problem-solver.	The basic degrees are in electronic and computer engineering. These courses can be studied at many universities across South Africa.	Computer scientist, mathematician, physicist, programmer and systems engineer
<b>STATISTICIAN</b>	Uses statistical methods to collect and analyse data to help solve real-world problems in business, engineering, healthcare and other fields. They decide what data are needed to answer specific questions or problems, determine methods for finding or collecting, as well as analysing and interpreting the data.	Statisticians should have strong analytical and mathematical skills to enable them to understand problems, identify possible solutions and gather the tools (materials and methods) required to get to those solutions.	At most South African universities, students will start with a BSc course which includes linear algebra, calculus, experimental design, survey methodology, probability and the theory of statistical inference. Students then specialise in statistics when doing their Honours, Master's and PhDs.	Lecturer in statistics, statistician in the banking and insurance industry and actuary
<b>STRUCTURAL BIOLOGIST</b>	Researches the molecular structure of biological macromolecules, especially proteins and nucleic acids, how they acquire the structures they have and how alterations in their structures affect their function. Structural biology is a branch of molecular biology, biochemistry and biophysics.	This career requires inquisitiveness and dedication. Moreover, you have to be nimble with your hands as high-throughput micro-arraying is somewhat of an art.	At most South African universities, students will start with a BSc degree and then specialise when doing their Honours, Master's and PhDs in various different fields to equip them to work as structural biologists. Many of these courses are offered by departments of biochemistry.	Molecular biologist, biologist and biochemist



CAREER	DESCRIPTION	CHARACTERISTICS	WHERE TO STUDY	RELATED CAREERS
<b>TRANSPORT ECONOMIST</b>	Studies the movement of people and goods over space and time and how scarce resources are expedited and allocated in the transport sector to positively impact transport activities on society, the environment and the economy.	For this career, a strong background in statistics and econometrics is required. You should have an analytical mind.	Transport studies can be done at local universities such as the University of Johannesburg, Cape Town, Stellenbosch, North-West and the University of South Africa.	Public sector analyst, policy analyst, public transport specialist, fleet controller, transport regulator, transport policy specialist, business logistics practitioner, as well as careers in the aviation, roads, maritime, pipeline and rail sectors.
<b>URBAN AND REGIONAL PLANNER</b>	Guides the development of neighbourhoods, towns, and regions by applying conceptual, analytical, communication and technological skills to achieve spatial outcomes such as more equitable, sustainable and productive cities or thriving rural regions.	An urban and regional planner needs to be able to grasp spatial inter-relations and implications of major development challenges, as well as the wide range of economic, engineering, social, legal and procedural, land development and environmental aspects at play within an area.	Accredited undergraduate or postgraduate qualifications are available at a range of universities throughout the country. These will qualify one for a professional registration with the South African Council for Planners.	Urban designer, public policy analyst, environmental scientist, civil engineer and property developer
<b>WASTE MANAGEMENT RESEARCHER</b>	Develops waste and pollution reduction solutions through directed research to support government, society and industry in decision-making.	An inquisitive mind, an eye for detail and a positive attitude are required.	Most South African universities offer degrees in environmental management. Once students develop key areas of interest in this broad field of study, they may opt to pursue specialisation.	Waste treatment scientist, environmental researcher, environmental economist

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<b>AERONAUTICAL ENGINEER</b>	Researches, designs and develops aircraft and spacecraft. They also perform fundamental research that relates to aerodynamics, aircraft structures and related materials. They are involved in the optimisation of aircraft components, such as wings, engine inlets, tail sections and fuselages.	Aeronautical engineers typically enjoy solving complicated problems. They have an aptitude for mathematics and science and are creative. The type of work brings a fair amount of challenges, so perseverance is key.	The University of the Witwatersrand is the only institution in South Africa that offers a full aeronautical engineering undergraduate degree. Other universities, such as the University of Pretoria, offer mechanical engineering with some aeronautical subjects included in an undergraduate degree.	Mechanical engineer and industrial engineer
<b>ANALYTICAL CHEMIST</b>	Performs tests and other procedures on compounds to discern their nature. They typically do this work in laboratories, where they operate and maintain instruments such as spectrometers and chromatography instruments.	To be an analytical chemist, one needs to have an inquisitive mind and be keen to explore and solve problems. You need to be organised and have an acute interest in technology.	The majority of South African tertiary education institutions offer qualifications in chemistry or analytical chemistry.	Quality assurance manager in the food industry, production line manager in the petrochemical industry
<b>BEHAVIOURAL SCIENTIST</b>	Studies, analyses and draws actionable conclusions about how people think, act and react to a wide variety of situations in various fields such as the military, police, business organisations and many more.	To work as a behavioural scientist one must get along well with people from diverse backgrounds and also have a lot of patience.	Most South African universities offer degrees in psychology, sociology and anthropology.	Human resource practitioner, corporate psychologist, sociologist and anthropologist
<b>BIOCHEMIST</b>	Explores the chemical processes within, and related to, living organisms. They work in laboratories to bring together biology and chemistry to solve problems such as those in the biotechnology and related fields.	To qualify as a biochemist, one needs to obtain good grades in mathematics, as well as physical and life sciences in matric. For undergraduate studies, one needs to take at least one of the following subjects as a major: Biology, microbiology or biochemistry.	The majority of South African tertiary education institutions offer science degrees.	Structural biologist, biotechnologist, medical biochemist, protein biochemist, application specialist for equipment or consumable supplies and laboratory manager
<b>BIOENGINEER</b>	Works at the intersect of engineering, science, biotechnology, chemistry, and nanotechnology, to design and manufacture products and solutions.	Strong abilities in mathematics and science are required. Subjects such as computer science and biology are also useful, but not essential.	Most South African universities offer a BEng degree in electronic engineering. It is important though to choose a university with a strong engineering faculty that allows for specialisation in bioengineering. Some examples are the University of Pretoria, UCT and Stellenbosch.	Electronic engineer, biomedical scientist, medical doctor



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CHEMICAL ENGINEER	Concern themselves with the practical design and operation of equipment used in making new products or chemicals as well as streamlining existing production processes.	Chemical engineers should be interested in how processes work and how products are developed. They should excel in mathematics, physics and chemistry.	Chemical engineering is offered at most universities in the country, as well as some universities of technology.	Chemist, process designer, materials scientist
CIVIL ENGINEER	Civil engineers design, construct, maintain and adapt the built environment infrastructure.	Civil engineers need to be innovative, willing to work hard and continuously develop their skills.	Most South African universities and universities of technology offer civil engineering programmes.	Environmental engineer, transport engineer, hydraulics engineer, geotechnical engineer and structural engineer
COASTAL ENGINEER	Studies the ongoing processes and construction within the coastal zone. The field involves aspects of nearshore oceanography, marine geology, and civil engineering, often directed at combating erosion of coasts or providing navigational access.	One must have problem-solving skills, be a logical thinker and have strong abilities in subjects such as mathematics, applied mathematics and physical science. Most importantly, one should have a love for the sea and being outdoors.	The University of Stellenbosch is the only university in South Africa offering specialisation in coastal engineering.	Marine engineer, oceanographer
COMPUTER SCIENTIST – HIGH PERFORMANCE COMPUTING	Helps researchers to understand complex data sets by using software to visualise them.	You should enjoy spending long hours behind a computer and be good at problem-solving and logical reasoning.	Most South African universities offer courses in computer science.	Software engineer, software developer, business analyst
DATA SCIENTIST	Uses their analytical skills to find and merge different data sources, analyse them and formulate it in such a way that people understand their results.	To become a good data scientist, one needs strong technical skills such as mathematical modelling and algorithm design. You also need to be curious and willing to continuously learn and change with society if you want to stay relevant.	Most South African universities offer degrees in computer science, with Honours and Master's degrees in data science or related disciplines such as machine learning, data mining and artificial intelligence. The Sol Plaatje University in Kimberley in the Northern Cape offers an undergraduate programme in data science.	Risk analyst (banking and insurance), scientific informaticist (biological patterns, chemical structure modelling), academic or researcher

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<b>ELECTROMECHANICAL ENGINEER</b>	Electromechanical engineers bridge the gap between two disciplines (mechanical and electrical engineering) that often work together.	You must have an aptitude for mathematics and physics, love challenges and have a great deal of persistence.	Currently, the University of Cape Town is the only tertiary education institution to offer a degree course in electromechanical engineering in South Africa. However, mechatronics engineering is a very similar field and is widely offered at many South African universities.	Mechanical engineer and electronic engineer
<b>ENVIRONMENTAL SCIENTIST</b>	Applies science to improve the understanding of the causes and drivers of air pollution, as well as the study and discovery of means to mitigate the negative effects of climate change. This generally involves collecting data on the sources of pollution emissions and quantifying the impacts on air quality and on people.	Environmental researchers need a keen interest in the environment, good communication skills and the ability to work well with others.	Degrees in environmental science are offered at most South African universities.	Environmental engineer, climate specialist, geoscientist.
<b>ENZYMOLOGIST</b>	Studies and characterises properties of enzymes and how these function in biological systems, with an emphasis on translating these into products and solutions for research, industry and health.	To succeed as an enzymologist you need good technical acumen in this field. You have to develop dynamic problem-solving skills to formulate solutions in response to a multitude of challenges.	Most universities in South Africa offer a BSc in biochemistry or biotechnology.	Molecular biologist, proteomicist, protein biochemist
<b>GEOGRAPHIC INFORMATION SYSTEM (GIS) SPECIALIST</b>	GIS specialists visualise, analyse and interpret data to understand relationships, patterns and trends.	You need to have a good understanding of geography, mathematics, physics and statistics.	Learners can study at any university in South Africa. Some universities offer GIS as part of geography, surveying or environmental sciences.	A GIS specialist can work for government departments, local authorities, state-owned entities, private companies, mining houses and academia.



CAREER	DESCRIPTION	CHARACTERISTICS	WHERE TO STUDY	RELATED CAREERS
<b>INFORMATION SECURITY ENGINEER</b>	An information security engineer develops, monitors, evaluates and maintains systems and procedures to protect identified networks and systems from unauthorised access.	You need to have a passion for the development of security measures and the patience to educate people on how to protect themselves against cyber criminals who employ tactics that have not previously been thought of.	Information security engineering can be studied at various South African universities, such as the universities of Pretoria, Johannesburg and Cape Town as well as the Cape Peninsula University of Technology, Stellenbosch University and the Nelson Mandela Metropolitan University.	Security architect, incident responder, security consultant, security analyst, computer forensics expert, security specialist and malware analyst.
<b>LASER PHYSICIST</b>	Designs innovative laser systems for a variety of applications in sectors ranging from industry, to medicine, defence and communications.	Physicists are curious about how things work and why they work in a specific way. To specialise in the area of laser beams, one needs a good understanding of photonics.	Stellenbosch University and the universities of the Witwatersrand and KwaZulu-Natal offer courses that specialise in lasers.	Computer programmer, astronomer, mathematical modeller
<b>MATERIALS ENGINEER</b>	Uses the huge fundamental base of knowledge on materials and their processing to develop properties and new materials suited to specific applications. For example, using titanium powder to make industrial components such as valves.	An aptitude for mathematics, physics, chemistry, design and engineering is required. You need to be an analytical thinker and be system-oriented.	Various South African universities offer degrees in metallurgy and materials engineering. Students can also follow a general science track by acquiring a BSc in physics or chemistry at any university and following this up with a specialisation in materials engineering at the Stellenbosch University or the University of Cape Town	Lecturer, materials consultant to industry and research manager
<b>METEOROLOGIST</b>	Collects and analyses atmospheric data on, for instance, wind, air pressure and humidity to predict weather patterns. These forecasts are needed by industries, farmers, event planners and the general public.	To work as a meteorologist in general, you need to love the natural environment and have an aptitude for working with large datasets. You also need to take mathematics and physics at university.	The University of Pretoria offers a degree in meteorology, while the University of Cape Town offers degrees in ocean and atmosphere sciences. The Universities of the Witwatersrand and Venda, as well as the North-West University offer postgraduate degrees that include meteorology-related topics.	Atmospheric modeller, Weather forecaster

CAREER	DESCRIPTION	CHARACTERISTICS	WHERE TO STUDY	RELATED CAREERS
<b>MICROSCOPIST</b>	Microscopists support almost every field of science. In the healthcare industry, they may identify abnormal cells or disease-causing pathogens in tissue, while those who support environmental science may seek toxins or small organisms in water samples.	These professionals pay attention to detail and have a genuine interest in science and a strong commitment to customer satisfaction, collaboration and team work. They have good communication skills and the ability to work in a fast-paced environment.	A degree in natural sciences or engineering from universities and universities of technology can provide the basic background needed to become a microscopist.	Material scientist, physicist, chemical and metallurgical engineer, polymer technologist and biologist
<b>OCEANOGRAPHER</b>	A scientist who studies the ocean. The scope of the studies includes the geology of the sea floor and the physical properties within the ocean, the ecosystem dynamics, ocean currents and waves.	To become an oceanographer you should have a love for the ocean and be interested in science. A sense of curiosity about the Earth system and how the land and ocean interact is imperative - being able to swim is not.	The University of Cape Town and the Nelson Mandela Metropolitan University are some of the universities offering oceanography-related qualifications in South Africa.	Marine biologist, chemical oceanographer, marine physicist and climatologist
<b>PHOTOCHEMICAL MODELLER</b>	Studies how atmospheric pollutants interact through chemistry involving radiation from the sun, and how these are dispersed in space over time to affect air quality.	One needs to be able to grasp computer programming, because a lot of time is spent working with data and developing models.	Aspiring photochemical modellers should take chemistry as part of a BSc degree. BSc and MSc (Environmental Science) qualifications can be obtained at most universities in South Africa.	Air quality modeller and atmospheric scientist
<b>PHYSICIST – QUANTUM OPTICS RESEARCH</b>	Uses their knowledge of the fundamental laws of nature to develop new technological innovations. This includes research into the quantum control of atoms and molecules, developing quantum control applications of trapped ions and ultrafast pulsed lasers.	Physicists must be driven by a curiosity about the forces of nature and how it works, believe in the spirit of exploration, and have patience, coupled with discipline.	Most universities in South Africa offer both undergraduate courses and postgraduate degrees in physics.	Astrophysicist, photonics researcher, nuclear engineer
<b>PLANT ECOLOGIST</b>	Studies the diversity of plants in an ecosystem.	A love of the outdoors and plants, and an interest in and understanding of agriculture.	Most universities in South Africa offer undergraduate and postgraduate courses in botany and ecology.	Agricultural specialist, conservationist



The CSIR offers a number of opportunities to help you on your journey towards achieving your career aspirations. These opportunities are available for students who meet the requirements.

BURSARIES		POSTGRADUATE BURSARIES (INTER-BURSARY SUPPORT PROGRAMME)	INTERNSHIPS	STUDENTSHIPS
WHO QUALIFIES	<ul style="list-style-type: none"> <li>South African citizens</li> <li>Unemployed students studying full-time towards BSc, BEng, BSc Honours or B Tech, MSc and PhD</li> <li>Current Grade 12 intending to enrol full-time for the degree of choice at a South African public university with English (Level 5) and Mathematics, Physical Science (Level 6)</li> </ul>	<ul style="list-style-type: none"> <li>Full-time students at any public university studying towards Honours/BTech, 4th Year Engineering Masters, and Doctoral degrees.</li> <li>Thematic areas supported include ICT, Modelling and digital sciences, Photonics, Microsystems, Biotechnology, Titanium, Aerospace and Composites</li> </ul>	<ul style="list-style-type: none"> <li>New graduates in science, engineering and technology fields interested in gaining work experience</li> </ul>	<ul style="list-style-type: none"> <li>BSc Honours, BEng Honours, MSc or MEng graduates studying full-time at tertiary education institutions could qualify for a CSIR studentship</li> </ul>
WHAT DOES IT ENTAIL	<p><b>Financial support</b></p> <ul style="list-style-type: none"> <li>Registration fees</li> <li>Tuition fees</li> <li>Book allowance</li> <li>Laptop allowance</li> <li>Accommodation</li> <li>Meal allowance</li> <li>Living allowance</li> </ul> <p><b>Non-financial support</b></p> <ul style="list-style-type: none"> <li>Annual induction, vacation work, visits at the university and an annual social event</li> </ul>	<p><b>Bursary support as follows:</b></p> <p>Honours level = R75 000 Masters level = R100 000 Doctoral level = R130 000</p>	<p><b>Financial support</b></p> <ul style="list-style-type: none"> <li>Monthly stipend</li> <li>In-house short courses</li> </ul> <p><b>Non-financial support</b></p> <ul style="list-style-type: none"> <li>Mentorship</li> <li>Working on projects that contribute to the improvement of the lives of South Africans</li> </ul>	<p><b>Financial support</b></p> <ul style="list-style-type: none"> <li>Monthly salary</li> <li>Registration and tuition fees for an MSc or PhD degree</li> <li>Informal in-house training (short-courses)</li> <li>Opportunity to present your work on a national and international stage</li> </ul> <p><b>Non-financial support</b></p> <ul style="list-style-type: none"> <li>Mentorship</li> <li>Working on projects that contribute to the improvement of the lives of South Africans</li> </ul>
<b>How do I apply</b>		Opportunities are advertised throughout the year on <a href="http://www.csir.co.za">www.csir.co.za</a> in the vacancies section.		
<b>Contact details</b>		For more information, please e-mail: Ncamisile Masuku at <a href="mailto:NMasuku@csir.co.za">NMasuku@csir.co.za</a> or on +27 841 7518. For postgraduate bursary, please email to <a href="mailto:HCD-INTERBURSARY@csir.co.za">HCD-INTERBURSARY@csir.co.za</a>		

For more information on the above offerings, visit the careers section on: **[www.csir.co.za](http://www.csir.co.za)**

