Integrity in scientific research – promoting the case for ethics in research: a contribution from Reformed ethics

Laetus O.K. Lategan
Dean: Research and Innovation
Central University for Technology, Free State
Private Bag X20539
BLOEMFONTEIN 9300

Llategan@cut.ac.za

Opsomming

Hierdie studie beredeneer die grondslae van navorsingsetiek en integriteit. Die studie sluit aan by die wetenskapsteoretiese oriëntering dat wetenskap nie waardevry is nie, dat dit binne 'n bepaalde konteks beoefen word en dat religie en kontekstuele faktore impakteer op die manier waarop wetenskap beoefen word. Die artikel stel 'n vier-vlak verstaan van navorsingsetiek voor. Die vlakke waarna verwys word, is die konseptuele en kontekstuele, antropologiese, omgewingsimpak en monitering, evaluering en aanpassingsvlakke. Die artikel definieer navorsingsetiek as die studie van beginsels en die identifisering en toepassing van waardes in 'n wetenskaplike domein. Navorsingsintegriteit word verduidelik as die eweknie navorsers, befondsingsliggame en publiek se vertroue wat daar in navorsingsresulate en die -proses is. Die posisie wat die artikel inneem, is dat etiek self 'n wetenskap is en dat die verstaan van navorsingsetiek nie buite die raamwerk van die wetenskapsteorie kan wees nie.

Keywords: ethics, integrity, research, research integrity.

1. Where are we with the debate on research ethics and research integrity?

1.1 The international perspective

Research integrity is commonly known as the trust that peers, funders and the public express in the conducting of research and

the research process. Research misconduct is no longer limited to the conventional confinement of disrespect for or harm to human subjects involved in the research process, plagiarism, falsification and fabrication of data. The agenda in favour of ethical-driven research is extended to include topics such as respect for animals, the promotion of sustainability, the implementation of safety and security activities, financially sound business practices, the protection and safeguarding of data and the implementation of effective management systems and supportive governance structures – to name but a few. At the same time are the bars raised to meet the global/international requirements for research integrity. It is no longer simply a matter of *comprehension* but continuous *awareness* and *analysis* of progress with research ethics and integrity application.

Mayer (2013) convincingly raised awareness for research integrity. He continued to say that although everybody knows the importance thereof, there are no empirical-based answers (yet) to questions such as: do we make a difference despite all our efforts? In 2012 the Inter Academy Council published a policy report on the responsible conduct in the global research enterprise. It is evident from this report that the responsible conduct of research covers a spectrum of activities for which universities/research institutions are *collectively* and researchers *individually* responsible. Words such as responsibility, upholding of standards and safeguarding the research process are used intentionally in this report.

The debate on research integrity can be grounded in Tilley's (1998) proposal that research should be conducted *respectful.* Her proposal is informed by the fact that the researcher moves outside his/her space to interact with other people and contexts. The researcher has to engage as "outsider" with a person/context that may not always be familiar to him/her. This can influence the way in which the research is conducted. No research can go without respect. This is especially required when the researcher deals with vulnerability (example, the sick, children, poor, war victims, etc).

1.2 The South African perspective

Turning to South Africa, a number of developments can be reported too. First, some legislation regulates ethical committees and/or practices. Typical examples are Act 61 of 2003 (National Health

Research Ethics Council), Act 10 of 2004 (Bio-diversity) and Act 51 of 2008 (Intellectual Property). Second, some government policies and funding agencies advocate the importance of research ethics. The updated funding policy framework, "Policy and Procedures for Measurements of Research Output of Public Higher Education Institutions" (2012) regulating government funding for research outputs in South Africa, states that research integrity is part of *participating* in research and the *funding* of research. Research councils, such as the National Research Foundation (www.nrf.ac.za), requires confirmation that researchers will perform their research according to the norm and standards set for research by their respective universities or research institutions. Third, many universities have developed/are developing research ethical codes. A random selection suggests that the emphasis is primarily on research on humans and animals. Research in collaboration with humans, the environment, data and information protection, the relation between the supervisor/adviser and student, science writing and Intellectual Property are emerging fields. From these codes it is evident that academic freedom, respect for others (no discrimination) and social values such as social justice, responsibility and benevolence are important. Fourth, there is no national approved/accepted statement of research integrity (yet). The NRF promoted a discussion on drafting such a statement. During 2011 a meeting was convened to outline such a statement (see Emerging Researchers Network 2012). Fifth, the *Intellectual Property Act* 2008 No 51 promotes the protection of intellectual property and how this should be regulated. Sixth, the Academy of Sciences of South Africa (ASSAf, 2010) published guidelines for responsible authorship and how it should be viewed by editors. Seventh, the debate on responsible postgraduate education was extended too. The Academy of Science of South Africa published its Report on doctoral education. This report, *The PhD Study: An evidence-based study on how to meet the demands for high level skills in an emerging economy,* challenges, amongst others, the ethical practices associated with doctoral education in South Africa.

From these observations one can conclude that although there may be no general South African statement/guideline, such a statement will include matters related to academic, scientific and societal (including business, industry, government and social communities

as end users) responsibility. Central to this responsibility should be the general trust from peers, funders and the public on the research processes, practices, results and applications.

1.3 Reflection

A summative perspective on scientific misconduct regardless the context is found in the Flemish Research Code's [*Ethische code van wetenschappelijk onderzoek in België* (2008)] comment that it is evident that unethical behavior can occur at any stage of the research process. It ranges from grant application and awarding of grants; research designs and the execution of the research project, the falsification of results or observations, selective presentation of results or the deliberate omission of results. Misconduct is a systemic challenge. Because of the reality of misconduct in research, The Lanchet's editorial (27 October 2012:1445) advised that agreement on ethical principles should be reached before one embarks on the project: "They declare that all those involved in research should be bound by the principles of scientific principles."

There should be no doubt that research ethics and integrity should be high on the agenda – to conceptualise (what is research ethics and integrity?), to manage, implement, monitor and evaluate. The Singapore Statement on Research Integrity (2010) reminded one that research is also challenged through the way in which we do research, how the project is executed and what research results are presented. The draft Montreal Statement on Research Integrity (2013) continued the advocacy for research integrity through its emphasis on sound research networks and partnerships.

This, of course, cannot be limited to the one corner of the research workers only – namely researchers, but should include research leaders, managers, administrators and teams since all of them are part of the research community.

A deeper analysis of these developments, suggests that the challenges straddles three issues: the professional research behavior of the scientist, the research environment in support of research and the impact the research result will have on a research community.

Following on this analysis two more, albeit different, issues should be raised: What are the underlying ideologies and paradigms influencing the debate on research integrity?

From an epistemological perspective one more question can be asked: What is the fit of research integrity in the broader context of research ethics? During the opening of the Third World Conference on Research Integrity, Stroud (2013) presented a case for ethics in research. She commented that research aims and objectives cannot be met unless ethical practice is evident in the way which research was conducted. Ethical foundations informing the research process can therefore be seen as the basis for ethics in research.

The emerging question is what are the foundations of such an ethic? The aim of this paper is to engage with this question as basis for promoting ethics in research.

2. The foundations of research ethics

2.1 The "galaxy" of ethics

The philosophy of science made it clear that scientific results are always produced in a particular context and that the contexts impose the values driving/influencing the context onto research. A study of scientific paradigms will suggest that multiple paradigms exist and that these paradigms shape one's understanding and practice of science. This can be practically illustrated through an editorial commentary in Science (Nath & Winnacker, 2012) on the Inter Academy Council's report on research ethics that different cultures will have a different interpretation of ethics' role in research.

In this paper the author will subscribe to a multi-sphere approach to ethics finding its roots in reformed philosophy (for a detailed account of this philosophical orientation see Strauss, 2009). Here the emphasis is, as articulated by Smit's (1992) anthropology, that man is a *duality of body and a religious heart*. (Duality merely refers to a distinction between man and his inner being.) His behavior is expressed through his religious heart. This can be grounded in what Troost (1983) referred to as *ethos*, which in turn is an extension to what Dooyeweerd called *ground motives* (deepest motivation why man will do something). This is manifested through man's interaction with, amongst other, the nature, culture and structure (see Heyns, 1982). The anthropology and participation in these spheres of activity relate to a reformed confession of deity. This confession has the orientation that whatever man is doing, is being influenced by this point of reference. In essence, the position I am

taking is that man, through his religious orientation, is performing his scientific duty in the context of his calling to be in command of the creation [see Gispen (1975:79) and Von Rad (1972:6)] and that in St Paul's language is an indication of his new life in Christ. [It is no longer a matter of orientation but of evidence – see Joubert (2012).] This view is further supported by the Biblia Hebraica Stuttgartensia (BHS, 1977) which makes reference to *abad* ("to serve") and *somar* ("the idea of tenderness and care") (see Vos, 1982). These are so-called "soft sounds" which are embodying the meaning that man should not exploit the creation but rather constructively contribute towards the creation. This applies to man's scientific endeavor too. This view is deeply rooted in the ongoing debate on religion and science. The challenge (in the debate and its application) is to avoid the struggle between who has the authority over science (in the Reformed perspective the Bible and in modernity rationality) but rather to focus on its intersecting relationship between evidence and interpretation. Evidence is based on facts, theory and existence (all linked to rationality) whilst interpretation is found back in world and life view. Conradie (2006) positions the latter perspective within his framework for *spirituality.* Spirituality refers to man's interaction with the world seen from his religious orientation.

In building a framework for (research) ethics, my presentation is built on four different spheres of activities that will inform a framework for research ethics. These spheres of activities relate to the multi-dimensional approach to conceptualise research ethics. Theses spheres are:

- Sphere 1: Conceptual and contextual scan
- Sphere 2: Anthropological participation
- Sphere 3: Environmental impact
- Sphere 4: Monitoring, evaluation and adjustment

The spheres and their meaning can be explained as follows:

Sphere 1: Conceptual and contextual scan

An important observation is that the concept of research ethics is constructed based on (1) ethics as a science, (2) research as a scientific activity and (3) ethics' application to/meaning for the research activity. This understanding is informed by an intersecting understanding of ethics and research.

In this paper ethics is defined as the *science of principles for human, societal and organisational moral actions, intensions, behavior, decisions and choices*. Ethics outlines the core principles for a situation and identifies how this principle/these principles should be applied to a given situation. The identification of a principle and the application of the value deriving from the principle, is the core of ethics as scientific discipline.

Ethics as a science deals with *analysis* (based on similarity and differences), is based on constructs (such as loyalty, honesty, dignity, engagement, etc.) and theories (behaviorism, utilitarianism, cultural relativism, etc.) is influenced by scientific paradigms (such as post religion, postmodernism, constructivism, etc.) and is evidence based (both qualitative and quantitative). A syntax of ethics (words have meaning) suggests that ethics derives from the Greek word *ethos* meaning house, home or lifestyle. The application presupposes that man should live/function/operate in a society where his actions are not threatened and at the same time he does not threaten others through his actions. It is essentially about building a conducive and purposeful world. But, ethos, as ground motive for why we are doing things, influences our actions and behavior (see Troost above).

This description of ethics communicates that one's ethical behavior is influenced by one's ethos, which is driven by one's spirituality. In dealing with challenges in the world, this view on ethics will influence one's understanding of a situation and the action one wants to take in a given situation.

The significance of understanding ethics in this context is that no science can go without a value. Its application is evident in the way in which man perceive his reality. For example, research on embryos will be influenced by the way in which one values unborn life; the development of nuclear weapons on how one supports peace and a human rights culture and bio-genetics on what limitations (if any!) should there be for man's technical and technological abilities.

Sphere 2: Anthropological participation

Two important anthropological actions are the *analysis* and *interpretation* of the situation and the *making of choices* based on informed decisions.

The meaning of the situation is highlighted through s*ituation ethics.* Although situation ethics highlights the need to understand that each context is unique and warrants a particular understanding, it is limited by its orientation that love makes all other principles relative. Despite this limitation, it advocates the *uniqueness* of each situation – no two situations are the same. This is in itself an improvement on the casuistic which advocates that there is (already) a rule for each situation (causes).

The analysis and interpretation of the situation, requires that decisions are taken and choices are made. This makes ethics both a *conceptual* science (What are the challenges?) and a *consequential* science (What are their implications?). Here Fisher's (2002) reference, though from a business ethics perspective, is useful. All decisions are made on the basis of the available information. No decision should be haphazard. It should always be based on the facts. Back, to the business literature, Fisher emphasises the concept of *making choices*. Ethics is not about speculation but making a choice. This perspective underlines that ethics is an *active engagement* with a particular situation. The importance of making choices should be evident in applied ethical choices (example: abortion, euthanasia, genetic manipulation, reproductive technologies, blood transfusion, etc. in medical ethics) and meta ethics (example: the compromise as a choice between the lesser of two evils).

The question is also raised how decisions should be taken and choices made. Sieber (2013) promotes the case for blowing the *oboe* opposed to the more-known *whistle blowing*. Her concept advocates that in a humane way, through storytelling, one can sensitise researchers about the reality and dangers of scientific misconduct and inform researchers who may not have exercised their research in a responsible manner.

Responsibility is an important value that should be practiced by all researchers. My own understanding of responsibility is informed by Douma's (1999:24,25) understanding who says that all human actions should reflect an "ought" to and "must" have character. Human actions should reflect a yardstick or standard. This is the basis of normative behavior and follows on choices for which man has the responsibility to practice. This relates to Heyns' (1973) constructs of a *theology of obedience*. Heyns claims that all human actions are always in response to man's calling within the kingdom.

There is not a corner in the world that can escape the notion of obedience. The concrete meaning of responsibility and obedience refers to care – for the other, nature, culture and structure.

A significant part of ethics deals with how one engages with fellow-beings. The "other" is always prominently reflected in one's ethical behavior. Burggraeve (2000), influenced by Levinas, delineates an ethics of engagement with the other that is unintentional, an awakening of the other, an act of mercy and an exercise in neighbourly love. Meeting the "other" gives meaning to life and is a discovery of the self. Engagement also challenges the absence of ethics or the conflict that might exist because of immoral behavior. Through his analysis of the parable of the merciful Samaritan, he illustrates the importance of corporality in engagement. Burggraeve outlines the discovery of the self through other people and how other people awake responsibility in what we do. Ethics is therefore about engagement, awakening and action with the other – through these acts one finds purpose and meaning in life. The value of such a perspective is that ethics is always a recurring engagement, awakening and action – ethical behavior impacts on the actor and recipient of the action. Vosloo (2006) also reflected on Levinas and highlights the importance of the other for ethics. The idea is not to suppress other because of who you are or to change others to become like yourself. It is to be reminded of the differences of the other and how one should engage with that. But, because of others, ethics is also to inform and warn because of one's care for others. Ethics can be no silent acceptance of unjust behavior or intensions. Related, to researchers, they too (as a collective group) have the responsibility to warn a society on what is wrong in science (for an informed case study see Schrag, 1999).

The anthropological sphere in ethics rightfully points out a sensitivity towards humanity in ethics, the importance of human actions and the way in which a value system should impact on these actions. One cannot escape the reality of (difficult) choices that have to be made and that these choices, regardless their challenges, should always reflect one's responsibility to yourself, other, the nature, structure and culture. Ethics is therefore evaluation, decision and activity. Ethics should recognise the impact a decision may have on a situation. Regardless one's conviction no ethics can be without the universal human rights values of the right to life, the

right to basic medical care, fair treatment, safety, security and humanity. Responsibility is a virtue and a commitment to behavior. Neither responsibility nor behavior can be delegated.

Sphere 3: Environmental impact

Ethics, as said, has a *meta* (asking core questions) and *applied* character (the application of ethical decisions, norms, values to a situation). This should be manifested in ethical codes and guide-lines. These ethical codes and practices should be the basis of a responsible research community. A responsible research com-munity is the enabling environment in support of the responsible conduct of research (see Lategan, 2012). Typical characteristics of such an environment can be grouped into (i) the way researchers engage with their discipline, (ii) the effect of the research, its processes and outcomes on the environment, (iii) the building of a knowledge basis and (iv) participation in the public domain and the benefit for the researcher, the scholarly community and the public as a result of the research. Professional codes play an important role to embody the values of a research community. It is in this context that Gabrielle (2012) reminds scientists of education, role models and ethical sensitivity that can bring about the greatest good. Valenkamp (2006), too, builds a case for professional codes and the role of ethics in (technological-driven) research. Another voice that can be added is that of Steneck (2013) on the global (joined) understanding/training of research communities. Global training will harmonise common rules and understanding of responsible research conduct.

The benefit of the environmental sphere suggests that ethics is not only about reflecting on a situation but it functions within a situation/context. Ethics is therefore not only about identifying principles for a situation but also the basis from where the ethics is practiced.

Sphere 4: Monitoring, evaluation and adjustment

A valuable addition to ethical understanding is Burggraeve's advo-cacy for a growth ethics. Burggraeve (2000) argues that ethics does not end, once the moral dilemma has been addressed. There is more: Ethics should assist people to strive for the ideal situation. Ethics is applied because there is abnormality in a situation. Ethics

does not only point out the challenge and suggest a solution for the challenge but at the same time ethics inspires to grow to the ideal situation. His growth ethics is built on the central understanding that the problem may be addressed but one should always be living up to the ideal norm. At the very same time, this approach challenges one to review the situation. The review is based on the following: (1) An understanding what the ideal situation and accompanied behavior should be. (2) Another / different situation can emerge due to the decisions taken. (3) Retrospective (backwards) and prospective (future-oriented) evaluation is always part of any science.

Summary

The spheres can graphically be presented as follows:

This discussion suggested that ethics is the science studying principles and identifying norms (following from these principles) from an identified paradigm for each situation. These principles should be taught, reflected in organisations and through human behavior. The norms are retrospective and prospective in nature. It calls for self-reflection (review) and an ongoing aspiration for what could be. Ethics is contextualised by an environment and is reflecting the values of that environment.

2.2 Contours of research

Research has grown in both scope and importance. The growth in research is evident through the global growth in research publications, training of doctoral students and organisation of/participation in research. The latter is evident through the industry that developed around, for example, associations. The importance of research is reflected through the global believe that research can contribute towards the global economy, the high monitory value and funds associated with research projects and the contribution from basic research to technology transfer, innovation, incubation and commercialisation. Research should be relevant. Wilhelm (2008:21) said if relevance is the criteria for research then there should be a mindset change – example assessment, funding, career opportunities, etc. She said: "There is a big difference in the satisfaction derived from developing a new low price technology to disinfect water and save children's lives and building a new gadget used mostly by trendy young shoppers patrolling the malls of Rome or Beirut." A complementary perspective is found in the Canadian National Research Foundation's revised focus to research in support of business and industry to stimulate economic growth. This move is not intended to erode the knowledge basis but align the advantages of science with the needs of society.

Research is associated with the creation of new knowledge. Die origin of the word relates to searching. The searching is based on "digging" deeper into the research question that is the reason for the research project. This digging deeper follows on a gap in the knowledge basis and once closed, will contribute towards an improved understanding of the discipline which means that new knowledge has been added to the existing knowledge basis. Closing the gap in the knowledge basis will contribute towards the formulation of conclusions and new perspectives/understanding. These conclusions are the findings and newly gained perspectives following on the completion of the research (see Lategan, 2013). The "digging deeper" does not mean that research is only about identifying and solving problems. Research is also motivated by a curiosity to know more about a particular topic and phenomenon, to advance the knowledge basis and to drive the promotion of health and wealth in society. Curiosity-driven research serves as platform for basic research which is not only the foundation of the scientific basis but

also the most effective way to dig deeper into the knowledge universe.

Applied to the three best known research outputs, publications, qualifications and innovations, the following scientific values are associated with these outputs. In general research outputs should be original, make a contribution to the discipline and thus science, should promote the common good of society and should reflect the universally accepted values associated with research such as no plagiarism, respect for humans, animals, the environment and data, expenditure of the research grant according to the audit guidelines associated with the grant and objectivity [see for example The Australian National Statement on Ethical Conduct in Human Research (2007), the European Science Foundation's European Code of Conduct for Research Integrity (2010), Singapore Statement on Research Integrity (2010), the Expert Panel on Research Integrity in Canada (2010), etc.]

3.3 The intersection between ethics and research

What have now been established is that ethics is about the study of principles directing responsible behavior and research about closing the gap in the knowledge basis. The intersecting approach outlines that (i) no research can go without the constructs for ethics outlined in 2.1; (ii) Ethical concepts should impact on the research activities.

It should also be mentioned that aligning ethics with research activities is more than a paper exercise only. A supportive example is found in the debate on global climate change. During a talk on the US importing oil from Canada, former US Vice-President and environmental activist, Al Gore, commented that there is no such thing as "ethical" oil but only "dirty" and "more dirty" oil. With this comparison Gore indicates that public actions have ethical implications and should be understood as such. In reality this means that no research project can escape an ethical focus. Ethical considerations are therefore no option in research but a given.

Based on the arguments presented in this paper *research ethics can be outlined as the principles identified for and norms applied to the doing of research.*

3. Once again: research ethics and research integrity

The discussion thus far promoted an intersection between ethics and research. But, scientifically seen, the ethic constructions in this paper should be aligned with the research understanding outlined in this paper. This means, that research ethics in this paper can be explained as follows: All research focuses on man and his environment. The responsibility of man as scientist cannot be waived – thus research is responsible when it is illustrative of the dictum "do no harm", is robust in action but caring in approach, and results in exploring, interpreting and extending man's existing knowledge of creation. Research responsibility is therefore a reflection of man's activities to care for the creation. Research ethics reflects responsibility, discovery and care. The ethical discourse of this paper will advocate that these notions should be in balance with each other. The model further suggests that research is also *reflective.* Typical questions will be: What have I done? What have I accomplished? What is the intension of this research? Why do I engage with this research project? What contribution am I making? At the same time research is also *prospective.* Emblematic questions will be: What will the impact be on my discipline? What other possibilities can follow from my discoveries? How will other/future researchers benefit from the research results? These perspectives link up to the importance of *self-assessment* and *self-review.*

The value of research is not only in its discovery but also the application. All these processes suggest *decision-making*. The decisions passed on the research should also reflect the values of responsibility, discovery and care. All research activities should also probe the question whether things can't be different. It should further assist to take one from where you are to another level of activity. Research should stimulate change and transformation (the growth-aspect) of research. This scientific behavior can be related to McCabe and Pavela (2005) who identified ten principles for academic integrity. The focus is on truth, love for the academic enterprise, encouragement of responsibility, to combat misconduct and air it when it arises, support and promote. When research activities give expression of these ethical values, then society (the scientific communities and social societies) should have trust in the research process.

4. Will this make any difference?

This paper promoted the view that research, ethics and science cannot be practiced in a value-free context. It was also advocated that there is a need for both research ethics and research integrity, that these concepts are not used interchangeably and that the one reflects on ethical principles and values in doing research and the other on the public trust that should prevail in research.

The paper also advocated that ethics as science together with its application, is not an abstract discipline but conforms to what is associated with scientific practice regardless the impact of paradigm, context and orientation on one's understanding of ethics.

Bibliography

ASSAf (Academy of Science of South Africa). 2010. *The PhD Study: An evidence-based study on how to meet the demands for high level skills in an emerging economy.* Pretoria: ASSAf

AUSTRALIAN CODE FOR THE RESPONSIBLE CONDUCT OF RESEARCH. 2007. Canberra: National Health and Medical Research Council, the Australian Research Council and Universities Australia.

AUSTRALIAN NATIONAL STATEMENT ON ETHICAL CONDUCT IN HUMAN RESEARCH. 2007. Canberra: National Health and Medical Research Council, the Australian Research Council and Australian Vice-Chancellors' Committee.

BIBLIA HEBRAICA STUTTGARTENSIA. 1977. Stuttgart: Deutsche Bibelgesellschaft.

BURGGRAEVE, R. 2000. *Ethiek en passie: over de radicaliteit van christelijk engagement.* Tielt: Lannoo.

CONRADIE, E. 2006. *Waar op dees aarde vind mens God? Op soek na 'n aardse spiritualiteit.* Wellington: Lux Verbi.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING. 2012. *Policy and Procedures for Measurements of Research Output of Public Higher Education Institutions*. Pretoria.

DOUMA, J. 1999. *Grondslagen Christelijke Ethiek.* Kampen: Uitgeverij Kok.

EDITORIAL. 2012. *The Lanchet.* 27 October 2012. Vol 380. P. 1445. Downloaded from www.thelancet.com. on 27 October.

ETHISCHE CODE VAN HET WETENSCHAPPELIJK ONDERZOEK IN BELGIË. 2008. Downloaded from the internet on 20 July 2013.

EMERGING RESEARCHERS NETWORK. 2012. Singapore Statement on research integrity receives thumbs up. *Emerging Researchers Network Blog.* 30 November.

EUROPEAN SCIENCE FOUNDATION. 2010. *Fostering Research Integrity in Europe.* Strassbourg: IREG.

THE EXPERT PANEL ON RESEARCH INTEGRITY. 2010. *Honesty, accountability and trust: fostering research integrity in Canada.* Ottawa: Council of Canadian Academics.

FISHER, J. F. 2002. The practice and purpose of teaching business ethics. In: Lategan, L.O.K. and Le Roux, P. (Eds.), *Business Ethics.* Bloemfontein: Tekskor.

GABRIELLE, E. 2012. From the editor's desk. *Journal of Research Administration,* xliii (1):11-13.

GISPEN, W.H. 1979. *Genesis Deel 2.* Kampen: Kok.

THE GLOBE AND MAIL. 2013. No such thing as ethical oil. A 11 – 7 May 15.

HEYNS, J.A. 1973. *Lewende Christendom.* Kaapstad: Tafelberg.

HEYNS, J.A. 1982. Teologiese Etiek 1. Pretoria: NGKB.

INTER ACADEMY COUNCIL. 2012. *Responsible conduct in the global research enterprise: A policy report.* Amsterdam: Inter Academy Council, IAP – the global network of science academies.

JOUBERT, S. 2012. *Ontsluit die Nuwe Testament.* Vereeniging: CUM.

LATEGAN, L.O.K. 2012. The building of a responsible research community: The role of ethics. *Journal of Research Administration,* xliii(1):85-97.

LATEGAN, L.O.K. 2013. Digging deeper: in search of the research problem. *Emerging Researchers Network Blog Series: Researchers in the making*. 26 March.

McCABE, D.L. & PAVELA, G. 2005. *Then principles for academic integrity.* Downloaded from the internet on 10 May 2013.

MAYER, T. 2013. The world conferences on research integrity and the Singapore Statement: Establishing a presence in the global research community. *Keynote presentation during the Third world conference on research integrity.* Montreal: 5-8 May.

MONTREAL STATEMENT ON RESEARCH INTEGRITY IN CROSS-BOUNDARY RESEARCH COLLABORATIONS. *Draft concept discussed during the Third world conference on research integrity.* Montreal: 5-8 May.

NATH, I. & WINNACKER. E. 2012. Science editorial: Responsible research conduct. *Science,*16 Nov. (338):863. Downloaded from www.sciencemag.org on 16 November 2012.

SCHRAG, B. 1999. *Research ethics: cases and commentaries.* Volume 3. Bloomington: Association for Practical and Professional Ethics.

SINGAPORE STATEMENT ON RESEARCH INTEGRITY. 2010. Downloaded from www.singaporestatement.com on 31 January 2011.

SMIT, J.H. 1992. Dooyeweerd oor die hart. In: Smit, J.H., Strauss, S.A, en Strauss, P.J. (Reds.), *Reformasie in ootmoed*. VCHO: Bloemfontein. 159-190.

STENECK, N. 2013. Global research integrity training. *Science,* (340) 3 May: 552-553.

STRAUSS, D.F.M. 2009. *Philosophy: Discipline of disciplines.* Grand Rapids: Paideia Press.

STROUD, S. 2013. *Opening remarks during Official Opening of the Third world conference on research integrity.* Montreal: 5-8 May.

TILLEY, S.A. 1998. Conducting respectful research: a critique of practice. *Canadian Journal of Education,* 23(3):316-328.

TROOST, A. 1983. *The Christian ethos.* Bloemfontein: Patmos.

VALENKAMP, M. 2006. *Technology asks for ethics. Thoughts about professional ethics for technicians in a world of modern technological innovations.* Public lecture presented at the Central University of Technology, Free State.

VOS, C.J. 1982. Calvin's view of man in light of Gen 2:15 or Man: Earth's servant or lord. In *Calvin's Reformator.* Potchefstroom: Institute for Reformational Studies.

VOSLOO, R. 2006. *Engele as gaste? Oor gasvryheid teenoor die ander.* Wellington: Lux Verbi.

VON RAD, G. 1972. *Genesis.* London: SCM Press.

WILHELM, B. 2008. Science and Innovation in Africa – a plea for relevance. *Research Africa,* 22 April: 20-21.