

EVALUATION AND RATING

Considerable International Recognition (CIR)

A Guide for NRF Specialist Committees and Assessment Panels

1. Introduction

In drawing together the principles and practices that underpin its internationally benchmarked system of evaluating and rating researchers, the National Research foundation (NRF) must take cognisance of the variety of disciplinary and academic conventions and practices that it represents. The notion of considerable international recognition (CIR) requires contextualisation within the broad area of research undertaken. In other words, there is not a *priori* set definition but research and scholarly work must be placed in the context of the diverse academic research practices that characterise humanities, social science and natural science research in South Africa and internationally.

It is this diversity in academic research practices that has frequently led to different perceptions amongst panel members and assessors of the concept of “considerable international recognition” as a prerequisite for placement in the B-category of rated researchers. This is leading annually to lengthy debates in panels about the placement of candidates in the C1 or B3 rating categories and in frequent non-consensus referrals to the EEC for a final decision.

This attempt in clarifying the concept must not be seen as an attempt to find a “one size fits all” definition, but rather to obtain clarity of the concept, given differing conventions and practices in certain disciplines.

This document has been informed by specialist committee specific articulations on CIR developed in the 2009 – 2011 period. In defining CIR, we aim to balance the tension between a workable definition that aims for equity of process across the vast academic terrain that the NRF rating covers, as well as the context specific dynamics and networks that shape knowledge production and its dissemination in particular disciplines and cognate areas of research across the humanities, social sciences, engineering and natural sciences. This is a difficult mix, reflected in this document in a set of principles, as well as the more specific guide that suggests indicators that help us identify and assess CIR through the reviewing and rating process. It can generally be applied to all the disciplines and sub-disciplines with the possible exception of a few sub-disciplines with a strong local or regional emphasis (See item 3, below).

As a starting point, there is a need to differentiate between research that results in a researcher achieving international standing and research of international standard. As the quality of research is benchmarked internationally by way of peer review processes, the NRF expects **all research it supports to be of an international standard**. This implies that any researcher who submits for rating should conduct research that meets internationally accepted standards of quality, i.e., the research should be of a nature that it would, everything being equal, be accepted in a widely recognised international journal of quality. However, conducting research of international standard does not necessarily automatically afford the researcher concerned international standing.

2. Towards a common understanding of CIR

Scholarly research has different qualities that help us place a body of work in relation to the question of CIR. Broadly, these are sketched below in three categories.

1. Researchers are participants in an ongoing disciplinary discussion, following well-established protocols and paradigms, actively doing research and writing in important, though predictable ways that constitute a disciplinary conversation, but do not impact it significantly. It is generally regarded as solid and useful, and adds incrementally to new knowledge. This may be appreciated and recognised as such by the international community of scholars and hence afford the researcher some international recognition

2. The research has depth and provides a new twist on an argument, a theory, or a method. In doing so, the body of work adds new life, making a substantive contribution, not just participating in a debate. This type, level and quality of research usually has international impact.

3. The research demonstrates leadership in a field and discipline. It offers a definitive contribution to theoretical or methodological debate. This research cannot be ignored by the field as it challenges and changes the paradigms and theories that underpin disciplinary debates. Such leadership through globally significant, paradigm shifting research is rare.

2.1 The output and outcome perspectives

The output dimension of a publication interrogates aspects such as the quality, methodology, and rigour of the research and must adhere to internationally accepted standards and norms of scientific publication in the disciplines concerned. These dimensions on their own do not afford a researcher CIR. The outcome of the publication on the other hand is the extent to which the research has impacted on the discipline and/or has useful applications, and it is largely this dimension of the published research which can afford the scholar the level of recognition required to comply with CIR in the rating system.

From an output and outcome perspective the description of the second category, which is normally applicable to CIR, can be expanded by considering the definitions such as:

- “Work should be recognised as being fundamental in her/his specific field of research; fundamental in the sense that it contributes to new thinking, a new direction and/or a new paradigm in the field of research, and to contextualise it in the international arena even if it relates to/engages mainly with local issues.” Important here is to differentiate between “contributing” and “leading” with the latter referring to leaders in the field.
- “Researchers ...that ... have recently produced research that is internationally excellent in terms of originality, significance and rigour, and which substantially advances knowledge and understanding in the field.” (Where international excellence equates with high quality and impact).

It may be more appropriate to reconfigure CIR as **considerable scholarly recognition internationally / globally**, i.e.: Excellence in scholarship that reaches beyond the local circle and registers in terms of international / global scholarly debate appropriate for significant work in a particular field.

2.2 Outcomes and impact measures

There is general consensus amongst most panels that there are quite a number of clear indicators of CIR. These should be addressed in support of any statements by reviewers regarding the standing of the applicant in their reports. Indicators of CIR include the following, in no specific order of importance:

- Citations and h-indexes, i.e., a reflection of the influence on the research of others, but with due acknowledgement that these vary greatly depending on disciplines and even sub-disciplines and the databases used for their calculation. These can never be used as a hard and fast rule as a measure of CIR, but can provide valuable guidance;
- Impact Factors of journals, where known, otherwise in internationally recognised quality journals with a wide readership;
- Books/monographs published by well-known international publishing houses and used by international researchers as scholarly texts;

- Invitations to contribute chapters to books published by well-known international publishing houses;
- Invitations to write major reviews on the topic of specialisation;
- Invitations as keynote/plenary speakers at high profile international conferences;
- Invitations to act as external examiner of PhD theses by prominent scholars in the field;
- Co-supervisors of PhD students of prominent scholars in the field;
- Awards by international scientific societies/organisations;
- Leader of or leading role in international collaborative research projects.

The list is not definitive. None of these indicators individually is a necessary condition for CIR and none is a decisive indicator. It is the **collective weight** of a number of these indicators highlighted in the reviewers' reports that could point towards a person enjoying CIR. A reviewer's opinion would be questionable if it is not based on some of these indicators and the scoring of the review report should then reflect this deficiency.

2.3 Qualified outcomes and impact measures

This includes invitations to serve on or become a member of, e.g.:

- Editorial Boards of Journals;
- Committees of international societies, advisory boards, conference organising committees, international research programmes;
- Convener/organiser of international conferences.

Although invitations are in many instances an acknowledgement of a researcher's international standing, this is not necessarily always the case, as such invitations may also be due to the need for regional representativeness on committees and boards or a recognition of the person's managerial, administrative and/or communication abilities. In the latter case there are often some indications in reviewers' reports that the research outputs do not equate with the standing based on these considerations.

2.4 Conventions and practices in disciplines

In assessing whether a researcher enjoys CIR, cognisance needs to be taken of different traditions in different disciplines. For example, the publication of a book or monograph by a reputed publisher and positive reviews published in international journals are considered to be essential outputs for CIR in many human and social sciences disciplines, rather than a series of publications in scholarly journals. In other, fast evolving disciplines, e.g., Information and Communication Technology, peer reviewed conference proceedings are often the preferred publication avenues for rapid dissemination of research findings.

For example, the specialist committee for the Performing and Creative Arts and Design panel has differentiated scholars in the field who conduct "formal" research and where the same kind of criteria for CIR referred to above apply, and Creative Practitioners.

Similar to the earlier example, the list is not definitive. Also, none of these listed indicators is a necessary condition for CIR and none is a decisive indicator. It is the collective weight of a number of these indicators that could point towards a person enjoying CIR.

3. The issue of regional/local relevance

A concern expressed by some specialist committees in the social science, law and humanities (particularly languages) is the difficulty of obtaining CIR when focussing on research topics that are of great local importance and significance but where there is little or no interest globally. In the social sciences 'theoretical' work is often given undue precedence over

empirical work, reflective of the ways in which debates and academic practice are configured in the global North. In the South African and more broadly in Southern contexts, original empirical knowledge is often crucial, leading not only to a better understanding of our societies but also to innovative theoretical work. The question that needs to be considered by assessment panels in such cases is not only whether the research is really so isolated that local or regional insights cannot be explored to develop innovative theories or testing of existing theory and thereby contribute to the international body of knowledge, but also whether it should not be the applicant's duty to do so? Related to this are concerns expressed by some specialist committees where such work does not resonate with research and knowledge practices of the Anglo-American social science and legal contexts, i.e., the environments where the notion of CIR is traditionally contextualised for most other disciplines by virtue of their academic dominance. Senior scholars in these fields should publish locally as well as in disciplinary journals globally as they in particular are best placed to propagate an alternative 'Southern' voice and thereby attain CIR.

Despite this, there are examples from languages, law and some other fields in which research is conducted of which the quality and impact conforms to the features of that described in item 2.1, but because the impact is on local issues they are at a disadvantage for a variety of reasons. This may be because the scholarly community is small (e.g. research into some of the country's national languages), or the subject matter is not of international interest (e.g. research into the work of a national literary figure as opposed to one with global stature or iconic status), or the research is primarily of national interest (the law of procedure or tax law), or the research has a strong locality focus, aimed at resolving social problems in local communities. The importance of these kinds of research activities may not be underestimated and hence care must be taken that the rating system does not become a disincentive to scholars to engage in local problems and challenges and result in deliberate decisions to alter focus or to engage in the one area above the other at the expense of the community that the research is intended to serve. Such decisions should be on scientific grounds and not be influenced by a rating system.

4. Extent of Specialisation

Numerous researchers engage in more than one area of specialisation with different levels of recognition by peers. A researcher may, e.g., be regarded as having CIR in one area of specialisation but not be as highly regarded in another area. In such cases reviewers' reports collectively tend to result in a C1 rating. In fairness to the researchers, assessment panels should in such cases solicit more reports in the areas of indicated CIR to confirm or challenge this standing.

Related to this is the size of the area or a high degree of specialization within a small subdiscipline, or within an African context, but often also emerging new research areas. In all such cases the community of researchers in such fields can be small and hence the choice of peers is limited. A frequent occurrence in such small communities is an overestimation of the importance of the research. Important considerations for CIR in such cases are issues such as comments by peers on their importance and impact within a broader disciplinary context, the standing of peers within the broader community, and evidence of contextualisation of the area of specialisation in a broader knowledge domain.

5. Selection of reviewers

It needs to be recognised that the NRF rating system was conceptualised as an internationally benchmarked system. It is for this reason that peers/reviewers internationally must recognise the research as such and that specialist committees in the selection of

reviewers, should select peers beyond the borders of South Africa if they believe that an applicant may on the basis of his/her research be afforded CIR.

CIR transcends international boundaries and is best done in the context of a community of scholars. What counts, though, is the expertly-informed nature and level of peer recognition in quality reports. There is general consensus amongst the different specialist committees that reviewers themselves should ideally enjoy CIR in order for their opinion to carry weight. This does not exclude South African reviewers who are established researchers and who are well suited to assess such work in relation to broader global debates, and hence well qualified to express an opinion regarding CIR.

6. Conclusions

This document provides a general outline of what is meant by CIR and identifies criteria for CIR that can generally be applied across the various assessment panels. Specialist committees do however play a crucial role in articulating the principles outlined in this document within the context of disciplinary conventions and practices, i.e. in ways that are relevant and appropriate for CIR in the areas of scholarly research considered in the rating applications. Furthermore, specialist committees not only play a key role in the identification of appropriate reviewers, but also in contextualising and with the necessary nuance any notion of CIR as it plays out in the individual ways in which the rating review process assesses individual South African researchers.

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Interpretation of CIR: Specialist Committees for 2023

Anthropology, Development Studies, Geography, Sociology and Social Work

Basic and Applied Microbiology

Biochemistry, Molecular and Cell Biology

Chemistry

Communication, Media Studies, Library and Information Sciences

Earth Sciences

Economics, Management, Administration and Accounting

Education

Engineering

Health Sciences

Historical Studies

Information Technology

Law

Literary Studies, Language and Linguistics

Mathematical Sciences

Performing and Creative Arts, and Design

Physics

Plant Sciences

Political Studies and Philosophy

Psychology

Religious Studies and Theology

Veterinary and Animal Productions Studies (previously A&V 2) and

Zoological Studies (previously A&V 1)

Anthropology, Development Studies, Geography, Sociology and Social Work (ADGSS)

In principle and in practice, the ADGSS panel requires a thick, contextual definition of 'international recognition'. For three reasons we have an imperative to define 'international' carefully and contextually.

First, in assessing 'international recognition' panel members must be wary of prioritizing and rewarding a particular sort of research and knowledge that reflects the biases and practices of Anglo-American social science and its dominance in the academy. All too easily 'international' equates with publishing and review in and by North American and UK-based experts. Panel members must not simply equate work published in these northern contexts with international recognition and thus a high quality assessment. And, the inverse: a local journal should not by definition be disqualified as a source of 'international recognition'. In parallel, panel members should weigh carefully their assessment of reviewer reports, ensuring that we do not overly prioritize those outside of South Africa, on the basis that they are 'international'. Local peers are often in as good or a better position to judge the quality of our work, able to assess it critically locally and in relation to broader regional and global debate and standard.

Second, this Specialist Committee (SC) is constituted by a diversity of disciplines. This diversity demands a broad notion of 'international' that appropriately and contextually responds to the ways in which knowledge and its networks are configured in the disciplines which ADGSS review for rating. Cognizance and careful weighting of journals, for instance, and their significance cannot be read solely off so-called 'international' indices. Indices are one source of assessment, but their weightings reflect different disciplinary bases and power (a paper published in an economics journal will be more highly ranked than one from an anthropology journal, for instance); moreover, they are reflective of a particular prioritisation of journal-based social science dominated by the English speaking world, the northern academy in particular. In some disciplines, the publishing of monographs and of book chapters is of greater importance.

Third, panel members must pay careful attention to the ways in which notions and assessment of 'international recognition' weight empirical (for instance, field-based primary research) as secondary, as of less importance 'internationally' than theoretical knowledge production. In the social sciences 'theoretical' work is often given undue precedence over empirical work, reflective of the ways in which debates and academic practice are configured in the global North. In the South African and in southern contexts, original empirical knowledge is often crucial, leading not only to a better understanding of our societies but also to innovative theoretical work. Panel members must be careful not to replicate through review processes and their assessment of 'international recognition' a narrow notion of 'international' that conservatively pushes South African scholars to write in particular ways and on particular topics that do not reflect South African priorities. Senior scholars should publish locally as well as in disciplinary journals globally.

SA ADGSS researchers work in a globalised world, where many of the problems resonate elsewhere, and they learn from and contribute to debates and research undertaken outside of SA's borders.

The ADGSS SC suggest instead that the panel must holistically and fully assess research on a wide array of standards and criteria that are reflective of South African and southern research imperatives, that are thus global, and thus reflect a contextual and appropriate notion of what is 'international'.

Basic and Applied Microbiology

A microbiologist / plant pathologist should be rated as having considerable international recognition if they have:

- An ISI Web of Science core collection h-factor of at least 15,
- A majority of their publications as senior author in high impact international journals,
- Been invited to give presentations at international meetings,
- Regularly reviewed manuscripts for international journals,
- Regularly reviewed grant proposals from local and international funding bodies,
- Editorship or associate editorship of international journals,
- Organised or been on the scientific advisory committee of international conferences.

Biochemistry, Molecular and Cell Biology (BIOC)

International recognition is reflected by the following (roughly in order of decreasing weight):

1. Peer reviewed publications are seen as being of high quality. Some evidence for this could be that papers have been published in high impact journals, are held as excellent examples of a particular research field, or data (tables or figures) from the work is included by international authors in seminal reviews, book chapters or books.
2. Research publications (in peer reviewed journals) are being regularly cited by international peers. Evidence for this would be high numbers of citations of several papers, and a high h-factor.
3. Publications that are judged by international peers to have had a wide impact in Biochemistry, Molecular or Cell Biology science.
4. Authorship of a book or book chapter(s) that are held in high regard and used by international researchers as scholarly texts s).
5. Invitation by international peers to contribute book chapters or subject reviews.
6. Research itself is seen by international peers as ground-breaking or leading the way.
7. Collaboration with international researchers – this must be more than ‘tokenism’ e.g. simply providing specimens. Researcher must be seen as an equal partner. Considerable international recognition could mean being a leader of an international research project.
8. Invitation by conference/symposium organisers to present plenary lectures or key noteaddresses at international conferences (an international conference can be within the borders of South Africa). Someone with **considerable** international recognition would have received several such invitations.
9. Invitation to edit an international journal or be part of an international editorial board. Invitation to review papers for non-South Africa journals also attests to some international recognition.
10. Any awards by international scientific societies.
11. Being voted onto the executive committee of an international society.
12. Being invited to serve on international scientific advisory boards.
13. Being invited to examine international PhD theses.

Chemistry

Chemistry is inherently carried out in an international context. The techniques and methodologies used are developed all over the world and it is critical for a chemist (even one working exclusively on South African problems) to keep up to date with global research. Conversely, one measure of the value of our research is its acceptance into the international media.

The degree of recognition is measured by the number of original and regular articles published in high to very high impact factor journals. This will lead to invitations to conferences, to review/write articles, collaborations, awards, etc. Peer review systems conducted by international established leading researchers will recognize this. International recognition is all of this, but judged by or in relation to researchers in those countries that drive fundamental and applied research worldwide. The careful use of h-index in the context of the narrow

research field could also be an indicator. Local or regional trouble shooting research will do very little to draw international recognition, unless it results in more generalized conclusions.

The term “considerable” international recognition means that the researcher is well known to his peers for his innovative work in his field of research and to some degree known by other scientists working outside the narrow field of specialization.

Summarizing: international recognition can be deduced from whether the candidate

- has a demonstrable record of being invited for Keynote and Plenary lectures at notable international conferences
- has received international awards/prizes etc.
- is invited to write major reviews, and regularly acts as referee to major journals
- has a high H-factor (although great caution should be exercised to this metric)
- is on advisory/editorial boards for important journals
- serves on important scientific organizations, boards etc.
- is “known” by other important scientists, even if outside of their scientific specializations.

Communication, Media Studies, Library and Information Sciences (CMLI)

Considerable International Recognition in this panel means that an applicant's work should be recognised as being fundamental in his/her specific field of research. Fundamental in the sense that it contributes to new thinking, a new direction and/or a new paradigm in the field of the research.

In other words, if for instance a South African communication/media/journalism researcher's work in the field of South African audience studies contributes to a new approach/new thinking about media audiences in general and is considered to be as such by (all) the reviewers, then the applicant's work receives "considerable international recognition". One can publish numerous articles in an ever growing list of international indexed journals, without being original and without contributing something fundamentally new to the field. We don't think that necessarily constitutes "considerable".

Some indicators of considerable international recognition would be the following:

- Clear statements by leading scholars about the international impact of the work
- Several publications in international journals indexed in reputable indices
- Authorship of a significant academic monograph that was well-received internationally
- International awards for scholarly work
- Invited plenary and keynote lectures at international conferences (i.e. not just being accepted to present a paper at an international conference)
- Editor or associate editor of international journals
- Reviewer of international grants
- Member of international advisory panels
- Authorship of book chapters in internationally edited books
- Invitations to write review articles in international journals
- Organising international meetings
- International research collaboration
- Recipient of international grants

Earth Sciences

The meaning must imply that the person being evaluated must enjoy recognition internationally and not just locally, and that this can be reflected in a number of indices of international standing, such as:

- publications appearing in high-impact international journals relevant to the particular

sub-discipline

- a high level of citation, as reflected in their h-index
- involvement in collaborative projects with other internationally recognised scientists and groups
- invitations to be plenary or keynote speakers at major international scientific gatherings.

To have achieved CIR the person must have some combination of some of these indices in their research profile.

The term “CIR” also suggests that the person is recognised by peers as an international authority in a discipline, but without necessarily being considered a global leader in the field.

Economics, Management, Administration and Accounting (EMAA)

A researcher with CIR could work on SA or Africa alone but could be world class on the basis of his/her contribution to the international body of knowledge through the content and its application to theory and also through the techniques being used. International recognition would require publishing in leading international journals in the field. An example would be an economist working on competition theory who is using SA as a case to explore and test existing theory but then is able to further contribute to the international body of knowledge. The use of SA as a case is incidental but there must be a contribution to the international body of knowledge which is recognized by international peers.

Indicators of considerable international recognition include, amongst others:

- Publication in high impact international journals,
- Invitation as keynoter to premier international conferences in the discipline,
- International awards or recognition for research contributions to one's field,
- Editor or Associate editor of well recognized international journal, and
- Research contributions to peer reviewed chapters in edited volumes for reputable international publishers.

Education

International recognition is reflected by the following:

- More than occasional publication in the top tier of journals in the applicant's field*
Publication of books under the imprint of non-South African publishing houses - including international publishing houses with branches in South Africa - or under the imprint of South African publishing houses known to reach beyond the country's borders
- Presentations and requests to deliver keynote addresses or present in plenary sessions at conferences involving more participants from other countries than from South Africa (but also including itinerant international congresses being held at that time in South Africa)
- Citations of an applicant's research in top-tier journals or by known leaders in the field, and
- Invitations to contribute to, consult with or participate in projects involving non-South African colleagues, to sit on editorial boards of non-South Africa-based journals, and to act as external examiner or co-supervisor with known experts and leaders in the field.

Engineering

In deciding whether or not an applicant enjoys “considerable international recognition”, we must rely principally on the opinion of the reviewers who, after all, are representative of the peers in the field. What this implies is that even if, for the sake of argument, an applicant does not have a particularly high number of publications, or does not have a particularly high h-index, the applicant could still be considered as having “considerable international standing” (or even as a “leading international researcher”), if the majority of peers in the field

say so (as evidenced by the reviewers' reports). This is because there are several other important indicators of "international recognition". So, it is important that the reviewers themselves enjoy "considerable international recognition" in order for their opinion on an applicant to carry any weight in this regard.

So how do we decide if an applicant enjoys "considerable international standing"?

If the reviewers explicitly include statements to this effect in their reports, we can accept this if the statements are supported by satisfactory evidence. If there are no explicit statements within a reviewer's report, we should look for praise for the candidate's recent work. This praise may be for example for one of more of the following:

- A breakthrough or a significant step forward in theory or design practise
- Significant multiple smaller contribution(s) to the field or subfield.
- Creativity, innovation, etc.

The essence is the quality, and to a lesser extent the quantity of work within the sliding window of the review period. If the quantity is not commensurate with the discipline/subfield, reviewers usually point this out, while they also tend to acknowledge quantity achievements. The reviewers report can be verified using the impartial indicators presented below. If there is a significant discrepancy, more reports should be requested from reviewers of an international standing. In general, the following indicators can be considered as evidence of "considerable international standing" (including "high" international standing):

- Applicant has a substantial number of recent high-quality publications in the leading international journals in one's field, as testified by the reviewers. Most of the applicant's publications are on the international level: reputable conferences, journals or book publishers. This is discipline specific, for example in electrical engineering the sponsorship will most probably be by the professional societies the IEEE or IET. Consequently international peers of significant standing have read, or at least know about the applicant and his/her work.
- applicant is regularly invited to review manuscripts for the leading international journals in one's field (this shows the applicant's knowledge of the subject and scientific judgement are respected and valued by peers)
- applicant is an editor or serves on the international editorial board of one or more of the leading international journals in one's field (leading international journals only appoint researchers of high standing to their editorial boards)
- The applicant has an international presence, and participates in international forums. He/she is occasionally invited to participate at international conferences as a "keynote speaker" or an "invited speaker"
- applicant facilitates interaction and dissemination of research findings within the international scientific community by organising or chairing important international conferences
- applicant has been elected to prestigious Fellowships within one's field (e.g. Fellow of the Royal Society; Fellow of a prestigious academy of science or engineering), or holds one or more honorary doctorates from reputable universities
- applicant has won prestigious international awards or prizes for their work (including engineering designs for products or processes) or for the quality of particular research outputs
- applicant has a strong international presence through serving on several scientific committees and advisory boards of international conferences
- the applicant has facilitated wide-ranging communication and interaction between international researchers and research groups
- applicant holds international patents especially when these have been licensed to third parties
- applicant has received numerous recognitions including honorary doctorate degrees

from the universities although this probably indicates an international leader

An applicant should satisfy preferably at least a number of these indicators in order to be deemed to enjoy “considerable international recognition”, but in certain cases, even one such indicator may be sufficient.

Health Sciences (Public Health / Clinical Health and Basic Health Sciences)

Considerable International Recognition (CIR) indicates that a researcher is recognised beyond the African continent for the high quality, impactful scholarly body of work that he/she has produced over the eight year period of review (realising that CIR often develops over a period of time and thus need not necessarily be based just on recent work. The research will be discussed extensively by others beyond Africa and beyond the researcher's immediate circle of collaborators, who do not necessarily know the applicant personally, but who work in the same /related field. The research will have substantially contributed to new thinking, a new direction and/or a new paradigm within the field. Consequently, CIR within the broad discipline of Health Sciences will be evidenced by many of the following criteria which are ranked in a general order of weighting.

(Note: The list is not definitive. None of these indicators is individually a necessary condition for CIR and none is a decisive indicator. It is the collective weight of a number of these indicators highlighted in the reviewers' reports that could point towards a person enjoying CIR).

- Publication of original research articles in respected high-tier, relevant journals in the field (impact factor) with a major author position
- High citation rates (citation index) indicating that publications appear in literature searches, and are frequently cited in international journals by researchers outside South Africa.
- The above criteria will be reflected in the h-index of the researcher, which will be among the upper scores of researchers in the cognate field. The use of this bibliometric will be applied judiciously by the panel, acknowledging that it is not an absolute measure
- Principal Investigator on prestigious international grants
- Initiator or major partner in international collaborations (i.e. evidence of inputs into the conceptualisation, design and evaluation and interpretation of the collaboration projects)
- Invitations to write reviews for leading journals in the field
- Invitations from reputable international publishing houses to write book chapters/edit books in the field of specialisation, which are used by international researchers as scholarly texts
- Regular invitations to give keynote addresses/plenary lectures at high profile international conferences
- Awards from prestigious international scientific societies/organisations, higher/honorary degrees
- Elected a fellow/member of learned international societies/academies and scientific advisory committees
- Appointment as advisor to high level international organisations engaged in globally defining policy recommendations and guidelines pertaining to the improvement of health systems (e.g. WHO)
- Editorial board positions on reputable international journals
- Chairing sessions/organising international meetings/conferences
- Fellowships/visiting professorships/honorary or adjunct professorships at international institutions
- Invitations to act as external examiner of PhD theses by prominent international scholars in the field

- Reviewer for prestigious international journals

Historical Studies

Historians in South Africa can be said to enjoy international recognition if their work has had an impact beyond the southern African region. This would involve their work having been noticed, discussed and/or used by scholars elsewhere, for example for teaching or research purposes. While international publications are not the only benchmark for assessing international recognition, publishing in leading international journals and/or with respected international publishers will usually be the basis for a scholar's claim to have found an international audience.

Information Technology

Besides the classic indicators for CIR* based on publication venues and impact factors (including h-index), we also consider the following indicators:

- Programme chair for major conference
- Keynote speaker
- Program and Organizing committee membership (especially for major conferences)
- Steering committee for major conference
- Elected to high ranking positions in, for example, the ACM, IEEE, IFIP and AIS?

*With regards to the term 'international' we would like to exclude the meaning where a researcher has worked in a number of research groups in more than one country and that this would be seen as having an 'international' status. We would rather like to see it as having an impact in a community wider than national and other than that in which the researcher is/was closely related.

Law

'International' should be defined carefully and contextually. In assessing 'international recognition' care should be taken not to prioritise and reward a particular kind of research and knowledge that reflects the biases and practices of Anglo-American social science and its dominance in legal literature. All too easily 'international' equates with publishing and review in and by North American and UK-based experts. There is an increasing and laudable tendency for South African legal academics to engage in international research in a regional and African context. Recognition by African peers must accordingly bear an equal weight to recognition by peers from elsewhere in the world.

Law is constituted by a diversity of disciplines. This diversity demands a broad notion of 'international' that appropriately and contextually responds to the ways in which knowledge and its networks are configured in the disciplines which we review for rating.

International recognition is therefore clearly a multi-faceted concept and is achieved in a number of ways and suggested criteria are listed below. Broadly speaking the **possible ways** by which a researcher could claim to have international recognition would include:-

- Publishing research (in peer reviewed journals and books), which is regularly cited by international (or internationally acknowledged) peers.
- Producing research which is regarded as being of high quality by international and internationally acknowledged peers. Some evidence for this could be that papers have been published in high impact journals; are held as excellent examples of a particular research field; or data from the work is included by international authors in seminal reviews, book chapters or books.
- Producing publications that are judged by international or internationally acknowledged peers to have had a wide impact in legal scholarship or practice.
- Authoring of a book or book chapter(s) that are held in high regard and used by international and internationally acknowledged researchers as scholarly texts.
- Receiving invitations by international or internationally acknowledged peers to contribute book chapters or subject reviews; to collaborate on multi-partner,

international projects; to participate in workshops, seminars and colloquia which attract an audience reaching beyond the South African legal sphere.

- Generally producing research which itself is seen by international or internationally acknowledged peers as ground-breaking or leading the way.
- Collaborating with international researchers. Researcher must be seen as an equal partner.
- Receiving invitations by conference/symposium organisers to present plenary lectures or key note addresses at international conferences. (An international conference may also be within the borders of South Africa.)
- Invitation to edit an international journal or be part of an international editorial board. Invitation to review papers for non-South Africa journals also attests to some international recognition.
- Any awards by international scientific societies.
- Being voted onto the executive committee of an international society.
- Being invited to serve on international scientific advisory boards.
- Being invited to examine international LLD theses.
- Being consulted on the basis of his/her expertise by legal practitioners / government / institutions beyond immediate national boundaries.

Literary Studies, Languages and Linguistics

Linguists as well as Literary Scholars in South Africa can be said to enjoy international recognition if their work has had an impact outside South Africa. This would involve their work having been noticed, discussed and/or used by scholars elsewhere, for teaching or research purposes. Considerable international recognition will be when the Scholar's work is used and / or discussed widely by scholars elsewhere.

The disciplinary nature of certain investigations in the humanities in particular is extremely specific. An obvious example would be the study of Shakespeare in English literature - there are many journals across the world devoted exclusively to research on Shakespeare, and a large number of journals for Renaissance English literature. It is quite possible to get international recognition, because the phenomenon of Shakespeare studies is inherently international. If one were to conduct research in exactly the same manner, i.e. highly specialised work on the oeuvre of a major author in another literature, and that literature happens to be a South African one, then there is a very extensive risk that one may never attain considerable international recognition. This applies equally to literatures written in Afrikaans and in indigenous African languages. If one were to write about these literatures in English and conduct comparative research, there is the potential of reaching an international audience. However, this implies research of a more sociological nature, exploring how a literature or an individual text engages its social context. This is but one way of studying literature, and certainly not the way that is most highly regarded by literary scholars. Close textual hermeneutics, the most central activity in literary studies, is of necessity bound to the language of the text, and lost upon readers who are not fluent in the language of the text.

The dilemma, is that the same scholarly activity potentially gives one a shot at a B rating if the literature itself happens to be English or another European language (thus, there are Brated scholars in French, German and even Russian literature), but specialists on individual South African languages find it excruciatingly hard to get above C2. Afrikaans scholars with higher rating almost invariably have a secondary interest in something else, or focus on Dutch literature too, to give them a shot at the higher rating.

Scholars focussing on African literatures generally have ratings above C2, but those engaged in the textual hermeneutics of individual languages and their texts are trapped.

So, it is not merely a case of working differently: the two avenues - hermeneutics and sociological, represent different research paradigms, contested by literary scholars, and a choice for the one above the other should be made on scientific grounds, and not be forced upon scholars by a rating system.

By contrast, linguistics is by nature a much more comparative enterprise, and the major theoretical movements are shared across languages. Linguists commonly read about research conducted on languages they do not themselves speak or understand, whereas it is extremely odd for literary scholars to do so.

Mathematical Sciences

A mathematician enjoys a considerable international recognition if he/she satisfies several of the following criteria:

- Is invited as a plenary speaker at international conferences and workshops (international means with organizing committee and significant number of participants drawn from more than two countries);
- Is invited as an external examiner/co-supervisor of PhDs internationally;
- Is a member of Editorial Boards of journals or book series which are either ISI rated or published by main publishing houses (Elsevier, Springer, Taylor-Francis, etc.);
- Is an author of research monograph(s) published by one of the main publishing houses, review articles or seminal papers;
- Received fellowships/visiting professorships/honorary or adjunct professorships internationally;
- Is regularly invited for research visits or lectures at overseas universities;
- Received higher/honorary degrees, awards etc. for research achievements, is elected a fellow/member of learned societies/academies;
- Is invited as member of scientific committees at international conferences;
- Receives considerable number of citations and has an h-index or other indexes of high enough (area related) value.

Performing and Creative Arts, and Design (PCAD)

[Comment from Specialist Committee: The panel did not wish to restrict the text to CIR: we felt that greater clarity and definition would be gained if we contrasted 'some' and 'considerable', in relation to international recognition. In the experience of our panel, many applicants have 'some' IR; in order to avoid ambiguity, therefore, we have recognised this, and shown that this is not the same as 'considerable' IR. Hence our submission leaves no doubt that CIR is the touchstone]

The PCAD panel deals with applicants of the following sorts:

1. *Researchers* – such as art historians, design or architecture historians, musicologists, ethnomusicologists, music educationists, and theorists of theatre and dance. [These are dealt with in 'A', below.]
2. *Creative Practitioners* – whether in art, music, theatre, design or architecture. [These are dealt with 'B', below.]
3. Those who work as *Researchers* and as *Creative Practitioners* – whether in equal proportions or not.

A: Scholars of Creative Arts and Design, Music, or Drama, who operate in the arena of Formal Research

Examples of clear markers of international recognition:

- Has authored articles in refereed scholarly journals published outside of South Africa which are widely regarded as important journals in the discipline or field; or has edited such a journal.
- Has authored or edited books which have been published by publishing houses outside South Africa which have wide reach.
- Has contributed chapters or essays to books which have been published by

- publishing houses outside South Africa which have wide reach.
- Has presented papers at conferences held outside South Africa.
- Has been invited to deliver keynote addresses at conferences outside South Africa; to visit universities to deliver lectures which have prestige value attached to them; to take up senior-level research fellowships, etc.
- For Art Historians (normally): Has been the recipient of invitations to curate exhibitions at major – i.e., international – museums or to produce essays for their catalogues.
- Has been invited to contribute to encyclopaedias, readers, *Festschriften*, etc., published outside South Africa.
- Has served as a member of the council or executive committee of a reputable, international academic body.

Example of some international recognition:

- Has authored articles in refereed scholarly journals published in South Africa but with a readership that is not limited to a local community; or has edited such a journal.
- Has authored or edited books which have been published by South African publishers, but whose texts have a reach wider than South Africa alone.
- Has contributed chapters or essays to books which have been published by South African publishers, but whose texts have a wider reach than South Africa alone.
- Has presented papers at conferences in South Africa which have attracted delegates who are not only local, and/or which have been organised by professional associations with memberships (or sub-entities) in a number of countries.
- Has curated exhibitions and contributed essays to catalogues that, while local, have attracted international viewers and readers.

A person with a **considerable international reputation** will have a large number of outputs which are clear markers of international recognition.

Markers of **some international recognition** may figure in this profile, but would need to coexist with clear markers of international recognition for the individual to be deemed to have a 'considerable' international reputation.

B: Creative Practitioners, who operate in the arena of Creative Arts and Design, Music, or Drama

Examples of clear markers of international recognition:

- Has held one-person exhibitions, or has been a featured creative artist, playwright or composer, at prestigious venues outside South Africa; and the featured works have been critically reviewed in appropriate publications.
- Has participated in (critically reviewed) art, music, or drama performances or exhibitions outside South Africa.¹
- Has received commissions for public art, musical compositions, plays, theatre designs, design projects, and the like, outside South Africa.
- Has been invited to do curatorial work or installations, or to direct or choreograph productions, or to design sets, costumes or lighting for productions, or to dance, act, play or sing, in theatres, concert halls, major museums or other recognised venues, outside South Africa; and this work has been critically reviewed in appropriate publications.
- Has released music recordings on reputable labels, or has had work significantly featured in programmes on major radio or television stations, outside South Africa – and this work has been critically reviewed in appropriate publications.
- Has had play scripts or musical compositions published by internationally recognised publishers – and these have been critically reviewed in appropriate publications.

¹ Where such work has taken place outside of art venues such as museums, galleries, concert halls or theatres, it should have been on invitation from, or under the auspices of, a recognised body or institution outside South Africa.

- Has had play scripts or musical compositions published by internationally recognised publishers – and these have been critically reviewed in appropriate publications.
- Has won first prize, or been a finalist, in a prestigious international competition in the appropriate field/ discipline.
- Has produced creative work which has been the topic of scholarly books, articles or chapters in books published outside South Africa.²
- Has produced creative work which has been the topic of substantial and scholarly reviews in newspapers and journals published outside South Africa.
- Has works in public collections outside South Africa.
- Has been invited to speak about his/her creative outputs at prestigious venues such as universities or museums that are outside South Africa.
- Has taken up residencies outside South Africa.

Example of some international recognition:

- Has participated to a limited degree – for example in group exhibitions – in (appropriately reviewed) art, music, or drama performances or exhibitions at prestigious venues outside South Africa.
- Has produced creative work (of the sorts mentioned above) which has been the topic of scholarly books, articles or chapters in books published in South Africa but which have a wider reach than South Africa alone.³

A person with a **considerable international reputation** will have a large number of outputs which are clear markers of international recognition.

Markers of **some international recognition** may figure in this profile, but would need to coexist with clear markers of international recognition for the individual to be deemed to have a 'considerable' international reputation.

Physics

Physics is a truly international branch of science that knows no geographical boundaries, and whose common body of knowledge is of relevance across the globe. For physics, "considerable international recognition" means precisely that, i.e. recognition by one's peers worldwide for the quality and impact of one's research. Impact is measured e.g. by citations, the discernible influence on the research of others in the field and the high profile participation in international collaborations. Recognition comes in the form e.g. of invited plenary talks at international conferences, membership of international panels and other bodies, and international awards.

There are some research topics in physics which have a regional association with South Africa, such as the physical properties of diamonds and platinum group metals, astronomy of the southern skies and ionospheric behaviour in the southern hemisphere, but even in these areas, a researcher should have attracted considerable attention outside of southern Africa for his/her work to qualify for "considerable international recognition".

The primary research outputs in physics that are regarded as having the greatest weight are publications of original research in peer reviewed journals, and scientific monographs. It is widely accepted that the reviewing process for so-called peer reviewed conference proceedings are less stringent than for ISI-indexed journals, and the rejection rate much lower, and so in physics these are better regarded as secondary outputs. In physics, software development is usually part of a process that culminates in the publication of one or more journal papers. It is the papers that are regarded as the primary output, rather than the "computational research tool". Publications in high impact factor journals are accorded more

² One is referring here to items authored by others. One is also assuming publications which have not been self-initiated.

³ One is referring here to items authored by others. One is also assuming publications which have not been self-initiated.

weight than those in low impact journals. In this regard, Physical Review Letters and Nature stand out as journals of particularly high repute. In some areas of physics, extensively multiauthored papers are the norm. An effort should be made in these cases to ascertain how significant the contribution of the candidate's is to the group effort. Patents have the weight of journal papers.

Plant Sciences

The following guidelines are proposed for the definition of "Considerable International Recognition" for applications to the Plant Sciences panel. Note that this is a criterion required for researchers to be placed in B or A category.

We recognize that a feature of much Plant Sciences research in South Africa is related to our plant species diversity, thus there is research on indigenous/endemic groups of plants or ecological systems that have a local focus. However, new knowledge and principles within these topics are relevant to the international community, and thus the definition of "International" does not need to be adjusted for Plant Sciences applications.

The following criteria should be considered when an applicant is evaluated for "Considerable International Recognition" in Plant Sciences **(in order of priority)**:

- Assessment statements by leading scientists about the international impact of the work
- Publications in high impact factor international journals (ISI listed)#
- Citation profile (including h-index (Web of Science)).
- Authorship of a significant scientific book
- International awards for scientific work
- Invited plenary and keynote lectures at international congresses
- Editor or associate editor of international journals
- Reviewer of international grants
- Member of international advisory panels
- Authorship of book chapters in significant scientific books
- Invitations to write review articles in international journals
- Chairing sessions/organising international meetings
- International research collaboration
- Reviewer for international journals (taking into account impact factor of journal and frequency of reviews)
- Other lectures given at international congresses

Political Sciences and Philosophy (PSP)

Considerable (international recognition) should be a qualitative and not just a quantitative notion. What should count is the expertly informed nature and level of peer recognition. A researcher whose work is highly rated by a large number of reviewers who are not closely involved in the specific area of research and/or are at a relatively less senior level themselves should count for less than one whose work is highly rated by a lesser number of those directly involved in the specific area of research and/or are established world leaders themselves. A qualitative norm of this kind will require informed judgment in its application but this is precisely where the responsibility and function of members of the expert panel come in. If the idea is to develop an assessment grid that can mechanically be applied and monitored by outsiders then that goes against the basic principle of peer evaluation. That said, we can recognise a number of indicators as being relevant to establishing international recognition, including (in no particular order):

- Authorship of a significant (e.g. with an international academic publisher and/or critical acclaim by peers) book
- Invited plenary and keynote lectures at international meetings
- Invitations to contribute to volumes or collections edited by international peers
- Substantial research collaboration with international peers
- Executive membership of international academic bodies

- Editor or associate editor of international journals with high standing
- Being asked to act as a reviewer for journals with high standing
- Being asked to act as an external examiner by institutions of high standing
- Publishing in journals with high standing
- Citations and h-indexes, or other reflections of the influence on the research of others
- Publications used by international researchers as scholarly texts;
- Invitations to write major reviews on the topic of specialisation;
- Invitations to act as external examiner of PhD theses by prominent scholars in the field;
- Co-supervisors of PhD students of prominent scholars in the field;
- Awards by international scientific societies/organisations;
- Leader of or leading role in international collaborative research projects.
- Publications that are judged by international peers to have had a wide impact in the relevant field within Philosophy or Political Science.
- Research itself is seen by international peers as ground-breaking, pioneering or leading the way.
- Organised or been on the scientific advisory committee of international conferences

The reports of reviewers may draw attention to indicators not on this list in the course of arguing for the international standing of the research by an applicant, and these comments should be assessed on their merits. International standing should be counted as “considerable” when a majority of reviewers argue that the applicant has international standing according to the criteria above.

Psychology

International recognition: recognition by academic peers, based in a number of different countries, as indexed by citations of one's work, or directly elicited written notice (e.g. in reviews) of the significance of the work.

Considerable international recognition is a distinction of degree by means of more frequent citation or acknowledgement, or great quality.

Less entrenched areas of psychology are also probably less thoroughly tested or debated areas, and recognition for work in such an area is not the same as recognition for work in more heavily patrolled waters. For example, if somebody doing work in Neuropsychology (well established field, using, for the most part, well established methodologies) is compared with somebody doing work in Indigenous Psychology or Postcolonial Psychology (both in their infancy, with limited appeal in the “First World”, methodology variable).

The issue of “recognition” is also complicating, in the sense that somebody may produce work of very high “international” quality which, because of the nature of the work done, receives very little recognition in the form of citations, invitations to present etc.

Religious Studies and Theology

The distinction between *participation* in scholarly discourse, making a *substantive contribution* to such discourse and offering *academic leadership* in such discourse (see section 2 above) is particularly helpful in the field of Religious Studies and Theology. All three require recognition but recognition of different kinds. All three also require a recognition of the inherent quality of a scholar's work. By contrast, the distinction between local, national and international recognition is less helpful for several contrasting reasons:

- Firstly, the fields covered are organised in terms of a large number of small guilds sometimes working on fairly narrow and highly specialised areas of interest (e.g. on one particular sacred text or on the work of one famous figure), while other areas are much larger, rather amorphous and not organised in terms of such guilds. The size of

such areas of specialisation therefore matters. A scholar may be regarded as amongst the top 10% of persons with a PhD working in a small guild (of 20 people), but may be regarded as amongst the top 25% of scholars if a somewhat wider area of interest is considered. Nevertheless, given the emphasis on specialisation, very high standards of excellence may well be maintained in the smaller guilds.

- Secondly, many of these guilds are already thoroughly internationalised through regular conferences, journals and book series. Mere participation in such guilds requires a certain standard of quality which then guarantees some form of international networks and recognition (whether considerable or not), but this does not imply that a substantive contribution within the field of specialisation would be recognised by others in the guild or in the wider discipline in which a scholar is working.
- Thirdly, the barriers for wider recognition are not necessarily geographic in nature – they may be related to the narrow area of specialisation – so that colleagues with the same area of specialisation may have regular contact across vast distances while the same contact may not be maintained with others who are close by but working in a slightly different area of specialisation. The barriers may also be related to particular religious traditions, confessional traditions and theological schools. Thus, for example, a South African Calvin scholar may relate with other Calvin scholars worldwide but not necessarily with those working in the field of black theology.
- Fourthly, the fields covered include areas of specialisations that are often highly contextual given the topics addressed but also the interlocutors selected – so that it would make little rhetoric sense to publish research outputs outside that particular context. Wider recognition is then based on the depth of work done in a very local context – which may take somewhat longer to become evident.
- Fifthly, the international centres of excellence for particular areas of specialisation are quite varied and certainly cannot be restricted to Europe, the UK or North America. In most cases such centres of excellence are already internationalised through participants in the various guilds. At the same time the academic standards maintained in such centres of excellence may also vary from one sub-discipline to another so that prudence is required in judging the comments from reviewers.

What, then, would be considered as criteria for the “wider” recognition of the “substantive” contribution made by a scholar in the fields covered under Religious Studies and theology? As in other disciplines, this has to be based on three forms of evidence, namely an assessment of the inherent and innovative *quality* of the scholar’s best work, an assessment of the *impact* that such work as made in the narrower field of specialisation (or discourse) and in the wider sub-discipline or discipline and an assessment of the academic *standing* of the scholar, preferably in somewhat larger fields of interest (e.g. Pauline literature rather than the letter to Philemon):

- The *quality* of a scholar’s work (whether this has indeed made a substantive contribution within the field) can only be judged by reviewers reading and critically assessing the best research output but some indications would be evident from the standing of the journals (local journals included) in which articles are published and especially from published scholarly monographs (still the benchmark in all the fields covered) and the standing of the particular publisher. In some cases awards for particular publications may also be helpful.
- The *impact* of the scholar’s work cannot yet be determined in terms of a citation index as this is employed unevenly. The value of such citations is that they go beyond a network of contacts: an outstanding scholar would be recognised and cited by others elsewhere in the world who are not known by that scholar. It should also be noted that citations may be positive or negative – so that those with far-fetched but highly publicised ideas may well be widely cited by those who seek to refute such ideas. Indicators of impact may include books reviews, review symposiums (at conferences or

in journals), and articles / theses / books / Festschriften on the work of the scholar. A better indicator of impact may be in terms of the academic standing of a scholar.

An assessment of the *standing* of a scholar is necessarily subjective but may also be influenced by the contested nature of various approaches within each sub-discipline. A scholar working in one school of thought may offer incisive criticisms of the work of a scholar established in another school which other peers may not recognise. It is therefore important to select reviewers who work inside and outside the school within which an applicant tends to move. As indicated above, it is also crucial to take the size of the field (the number of persons worldwide, with a PhD, and who regard this as one of their main current areas of specialisation) into account. In general, such standing would be evident from editorial roles in significant edited volumes (especially where a conceptualisation of the topic requires some academic leadership and not merely networking or language-editing skills), leadership positions in international academic societies, planning committees for larger research projects, various high profile and prestigious invitations, for example to deliver keynote / plenary addresses at major conferences (albeit that the need for multiple forms of representivity also play a role in such invitations) or to act as external examiner at prestigious universities, and finally various distinguished research awards.

Veterinary and Animal Productions Studies (previously A&V 2) and Zoological Studies (previously A&V 1)

International recognition is clearly a multi-faceted concept and is achieved in a number of ways and suggested criteria are listed below. Of these the most important are 1-6 as other recognition is linked to the track record and quality of research publications. For someone to have 'international recognition' they would therefore be some evidence of points 1-6. For anyone to have 'considerable international recognition' they would be enjoy most of the forms of recognition listed below.

Possible ways by which a researcher could claim to have international recognition would include:-

- Research publications (in peer reviewed journals) are being regularly cited by international peers. Evidence for this would be high numbers of citations of several papers, and a high h-factor.
- Peer reviewed publications are seen as being of high quality. Some evidence for this could be that papers have been published in high impact journals, are held as excellent examples of a particular research field, or data (tables or figures) from the work is included by international authors in seminal reviews, book chapters or books.
- Publications that are judged by international peers to have had a wide impact in zoology or veterinary science.
- Authorship of a book or book chapter(s) that are held in high regard and used by international researchers as scholarly texts (this would not include undergraduate text books).
- Invitation by international peers to contribute book chapters or subject reviews.
- Research itself is seen by international peers as ground-breaking or leading the way.
- Collaboration with international researchers – this must be more than 'tokenism' e.g. simply providing specimens. Researcher must be seen as an equal partner. Considerable international recognition could mean being a leader of an international research project.
- Invitation by conference/symposium organisers to present plenary lectures or key note addresses at international conferences (an international conference can be within the borders of South Africa). Someone with **considerable** international recognition would have received several such invitations.
- Invitation to edit an international journal or be part of an international editorial

board. Invitation to review papers for non-South Africa journals also attests to some international recognition.

- Any awards by international scientific societies.
- Being voted onto the executive committee of an international society.
- Being invited to serve on international scientific advisory boards.
- Being invited to examine international PhD theses.

__END__