

Gentle Science Shapes the World

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Gentle Science is conscientiously elaborated around the world, and should be encouraged, to become more powerful and efficient, and more gentle [1].

Gentle Science

- Gentle Science recognizes the special responsibility of the scientific community, for the quality of science, the quality of life in science, and its mission. While the individual scientist contributes her/his share, the scientific community requires concerted actions to encourage Gentle Science on institutional, national and world-wide levels [1,2].
- Open science - open source [3,4].
- Unexamined science is not worth practicing/publishing.
- Gentle Science develops and implements the concept of Scientific Social Responsibility (SSR), complementary to Corporate Social Responsibility (CSR). Combine large scientific footprints with small environmental footprints; implement strategies of sustainability: climate change in the laboratory [5].
- Gender balance at all levels.
- Young scientists balance.
- Gentle Science aims at quality that should not be compromised for the sake of quantity, speed, or 'first to publish'. From maximization to optimization [6].
- Gentle Science implements *Better Practice* and *Quality Assurance* explicitly.
- Gentle Science supports new approaches, making possible an evolutionary improvement of the quality of scientific publications, for fair science, fair citation, ... [7].

GS Notes

1. Does **Gentle Science** require a form of organization? – non-profit organization? – Gentle Science homepage? – Gentle Science network, linked on homepages – Gentle Science statements on homepages, Email signatures, letterheads – Encourage scientific societies and journals to engage in Gentle Science.
 2. How can the scientific community provide **positive feedback to the practice of Gentle Science**, rather than supporting junk science (unfair citation hiding the priority of other groups; incomplete methods description, not disclosing important detail to potential competitors; presentation merely of published information at conferences, preventing open exchange on cutting-edge scientific progress; quick-and-dirty publication instead of implementation of QA, compromising quality for the sake of apparent priority; ...)?
 3. Published scientific information – largely supported by the society – should be accessible in general, without separation of privileged 'rich' institutions and limited access in underdeveloped countries. **Open-source** initiatives should be supported.
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4. Provide information on the specific responsibilities of each co-author in all publications: While an increasing number of journals requests author information, inclusion of this information should constitute a decision and responsibility of the authors even in cases when this information is not requested (for comparison, less important statements are found frequently in the acknowledgements section).
5. **Climate change in the laboratory:** Unnecessary waste production can be limited in scientific institutions, by implementation of energy-efficient and material-efficient technologies. Dischargeable tools should be replaced by application of re-usable tools whenever possible. Scientific institutions should be rated on the basis of their positive scientific impact and their positive environmental impact factor.
6. **Optimization** instead of maximization is required in strategies of scientific publication. While scientific output is still rated frequently on a totally non-scientific basis of 'number' of publications, simple mechanisms may be implemented by the scientific community to encourage quality rather than quantity. In job applications and project applications, for instance, a personal selection of very few 'high quality and relevant' publications should be requested, without further consideration of numbers of scientific publications (what are large numbers good for?).
7. **Evolution of a scientific publication:** Even when trying the *best* in completion of a publication, there is generally scope for making it *better*. Whereas a printed 'paper' is a final document of an original publication, any published pdf file can potentially be edited for further improving the quality of a publication (corrections, additions, re-interpretations, even short discussions). For instance, **fair citation** may not always be possible in the most optimal way, given the constraints on page limits, maximum number of references, and the impossibility of complete awareness by the authors of further relevant references. Additions, corrections and extensions are possible, however, in the form of supplementary materials that may be added even after publication, particularly on the basis of correspondence that may be initiated only after publication. As long as journals do not include supplementary materials after publication, this may be achieved by institutional or other homepages etc., where sections are linked to the relevant publications. Corrections and additions may then not be limited to 'fair citations', but be extended to all other relevant supplementary information, which may be more useful and efficient than a 'new' publication.

Gentle Science Signatures

At the dinner following the summary session of the QA Workshop on 'Respirometry of Permeabilized Muscle Fibres: Towards Quality Assurance in the Diagnosis of Mitochondrial Function' (2009 December 9-12; Innsbruck, Austria), the discussion turned to the limited degree of freedom available in our world of competitive science to implement quality rather than quantity in the publication strategies of scientists. We are all fighting with the overload of new publications, many of which lack the quality that would be desirable in the spirit of true progress. What would be an alternative? Are we catering for *Fast Food* (i.e.



frequently junk food) in science? Do we need a *Slow Food (Slow Science)* movement? Then Shilpa Iyer proposed 'Gentle Science', and the response was clear and explicit: 'Gentle Science Shapes the World' was signed by all participants at the dinner discussion (see 'Signatures'; the table napkin was donated by the restaurant 'Glasmalerei'; several workshop participants had to leave the QA workshop before the summary discussion).

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Gentle Science Updates

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