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Research ethics and integrity challenges require innovative approaches

Our world is growing. The number of researchers and academics is increasing. The pressure for these researchers and academics, and indeed their institutions, to publish more is ongoing. Consequently, the number of research publications in both journals and books is on an exponential upward trajectory. Coupled with this positive trend is the challenge facing all countries, both developed and developing, to uphold the ethics of research and advance research integrity. However, this task is no longer simple and requires innovative, collaborative and coordinated approaches to ensure the integrity of the research enterprise. Research integrity may be viewed as active adherence to the ethical principles and professional standards essential for the responsible practice of research.

The objective of the World Conferences on Research Integrity (WCRI) is to foster integrity in research. The first WCRI was held in Lisbon, Portugal, in 2007. Six WCRI later, participation has grown from 275 participants from 47 countries in 2007 in Lisbon to 701 participants from more than 50 countries at the 6th WCRI held in 2019 in Hong Kong. The majority of participants were from Asia and Europe, with only 24 participants from Africa. South Africa has been afforded the privilege of hosting the 7th WCRI in Cape Town in 2021 – the first time that a WCRI will be held on the African continent. The WCRI have produced two global statements on research integrity, namely the Singapore Statement in 2010^{1,2}, of which the National Research Foundation (NRF) is a signatory, and the Montreal Statement in 2013^{3,4}. In fact, the NRF translated the Singapore Statement into eight of South Africa's official languages to ensure wider dissemination of the statement.

According to the *Singapore Statement on Research Integrity*, the value and benefits of research are vitally dependent on the integrity of research. While there can be and are national and disciplinary differences in the way research is organised and conducted, there are also principles and professional responsibilities that are fundamental to the integrity of research wherever it is undertaken. The *Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations* emphasises that research collaborations that cross national, institutional, disciplinary, and sector boundaries are important to the advancement of knowledge worldwide. This is particularly important to the NRF whose mandate includes research collaboration across national, regional and international borders.

*The STM Report*⁵ estimates that there are approximately 10 000 journal publishers globally, of which around 5000 are included in the Scopus database. The main English-language trade and professional associations for journal publishers collectively comprise about 650 publishers that produce about 11 550 journals. There were about 33 100 active scholarly peer-reviewed English-language journals in mid-2018 (plus a further 9400 non-English-language journals), collectively publishing over 3 million articles a year. The increase in publications may be attributed to the growth in R&D expenditure, the inherent international competition among researchers, institutions and countries with respect to knowledge production worldwide and the increasing number of researchers, which now stands at between 7 and 8 million. China surpassed the USA in 2017 to become the pre-eminent producer of research papers globally, with a share of about 19%.⁵

The research publication output trend is no different in South Africa where a recent study commissioned by the NRF on the *State of the South African Research Enterprise*⁶ showed an increase in absolute numbers of publications and a doubling of world share over the past 15 years. However, the exceptional research performance in terms of increases in scientific publication should be moderated against the background of growing concerns about increased examples of unethical and questionable publication practices, including predatory publishing, indiscriminate publication strategies and growing evidence of gaming the publishing system.^{6,7}

In a recent report to the South African Department of Higher Education and Training (DHET), Mouton et al.⁸ noted that predatory publishing in South Africa – at least in subsidy-earning journals – has decreased over the past 2 years. This decrease may be attributed to the high saliency of the issue, together with the interventions taken by the DHET, NRF and individual universities that have forced academics to rethink their publication strategies. However, this does not suggest that academics have stopped publishing in predatory journals. Studies from other countries in the world where academics do not benefit financially from publications suggest that predatory publishing remains a major challenge.⁸

According to the same report⁸, other forms of questionable publication practices that remain common in the South African higher education system include (1) excessive publication of papers by editors in their 'own' journals; (2) excessive publication of papers by members of the editorial boards of certain journals; and (3) excessive submission of conference proceedings for subsidy by certain individual academics. All of these practices constitute unacceptable gaming of the DHET subsidy system and require firm and swift action on the part of the DHET to sanction and hence prevent such practices from continuing.

Factors that may have contributed to the current state of affairs include (1) a culture of performance management that pervades every aspect of the academic culture; (2) an incentive and reward system that has produced unintended consequences; and (3) new opportunities for fraudulent and unethical practices emerging from the digital and open access movements.⁸

In a recent editorial in *Nature*⁹, it was emphasised that research integrity is about creating systems that boost the quality, relevance and reliability of all research, better record-keeping, vetting experimental designs, techniques to reduce bias, rewards for rigorous work, and incentives for sharing data, code and protocols. It is different from research misconduct that encompasses fraud, fabrication and plagiarism. According to the editorial, the conflation of integrity and misconduct is problematic because it stops researchers from talking about ways to improve their work.

The NRF is of the view that conducting research with integrity, honesty and accuracy must be acknowledged, upheld and sustained.

As South Africa's premier research funding agency, the NRF awards research grants to researchers at universities, science councils and the national research facilities based on peer review. The NRF also evaluates and rates its researchers based on their scholarship and research productivity over a period of time. As a result of its position, the NRF found it appropriate to spearhead the formulation of a joint *Statement on Ethical Research and Scholarly Publishing Practices*¹⁰ that sets out a national position on the issue of research ethics and scholarly publishing (the *Statement* is also published in this issue of SAJS). The statement consists of 12 principles and is in alignment with the deliberations of the WCRI. Adherence to these principles by researchers applying to the NRF are not negotiable. Adherence is effected through communications to institutions and the online application systems, and is monitored during the review processes.

The above constitutes a battery of NRF initiatives to ensure adherence to ethical scholarly research and publishing practices. These include, inter alia, the NRF's contribution to the Global Research Council's Principles on Peer Review; the issue of an NRF Statement on Predatory Publishing; and the issue of an NRF Statement on Open Access.

One of the objectives of the 6th WCRI in Hong Kong in 2019 was to contribute to reforming the way in which researchers are assessed.^{11,12} A draft of the *Hong Kong Manifesto for Assessing Researchers: Fostering Research Integrity* was developed and discussed at the conference and the third draft posted for comment on the conference website. The closing date for comments was 13 September 2019. The manifesto suggests that the current approach to research assessment by institutions is inadequate at best and creates perverse incentives for poor research conduct at worst. The approach involves counting publications without real quality assessment beyond simply using (rather indiscriminately) the journal impact factor or H-index and adding up an individual's grant income. The manifesto suggests six principles, which might form the basis of a new more comprehensive way of assessing researchers with a special focus on strengthening and rewarding research integrity. The principles include: societal need as a goal for research; responsible indicators that broadly reflect the contribution to the research enterprise; the need to publish or report all research completely and transparently; a culture of open research; the differentiated recognition of different research types, such as exploratory research and replication; and the inclusion of other contributions to the research enterprise, such as peer review and improving the research environment. It is hoped that once the finalised version of the manifesto is endorsed by participating countries, it will be adopted for implementation.

At the 6th WCRI in Hong Kong, Australia's Chief Scientist Dr Alan Finkel, in his presentation on 'Actions to Advance Research Integrity', focused on the practical aspects in the firm conviction that the research community has a system that is fundamentally sound, but that can undoubtedly be improved through several interventions.^{13,14}

Based on the aforementioned and given South Africa's own experiences, the following approaches may be considered by the NRF, in collaboration with its stakeholders and the international community, in fostering research integrity:

- Develop, in collaboration with other key role players in the research system of South Africa, a National Research Integrity Policy and Guideline, for implementation by all research entities.
- Explore the development of an online 'Research Integrity' module that is free and easily accessible to all researchers and graduate students.
- Ensure that capacities and structures for ensuring the quality assurance of research and ethical clearances exist at all NRF-funded institutions.
- Ensure that mentors are available to guide emerging researchers in respect of grant proposal writing, publications writing and optimising networking opportunities.

- Make proof of research integrity training a requirement for applying for an NRF research grant, postgraduate scholarship or NRF rating. In the case of research grants, proof of research integrity training should be applicable to all investigators listed on the application.
- Continue to request the researchers' best five publications from them when they apply for an NRF rating. This criterion should be extended to all research grant applications.
- Consider new publications only from those journals that have proven their compliance with the Publication Process Quality Assurance (PPQA), as advanced by Finkel¹⁴.

It is hoped that the above measures will add impetus to upholding research integrity in the country. Globally, interest in research integrity and publication ethics continues to be critically important. There is growing awareness of the need to sustain ethical research practices and to avoid any form of misconduct. This is evident from the work of the Committee on Publication Ethics (COPE). The number of journal article retractions has grown substantially in the last decade. There are now more than 20 000 retracted papers in the Retraction Watch database. All these developments augur well for the future. However, as a research community, we cannot afford to become complacent.

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7th World Conference on Research Integrity 2021 – Announcement

The 7th World Conference on Research Integrity will be held in Cape Town in 2021, after the University of Cape Town (UCT) led a successful bid to host this conference for the first time in Africa. Three co-chairs have been appointed to organise and plan the 7th WCRI: Lyn Horn from UCT, Lex Bouter, Chair of the WCRI Foundation Board, and Sabine Kleinert, Editor of the *Lancet*. The co-chairs will work with the Local Organising Committee which includes members from science councils, the Department of Science and Innovation and other South African Institutions to make this conference a reality. The objectives of the 7th WCRI will be to promote and foster a culture of responsible conduct of research in Africa and globally in a rapidly changing techno-economic environment; to promote research into research integrity; to provide a platform to present the knowledge gained and explore ways this knowledge can be implemented to strengthen science, technology and innovation systems and institutions; and to explore how changes in the way science is conducted (e.g. large multi-national collaborations; open science movement) can influence the integrity of research both positively and negatively.

Conference themes will be developed in consultation with the 7th WCRI programme committee. Proposed themes include:

- Equity and social justice as components of research integrity
- Research integrity in Africa: opportunities and challenges
- The effect of the move to 'open science' on scientific integrity
- Counteracting plagiarism in multicultural and multilingual contexts
- Ethical best practice in authorship, publication and the use of scientific metrics
- Best practice in the detection, investigation and sanctioning of scientific misconduct
- Institutionalising responsible conduct of research (RCR) education and training including curriculum development and implementation in low-resource settings.

The 7th WCRI will be of great relevance to scientists and researchers in South Africa and wider afield both in Africa and globally. It is hoped that many African scientists will take the opportunity to attend this conference and actively engage with some of the themes mentioned above. The WCRI Local Organising Committee plans to offer a reduced fee for delegates from Africa as well as a significant number of scholarships with the support of both local and international sponsorship.