

# Multi-disciplinarity in Science as we enter the Fourth Industrial Revolution

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The South African Council for Natural Scientific Professions



science  
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Science and Technology  
REPUBLIC OF SOUTH AFRICA

# South African Council for Natural Scientific Professions

- A statutory body established under the Natural Scientific Professions Act (Act no. 27 of 2003)
- The Council was formed to provide for a credible *professional registration and regulatory body* for natural scientists to establish, direct, sustain and ensure a high level of professionalism and ethical behaviour in the natural scientific sector.
- Also to improve standards of services rendered by professionals, maintain their integrity, enhance their status and manage liabilities attendant to the practice of natural science professions.
- The Act requires that all practicing natural scientists in South Africa be registered with SACNASP.



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# What was and is a scientist?

A scientist was:

- A person who studied a scientific discipline and works in it.
- Disciplines were clearly defined.
- Careers were usually within the one or two disciplines studied.

A Scientist is...

- Someone who studied a natural science or a mix of natural Sciences
- The boundaries between disciplines are blurred
- There are constantly new disciplines
- Scientists cross fields, change fields and work with non-Scientists

# What does the IV IR Need?

- Institute for the Future identified the following skills that will be essential in this time:
- Novel and adaptive thinking: proficiency in coming up with solutions and responses beyond those which are by rote or rule-based;
- Computational thinking: the ability to translate vast amounts of data into abstract concepts and to understand data-based reasoning in order to make sense of this information;
- Cognitive load management: “the ability to discriminate and filter information for importance, and to understand how to maximize cognitive functioning using a variety of tools and techniques”;
- Trans disciplinarily: literacy in and the ability to understand concepts across multiple disciplines;
- Virtual collaboration: the ability to work productively and drive engagement as a member of a virtual team; and
- Technological literacy and technical entrepreneurial skills: the capacity for a new partnership with the new smart machines that will enter offices, factories and homes.

# How do careers now look different?

- The days of studying one thing and doing a job for 40 years are passing
- Scientists study multiple disciplines, mix their studies with commerce and humanities or switch during their studies
- Many scientists move out of the realm of science when they start working or during their career
- Many collaborate in multi-disciplinary teams
- Many switch disciplines during their working lives – adaptation is the flavor of the day

# Registering Scientists

- Currently 13500 registered scientists.
- Registering scientists in three categories –
  - Professional Natural Scientist
  - Certificated Natural Scientist
  - Candidate Natural Scientist

# Fields of Practice

Agricultural Science	Including Forestry and Wood Science
Animal Science	
Aquatic Science	Includes Marine Science
Atmospheric Science	Includes Climatology and Meteorology
Biological Science	
Botanical Science	
Chemical Science	Includes Industrial Science
Conservation Science	
Earth Science	
Ecological Science	
Environmental Science	
Extension Science	
Food Science	
Geological Science	
Geospatial Science	
Materials Science	Includes Metallurgical Science
Mathematical Science	
Microbiological Science	
Physical Science	Includes Radiation Science
Soil Science	
Specified Science	Fire Origin and Cause Investigation
Statistical Science	
Toxicological Science	
Water Resources Science	Includes Hydrological Science and Water Science
Zoological Science	

# Requirements for Registration

## **Professional Natural Scientist:**

- A BSc(Hons) or post-graduate diploma or equivalent (NQF Level 8) qualification & 3 years of relevant work experience; OR
- An MSc / MTech or equivalent (NQF Level 9) qualification & 2 years of relevant work experience; OR
- A doctoral qualification (NQF level 10) & 1 year of relevant work experience

In all of the above it is required that a certain percentage of the credits passed are in the natural sciences. The requirement is for 70% of first-year level credits, 80% of second- and third-year credits and 100% of fourth / honours year credits

It is further required that the majority of the credits are in the discipline or directly supportive of the discipline applied for

A breadth of basic scientific knowledge such as Chemistry, Mathematics, Physics etc. on first-year level is also required

## **Certificated Natural Scientist:**

- A BSc / 3-year diploma or equivalent (NQF level 7) qualification & 1 year of relevant work experience
- A 2-year diploma or equivalent (NQF level 6) qualification & 5 years of relevant work experience

In all of these it is required that 50% of the credits passed in each year of study are in the natural sciences

## **Candidate Natural Scientist:**

Meets the qualification requirements for any of the above categories with as yet insufficient work experience

# Recognition of Prior Learning

This provides a mechanism for individuals with insufficient formal qualifications to register with SACNASP once they have at least ten years of relevant work experience.

# What is relevant work experience?

Work experience is full-time work experience in a relevant scientific field

Duration of work experience is calculated from the date of graduation with the highest qualification being considered

Presently work experience obtained prior to the highest qualification will not be counted except in exceptional circumstances

Teaching experience, even at tertiary level is not considered

For a Pr. Sci. Nat. registration at least some of the work experience must be in a position of responsibility

# Referees: a peer review system

All individuals applying for registration as Professional or Certificated Natural Scientists must nominate referees to submit confidential reports on them to SACNASP

Referees should have personal knowledge of the applicant's scientific work, can be superiors, colleagues or clients but not subordinates

Referee reports should describe work performed as part of employment not studies

Referees should be registered Professional Natural Scientists or individuals of equivalent qualifications and experience e.g. potential registered Pr. Sci. Nat. or Pr. Eng. Etc.

Referee reports must be the original work of the referee, no copying and pasting, especially not from text the applicant wrote

SACNASP requests reports directly from referees, they get a unique link to upload their report directly onto our system

You do not have to referee for someone just because you're requested to – and your report does not have to be positive

# Continuing Professional Development

The CPD Programme was launched on 1 April 2017

- In order to comply with SACNASP's CPD policy, registered scientists need to accumulate 25 CPD points over a five-year period in order to be eligible for re-registration.
- These points can be gained through a number of activities including attending conferences, belonging to a Voluntary Association, assisting SACNASP as a referee or as a member of a committee.
- Substantial effort has been put into explaining to VAs how the system works. SACNASP is also hosting workshops around South Africa to address the concerns of registered natural scientists.

# Code of Conduct

- Code of Conduct in place for protection of registered Professional and the public.
- *Speaks to the professional behaviour of the Registered Professional.*
- “Conduct themselves in such a way as to uphold the dignity, standing and reputation of the natural science professions”.

# Where to from here?

- We need criteria for defining and recognising scientists that fit the new era
- Less rigidity on how we define fields
- More space for adaptation
- Should we trust a professional's own judgement on their competence?

# Thank-you

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