



Summary

An action-oriented approach

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Credibility and integrity of the science system as a whole

- Science (and T and I) underpins society, also as training ground for next generations
- Credibility and integrity must be on everyone's agenda: basis implicit covenant between science and public to respect core values
- Still self-regulation? Yes, but world has changed last 50 years
 - Size of science endeavour
 - Globalisation once more in science, but now of national science systems
 - High societal expectations,
 - Commercialization encroaching upon academia, as well as other pressures (political interference, military research, global risks and uncertainty,...)
 - High visibility hence obligation for open discussions with public and media

Hence

- extend classical value system of science to incorporate broader societal value system
- Add checks and balances, including regulations and procedures in crucial areas, and sample auditing: overall system perspective



Research Integrity: broad or small

- Entirety of Conference has resulted in very broad idea of RI. Nothing wrong, all aspects have value
- Are 'system' integrity and credibility ensured
 - If we can root out all fabrication and plagiarism, but let commercial interests 'take over' universities, or simply accept developing H-bomb?
 - Other way around?
- So let's argue from perspective and desire to discuss practical actions?
- Can we dissect the total area in small number of clusters within which more easily agreement on
 - operational meaning of RI in that cluster
 - primarily responsible actors
 - Relevant set of national, international rules, guidelines
 - most urgent and feasible additional actions/measures, if any, to be undertaken



Evidence: numbers, motives/causes

Misconduct more frequent?

Peer review more vulnerable?

- NIH studies
- Academic studies about cheating in education from all over the world, up to fake PhD theses
- # of investigative cases at DFG, NIH...
- Problems in developing countries and countries in transition

Pathological cases will always occur

All scientists are human

- But is huge pressure excuse?
- Are cultural differences excuse?

However

- Distinguish big cases from smaller ones
- Can't we really reduce (nature of) pressure on especially young scientists?
- 0.02 of papers on PubMed retracted: impact on science slight

Need better empirical material!

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Four actionable clusters

- Scientific misconduct (whether in the limited sense of PFF or broader including QRP), whether due to internal system pressures (national ‘Nobel’ pressure etc), or not
- Infringements of bioethical regulations and guidelines for scientific research.
- External pressures on scientists and science institutions arising at the interface of science and political, economic, military and other interests.
- Government and institutional policies to maintain integrity of institutions.



Linkages and blurred borders

- 'Hwang' case turned from ethical infringement to include misconduct
- Governments', funding agencies', universities' insistence on accountability and career requirements (cluster 4) often resulted in unhealthy pressure and liability for misconduct (cluster 1)
- Clinical trials' reporting transgresses into selective representation, withholding information to close to datamanipulation (cluster 2 cluster 1)
- Lack of cooperation due to entrepreneurship being on the increase (cluster 3) induces risk taking and misconduct (cluster 2)



Value-based + Compliance-based

In all clusters actors balance between

Value-based perspective

- internalising integrity through training, self-regulation, stressing positive values of science (reliability, objectivity, honesty, impartiality..), Socratic dialogues and setting examples..

Compliance-based perspective

- Government-, funding agencies-, universities-sanctioned bodies apply definitions, rules and procedures to deal with allegations of misconduct to protect society and correct spending public money



Actions in cluster 1 'Misconduct'

- Funding agencies, governments and universities/institutes to review rules to reduce pressure from quantity-orientation on especially young scientists
- RCR Training: yes, but high quality; don't forget secondary/primary schools; nothing better than Socratic dialogue, and positive example
- Universities to handle misconduct cases more seriously and openly: Where were VCs, Rectors, Presidents?
- Avoid building too complex systems: universities/institutes key, plus national body for intake, overview, and occasional take-over?
- Avoid turning being scientist into a legally regulated profession
- Scientific integrity (~ PFF) may be set apart from proper practice, proper ethical behaviour, but there are indications that QRF is more important for trust in science; and consequences may be severe.



Actions in cluster 1 'Misconduct': continued

Journals

- Co-authorship responsibility: PI or core group responsibility for paper's entire veracity
- Use technical tools to combat plagiarism and image manipulation
- Public digital repositories for primary data (US: IAWGDD; Europe: Alliance for Permanent Access)
- Independent authority to report suspicious case to, or inform institutions?

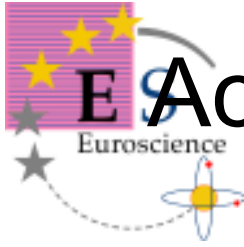
Harmonisation of rules, procedures, collaboration

- Internationally in view int'l collaboration and peer review
- Across disciplines
- Across journals
- Initiative: OECD GSF?, STM Publishers? ICSU? IAP? UNESCO? One or two initiatives? Leading to overall International Code of Conduct and subsequent more detailed arrangements?



Actions in Cluster 2 'Bioethics'

- Many regulations, guidelines, codes of conduct in place; many national, institutional and international bodies active in ensuring compliance. But there are definite areas for action
- **Clinical trials**
 - Ensure compliance to home-country rules in host-countries for clinical trials
 - Effective monitoring of clinical trial compliance
 - Modify regulations to ensure that clinical trial design does not reflect unequal power distribution between large company and developing country
- **Experiments involving human beings**
 - Reconsider 'informed consent' in experiments involving human beings to account for increasing commercial use
 - How to curb practice of paying persons brought into research projects, or of wandering around of condemned medical practitioners?
- **Ethical education**
 - Universities and professional medical associations should require more than minimal, and high quality training (Socratic interrogation) for



Actions in Cluster 4 'Conflicting interests'

- Discussion has concentrated on scientists in public sector, or at least funded from public purse. Is it possible to take into account scientists in private sector, in CROs, in the defense laboratories?
- Advancement of science and generation of wealth require co-existence public knowledge system and proprietary knowledge-based private system. What is acceptable at interface? Taking patents: why not? Sharing in license income? Start-ups on campus? Yes, but safeguard fully open exchange of information. Equity in start-ups? 1/3 lead authors in biomedicine has financial interests. Problem. Very different answers from different institutions and governments. OECD good forum
- Political and religious interference: disregarding research, opposing free and independent research, supporting fake research for ideological reasons, influencing research are occurring/have occurred in many places. Some governments take firm stand, others waver. In religious communities it is not different. Academies of Science traditionally in most occasions strong safeguard. International fora?



Actions in cluster 4 'Institutional integrity'

- Governments often create institutions in science system, and their boundary conditions. Accountability, evaluations, mission definitions, funding mechanisms, but also priority areas, and so on. Include acceptable behaviour of individuals or institutions. Accepting 'industry' on the campus has been one important example of changes. Two things stood out:
- 'Intelligent' accountability: solid on the numbers financially, solid on the quality and substance in research and education
- In responsible system all actors accept responsibility; checks and balances; careful distribution of power between government, funding agencies, universities, faculty, students etc



Cross-cutting issues

Challenges for developing countries, countries in transition, emerging economies

- We all benefited from presence of so many from all over world
- Clearly problems much more interwoven and acute a.o. because of smallness of system (small number of scientists, small journals,), in other cases rapid, uneven, unbridled growth,..
- Many capabilities are there; actions heartening; but social and political environment very difficult
- Need special attention: what can international community do? Including politically determined and courageous actions.

Awareness about science, science culture

- Credible science system, perceived as displaying integrity needs trust of public
- Needs to be seen to tackle all the issues in the four clusters having to do with integrity sincerely, openly, and acknowledging uncertainties
- All actors, levels need to think how they can share the responsibility to engage with the public.