

**OECD GLOBAL SCIENCE FORUM**  
**Workshop on Best Practices for Ensuring Scientific Integrity and Preventing Misconduct**  
 22-23 February, 2007 Mita Conference Hall, Tokyo, Japan

Draft Annotated Agenda (as of 12 December, 2006)

**Thursday, February 22**

|             |             |  |
|-------------|-------------|--|
| <b>9:15</b> | <b>0:45</b> | <b>Session 1: Welcome and Introduction</b>             |
|             | 0:10        | Presentation by a MEXT official                        |
|             | 0:05        | Presentation by an OECD official                       |
|             | 0:15        | Introductory remarks by Co-chair Prof. Makoto Asashima |
|             | 0:15        | Introductory remarks by Co-chair Dr. Nigel Lloyd       |

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| <b>10:00</b> | <b>2:35</b> | <b>Session 2: Scientific Misconduct and Its Consequences</b>  |
| 10:00        | 0:40        | 2a: Keynote presentation on the historical, social, cultural, and scientific background, and current trends in promoting research integrity |
| 10:40        | 0:45        | 2b: Practical consequences of research misconduct   |
| 11:25        | 0:25        | <i>Coffee break</i>   |
| 11:50        | 0:45        | 2c: The various types of research misconduct, and the implications of this diversity for policy development                                 |

12:35 1:25 *Lunch*

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| <b>14:00</b> | <b>3:40</b> | <b>Session 3: Dealing with Misconduct Allegations - General</b>                                  |
| 14:00        | 2:00        | 3a: General Structure of a System for Dealing with Research Misconduct (including presentations) |
| 16:00        | 0:25        | <i>Coffee break</i>  |
| 16:25        | 1:15        | 3b: Elements of a Misconduct Investigation   |

17:40 *Conclude first day. A reception (hosted by MEXT) will be held at the workshop venue.*

**Friday, February 23**

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|-------------|-------------|--|
| <b>9:15</b> | <b>3:05</b> | <b>Session 4: Dealing with Misconduct Allegations - Details</b>                    |
| 9:15        | 0:45        | 4a: The First Link in the Chain: Receiving and Initial Processing of an Allegation |
| 10:00       | 0:45        | 4b: Due Process and Fairness in an Investigation. Confidentiality versus Openness. |
| 10:45       | 0:25        | <i>Coffee break</i>  |
| 11:10       | 0:45        | 4c: Misconduct in Collaborations (Including International Ones)                    |
| 11:55       | 0:25        | 4d: Review and Evaluation of the System  |

12:20 1:25 *Lunch*

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| <b>13:45</b> | <b>2:30</b> | <b>Session 5: Preventing Misconduct, and Promoting Research Integrity</b> |
| 13:45        | 1:00        | 5a: Causes and Contributing Factors                                       |
| 14:45        | 1:30        | 5b: Practical Remedies and Preventative Measures                          |

16:15 0:25 *Coffee break*

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| <b>16:40</b> | <b>1:00</b> | <b>Session 6: Findings and Conclusions. Next Steps.</b> |
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17:40 *Conclude Workshop*

## Background and Rationale

Governments of OECD countries make large investments in scientific research, much of which is conducted directly by governmental institutions. On behalf of the public, and to achieve societal benefits, governments oversee, manage and evaluate research. Scientific misconduct (such as fabrication, falsification, plagiarism, and other inappropriate actions) damages the scientific enterprise, constitutes misuse of public funds, and weakens the trust of citizens in science and in government. At a time when scientific advances are considered to be critical in areas such as economic competitiveness, health, national security, and environmental protection, governments are strongly motivated and determined to prevent scientific misconduct and to ensure the highest possible integrity in research.

Recently, many instances of scientific misconduct have gathered widespread attention. Their importance, significance, the damage done, and potential new preventive measures, are the subject of debate among scientists, government officials, the press, and concerned members of the public. Recognising that the issue affects all of these stakeholder communities and that, like science itself, the problem has a major international dimension, the OECD Global Science Forum decided to convene an international consultation of government-designated experts and officials. The Forum's decision was based on a discussion paper that was submitted to the 14<sup>th</sup> meeting of the GSF in February 2006 by the Delegation of Japan. An Experts Group was established, and the Delegation of Canada agreed to co-lead the activity, which culminated in the submission of a formal proposal to the 15<sup>th</sup> meeting of the GSF in July 2006. The Forum approved the proposal and agreed to hold a workshop in Japan in February 2007, following which a written report will be submitted to the GSF for discussion and approval at its 17<sup>th</sup> meeting in the fall of 2007. Possible follow-on actions could be proposed and considered at that time. The work would be reported in detail at the "World Conference on Research Integrity Fostering Responsible Conduct in Research" in Lisbon on September 17-19, 2007, where a special session would be organized by the Global Science Forum.

To supervise the workshop preparations, fourteen GSF Delegations nominated members to the International Steering Committee (ISC). In September 2006 the ISC (whose members are listed in Appendix A) agreed to sponsor the preparation of a discussion document (this Annotated Agenda) for the workshop. Interested delegations nominated national experts who were interviewed (by telephone or in person) by members of the GSF secretariat, according to the schedule that is presented in Appendix B. The interviews were based on the survey template that is attached as Appendix C. Based on the interviews the secretariat drafted the present document in consultation with the Co-Chairs, Professor Makoto Asashima of Japan and Dr. Nigel Lloyd of Canada.

The goal of the Workshop is to deepen the understanding of the underlying phenomena, to identify the range of possible solutions and, based on experience, and to enumerate the pros and cons of possible practical measures, lessons learned and good practices. A number of countries are currently creating, modifying, or reviewing mechanisms for dealing with scientific misconduct. For these countries, the Global Science Forum workshop will be particularly timely by providing opportunities for international consultation and for learning from the experiences of others. The workshop participants will address the issue of international scientific collaborations, and will consider whether any new measures might be needed to deal with special problems created by the differences in the ways that collaborating countries deal with allegations of misconduct.

## Workshop Structure and Schedule

The Draft Annotated Agenda is designed to take maximum advantage of the presence of national experts and practitioners. Accordingly, of the approximately over 11 hours of substantive deliberation time over a period of two days, 85% of that time is programmed for discussions, and 15% for formal presentations.

As can be seen on the pages that follow, Sessions 2-5 are subdivided into ten subsections (e.g. 2b, 3c, etc.), each devoted to a specific topic and set of questions for debate, and ranging in length from 30 to 90 minutes. To further benefit from the assembled expertise, it is proposed to assign a chairperson to each subsection, selected in advance from among the workshop participants. These persons will be responsible for moving the discussion forward, and for promoting the formulation of concrete findings and conclusions that can be assembled into the final written report from the workshop.

## ANNOTATIONS TO THE DRAFT AGENDA

|                  |  |                        |
|------------------|--|------------------------|
| <b>Session 2</b> | <b>Scientific Misconduct and Its Consequences</b>  | <b>2 hrs. 35 mins.</b> |
|                  | <i>Introduction</i>  |                        |
|                  | <p>Instances of research misconduct have attracted a considerable amount of public and political attention over the last few years. Several highly-publicised cases have generated doubts about the integrity of the scientific enterprise itself. Accordingly, governmental scientific administrations are responding via a variety of administrative and educational measures. This workshop grew out of a realisation that the design and implementation of these measures can benefit from an international dialog among countries that, in any case, engage in extensive scientific cooperation.</p> <p>A wide range of (mis)behaviours by scientists can be considered to be “misconduct”, so clarity on this issue is important, especially as a prerequisite to establishing or evaluating an administrative system for processing misconduct allegations, for considering the causes and remedies. The goal of Session 2 to review, from an international perspective, the mechanisms and modalities that are most appropriate for dealing with various kinds of inappropriate behaviours (many are listed under Session 2c). In particular, it is important to identify instances of misconduct that merit a full investigative treatment, the elements of which are the subject of Sessions 3 and 4, which deal with administrative systems for processing allegations, investigating specific charges, punishing the guilty, and exonerating the innocent.</p> |                        |
| <b>2a</b>        | <b>Keynote Presentation</b>  | <b>40 mins.</b>        |
|                  | <p>Presentation by an acknowledged intellectual leader and practitioner in preventing and dealing with research misconduct. The presentation will outline the historical, social, cultural, and scientific background, as well as current trends from an international perspective.</p>  |                        |

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| <b>2b</b>  | <b>Practical consequences of research misconduct</b>  | <b>45 mins.</b> |
| <i>Issues and Questions for Discussion by Workshop Participants:</i> |   |                 |
|  | <p>Workshop participants are invited to explore the ways in which research misconduct damages the scientific enterprise, and how the negative consequences extend into the broader societal context. The key question is: what degree of intervention (prevention <u>and</u> repression) is commensurate with the amount of damage that results from research misconduct? In other words, is the problem serious enough to justify establishing a dedicated quasi-legal system for investigating allegations? A corollary question is: is the prevalence of misconduct changing, and, if so, why?</p> <p>The following general areas where negative impact occurs were mentioned in the course of the expert interviews:</p> <ul style="list-style-type: none"> <li>- Harm to individuals and to society, if fraudulent research results in the release of an unsafe product or process (e.g., a drug or a therapy). Society may be harmed if false results become widely known and believed, even though the formal responsibility for protecting the public lies mostly outside the research administration system, and is assured by a well-developed structure of national laws , regulations, and institutions (e.g., the drug approval process).</li> <li>- Direct damage to science itself, by creating false leads for other scientists to follow, and/or forcing others to waste time and effort to falsify incorrect results. It is usually pointed out that misconduct rarely results in serious long-term harm to science itself, because of its inherently self-correcting character.</li> <li>- Direct damage to science via the degradation of the relations among scientists, between senior researchers and students, and between researchers and agency programme managers (in cases where the need to suppress misconduct leads to increasingly time-consuming, intrusive and onerous requirements in grant applications, reviews and reporting).</li> <li>- Indirect damage to science through the undermining of the public’s trust of science, and of the government’s ability to manage research in a competent and responsible manner. The tarnishing of the reputation of science could also aggravate the observed decline in student enrolment numbers.</li> <li>- A decline in the credibility of scientific analysis and advice on issues that have important implications for society and, hence, for government policy. These issues (in such areas as health, environment, energy, security) often have a major scientific component, and science-based laws and regulations may be needed to successfully address them.</li> </ul> |                 |

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| 2c   | <b>The various types of research misconduct, and the implications of this diversity for policy development</b>  | <b>45 mins.</b> |
| <i>Issues and Questions for Discussion by Workshop Participants:</i>   |   |                 |
| <p>Interviews with experts revealed a broad spectrum of types of misconduct by scientists. At the centre of the spectrum are FFP (Fabrication, Falsification and Plagiarism). There is general agreement that FFP deserve to be investigated (whether through formal or ad-hoc means) and punished if guilt is established. The same applies to financial misconduct, which is unambiguously in the province of administrative and accounting departments in research institutions and central administrations. On the far ends of the spectrum are such phenomena as inappropriate personal behaviour, and simple scientific incompetence. For these, it seems that the internal mechanisms of the scientific community can provide the most effective remedies, without the need for formal intervention at the administrative level. But there are also “grey areas” where science administrations may want to be involved. The consideration of these issues is complicated by the question of <u>establishing intent</u>, which is notoriously difficult to do in an investigation. Thus, for example, an inability to provide primary data may be the result of an “innocent” mistake or accident, but it could also be considered as <i>prima facie</i> proof of serious misconduct if it can be established that it was done deliberately to conceal an act of FFP.</p> <p>Workshop participants are asked to take note of the six categories shown below, and to reflect on which ones are of greatest concern to research administrations and should be the targets of investigation and sanctions.</p> <p>(NB The classification scheme below is not intended to be exhaustive or to constitute a universal intellectual framework for a theoretical study of research misconduct. Thus, it is not in itself intended to be a subject of discussion, and is presented merely as a way to summarise the information extracted from the expert interviews.)</p> |   |                 |
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| <p><u>1. Core “FFP”</u></p> <p><b>F</b>abrication of data</p> <p><b>F</b>alsification of data</p> <p><b>P</b>lagiarism (Stealing ideas/text from colleagues)</p> <p>Selectively rejecting data from analysis</p> <p>Misinterpreting data to obtain desired results (including inappropriate use of statistical methods)</p> <p>Producing false data or results based on pressure from a sponsor</p>  | <p><u>2. Publication-related Misconduct</u></p> <p>Undeserved authorship</p> <p>Doctoring images in publications</p> <p>Artificially proliferating publications (“salami-slicing”)</p>  |                 |
| <p><u>3. Bad Data Practices</u></p> <p>Not keeping primary data</p> <p>Bad data management, storage</p> <p>Withholding data from scientific community</p> <p>NB The above applies to physical research materials as well.</p>  | <p><u>4. Bad Research Practice</u></p> <p>Performing harmful or dangerous research</p> <p>Poor research design</p> <p>Experimental, computational errors</p> <p>Violation of human subject protocols</p> <p>Abuse of laboratory animals</p> |                 |
| <p><u>5. Administrative Misconduct</u></p> <p>Peer review abuse e.g., non-disclosure of conflict of interest, unfairly holding up a rival’s publication</p> <p>Misrepresenting credentials or publication record</p> <p>Mis-use of research funds for unauthorised purchases</p> <p>Mis-use of research funds for personal gain</p>  | <p><u>6. Personal Misconduct</u></p> <p>Inappropriate personal behaviour, harassment</p> <p>Inadequate mentoring, counselling of students</p> <p>Insensitivity to social or cultural norms</p>  |                 |

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| <b>Session 3</b> | <b>Dealing with Misconduct Allegations - General</b>  | <b>3 hrs. 40 mins.</b> |
| <b>3a</b>        | <b>General Structure of a System for Dealing with Research Misconduct</b>   | <b>2 hrs.</b>          |
|                  | <i>Background</i>   |                        |
|                  | Interviews with designated experts revealed a wide diversity of national systems for dealing with misconduct. Notably, some OECD countries have not developed any such systems. In these countries, few cases of misconduct are reported, and these are dealt with on an ad-hoc basis by committees that are appointed by government agencies, or university administrations, or scientific academies. Other OECD countries have put into place highly-structured, multi-level systems for receiving allegations, investigating them, and punishing those who are found to be guilty. This session (and the ones that immediately follow) focus on the detailed properties of such mature systems.  |                        |
|                  | <i>Presentations</i>  |                        |
|                  | General presentation about the diversity of systems for dealing with research misconduct (20 mins.)   |                        |
|                  | Description of the system in Japan (10 mins.)   |                        |
|                  | Description of the system in Denmark (10 mins.)   |                        |
|                  | Description of the system in the United States (10 mins.)   |                        |
|                  | Description of the system in Germany (tentative) (10 mins.)   |                        |
|                  | <i>Issues and Questions for Discussion by Workshop Participants:</i>  |                        |
|                  | <p>If there exists a central institution/committee/office at the national level:</p> <ul style="list-style-type: none"> <li>- Where should it be located administratively (stand-alone, within a Ministry or Research Council or Academy)? What should be its legal status and authority (in particular, vis-à-vis persons involved in an investigation)? Who does it report to? Who appoints the members? For how long? Are there defined requirements for the composition of the national entity (e.g., in terms of expertise, affiliation, etc.)? What is the source of its authority over the persons who will be involved in an investigation?</li> <li>- Should a national entity itself conduct investigations?</li> </ul> <p>Is there a need for one central national office that oversees, monitors and evaluates the entire system for dealing with misconduct (including prevention and mitigation)?</p>   |                        |
|                  | <p>If misconduct is dealt with primarily at the local level, i.e., at the level of the research institutions or universities where the misconduct takes place:</p> <ul style="list-style-type: none"> <li>- Should the local entity/institution formally commit to a set of procedures? How? (in writing, as a condition of receiving grants?) Is there a legal requirement to set up an office, board, etc?</li> <li>- Should there be uniformity across institutions, in a country, internationally. Can a country successfully maintain multiple systems for dealing with misconduct (for example, a centrally-administered government-level system, with one that is maintained by a non-governmental scientific society)? If so, how can they coordinated be, and how do they interact (if, for example a specific misconduct case affects many individuals and institutions)? Is there a basic fairness issue if standards and procedures are not sufficiently uniform or explicit?</li> <li>- In the case of a multi-level system, what criteria are used to decide where a given case is to be considered? Can the parties to the case (for example, the accuser) influence the choice of the venue?</li> </ul> |                        |
|                  | Does it make sense to talk about some kind of universal optimal structure, or can it depend on local circumstances (for example, the size of a country and its scientific community)? For a given country, can the same system deal with misconduct across all fields of science, including social and behavioural sciences, and even the humanities (e.g., history, literary criticism, theology)?   |                        |

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| <b>3b</b>  | <b>Elements of a Misconduct Investigation</b>  | <b>1 hr. 15 mins.</b> |
| <i>Issues and Questions for Discussion by Workshop Participants:</i> |  |                       |
|  | Investigative committees: fixed national-level vs. ad-hoc local ones: pro and cons.  |                       |
|  | Types of expertise needed in the make-up of investigative bodies, including judicial/procedural.   |                       |
|  | <p>For an ad-hoc local body, are there voluntary/mandatory guidelines, regarding such matters as:</p> <ul style="list-style-type: none"> <li>- The number of members and their affiliation (from inside/outside the institution where misconduct is alleged)?</li> <li>- The areas of expertise that committee members need (including judicial/procedural)?</li> <li>- Avoidance of conflict of interest (and how conflict of interest is defined)</li> <li>- Preventing bias by local-level committees towards protecting the reputation of a home institution.</li> </ul> |                       |
|  | How and under what authority does the investigatory body obtain the cooperation of the parties, especially those who are not themselves accused? Can they compel collaborators to provide data or testimony? What if they need cooperation from outside the institution? Does lack of cooperation with an investigation itself constitute misconduct?  |                       |
|  | Can an investigation be enlarged as new evidence is discovered? Can it be extended to other institutions? If so, are more committees established? Is there a time limit on investigations? What happens if the accused resigns, stops the work, etc.? What happens if possible criminal conduct is uncovered? Does the investigation continue in parallel with the legal process?  |                       |
|  | Are there limits on the power/authority of the investigators? How much new work can they require (for example, repeating an entire series of experiments)?   |                       |
|  | What do we know about the costs of conducting investigations? Do funding agencies provide any support?   |                       |
|  | <p>Investigation outcomes (penalties and exoneration):</p> <ul style="list-style-type: none"> <li>- Can “punishment” begin during the investigation (e.g., suspension of the research, withholding of grant)?</li> <li>- Does investigating body just make findings, or can it recommend penalties? Is there an established set of possible “verdicts”? Is it a straight guilty/not guilty system, or are shadings possible?</li> <li>- What specific steps can be taken to restore a damaged reputation?</li> </ul>   |                       |
|  | Is there any provision in the system for the protection of “innocent bystanders”, such as graduate students whose projects may be terminated even if their work had nothing to do with the misconduct committed by the principal investigator?   |                       |

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| Session 4 | Dealing with Misconduct Allegations - Details   | 3 hrs. 05 mins. |
| 4a        | <b>The First Link in the Chain: Receiving, and Initial Processing of an Allegation</b>  | 45 mins.        |
|           | <i>Background</i>   |                 |
|           | <p>Misconduct allegations almost invariably result from spontaneous, unsolicited allegations. There are some exceptions, for example, automatic computerised searches for plagiarised text in student papers, or verification by potential employers of claims made in CVs. Typically, a student or other co-worker, has a suspicion that certain data have been fabricated, or a researcher in the same domain becomes suspicious when unable to reproduce a measurement. Typically as well, the potential accuser has no idea where to turn to with their suspicions, and such uncertainty can be a powerful disincentive to making an allegation. Thus, the design of the “first link in the chain” is a crucial part of any system for dealing with misconduct.</p>   |                 |
|           | <i>Issues and Questions for Discussion by Workshop Participants:</i>  |                 |
|           | <p>Who is the first person/organisation to turn to with an allegation or suspicion? Is there a special office/officer who is located at/near the same venue as the person who suspects misconduct ? If so, does the person receiving the allegation have special expertise or training?</p> <p>Is the receiving office/officer at a level (e.g., dean of academic faculty, official of science ministry) that could discourage a student or other person who is in the lower ranks of the scientific hierarchy?</p> <p>Is there adequate information for the uninitiated potential accuser? Is there generally-accessible information on a web site, for instance, or via an anonymous hotline? Is there someone to consult with just with in the case of a mere suspicion, without certainty or definitive evidence?</p> |                 |
|           | <p>Are there requirements/restrictions on who can be accused (and be an accuser). Can anyone come forward with an allegation? Are there restrictions on substance (for example, work outside one’s academic field, work not published in a peer-reviewed journal, “opinion”-type work)? Does work need to be published, versus presented in a conference, or mentioned in a conversation?</p> <p>Does the system accept anonymous allegations?</p> <p>Is there the equivalent of a “Statute of limitations” on misconduct allegations?</p>  |                 |
|           | <p>What is the receiving person’s exact role and authority? Does he/she play a mediator role, or just decide the merits of the allegation?</p>  |                 |
|           | <p>How does the system dealing with frivolous or malicious accusations? Does bringing forward a false accusation itself constitute actionable misconduct, i.e., can the accuser become the accused?</p>   |                 |

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| <b>4b</b> | <b>Due Process and Fairness in an Investigation. Confidentiality versus Openness.</b>   | <b>45 mins.</b> |
|           | <i>Background</i>   |                 |
|           | <p>Questions of fairness and due process are particularly important when dealing with research misconduct, because the investigation process is a quasi-legal one; that is, it has many of the attributes of criminal or civil procedures, but is vastly reduced in complexity, and is meant to function on a greatly reduced time scale. Moreover, the penalties can be severe, amounting frequently to the destruction of a scientist's reputation and career.</p>  |                 |
|           | <i>Issues and Questions for Discussion by Workshop Participants:</i>  |                 |
|           | <p>What are the conditions and rules of confidentiality for accuser and accused. How can "whistleblowers" be protected without generating too many spurious/frivolous allegations?</p>  |                 |
|           | <p>What is the "standard of proof" in a misconduct investigation (e.g., preponderance of evidence? Proof beyond a reasonable doubt)? Is there a presumption of innocence? How can validity of the proceedings be ensured, given that the investigators may be prominent scientists, but legal amateurs? What if accused is doing "unpopular science" that draws the hostility of colleagues? In cases where intentional misconduct is hard to distinguish from unintentional carelessness, how do the investigators establish intent?</p> |                 |
|           | <p>How can the accused defend him/herself? Does he/she have access to documents, testimony? Can the accused confront accusers and witnesses? Can the accused have assistance, a lawyer (if so, who pays?) Does the accused have a right to question the composition of the investigating entity? In general, how do rights of accused compare to those in a criminal or civil proceeding?</p>   |                 |
|           | <p>What are the rights of appeal and review (by accuser or accused) at each step of the investigation? To whom is an appeal made?</p>   |                 |
|           | <p>Who gets notified of the progress of the investigation, and when? How much detail is provided (e.g., to the funding agency)? Can the agency provide feedback, suggestions, information? Can it play an even more active role during the investigation?</p>   |                 |
|           | <p>What are the conditions of access by journalists and the public to the outcomes and records of investigations. When are names named (those of the accuser and accused, plus other persons involved in the investigation)? Can suspect require that exoneration be published? How do requests for information relate to "sunshine" or freedom-of-information-type laws? Is it feasible to institute restrictions on speaking to journalists (a "gag order") during the investigation?</p>   |                 |

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| <b>4c</b> | <b>Misconduct in Collaborations (Including International Ones)</b>   | <b>45 mins.</b> |
|           | <i>Background</i>  |                 |
|           | <p>In the case of research collaborations, there is (in theory, at least) a potential for significant complications in investigating and punishing misconduct. The complications could be due to a lack of uniformity – or even contradictions – in the relevant factors. Among these factors are definitions of what constitutes actionable misconduct, rules and procedures for following up allegations, and the penalties that can be imposed. Questions of jurisdiction and authority can arise when more than one entity could investigate the same case. For example, how can investigators obtain needed/relevant testimony and data from a researcher from: (i) an unaffiliated institution that may be receiving funds from a different agency; (ii) an institution that is based in another country; (iii) a privately-owned research organisation?</p> |                 |
|           | <i>Issues and Questions for Discussion by Workshop Participants:</i>   |                 |
|           | How can misconduct be investigated at the local level when multiple institutions in a given country are involved?  |                 |
|           | What are the special challenges involved in dealing with misconduct in privately-funded research, and in public/private collaborations (NB it is acknowledged that the [principle preoccupation of the OECD workshop is with government-funded research)?  |                 |
|           | What is the evidence concerning the prevalence of misconduct in international collaborations? What are the qualitative and quantitative trends in this area?   |                 |
|           | Is there a need for further study of research misconduct in collaborations? Is there a need for international harmonisation of definitions, rules, and procedures? Should there be bi-lateral and multi-lateral agreements for cooperation in investigations of misconduct that transcends national and regional boundaries?   |                 |

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| <b>4d</b> | <b>Review and Evaluation of the System</b>   | <b>25 mins.</b> |
|           | <i>Issues and Questions for Discussion by Workshop Participants:</i>   |                 |
|           | Are there standards of performance of the misconduct handling system? Is there oversight and periodic review? Who participates in the reviews? Are there mechanisms for changing the system? |                 |
|           | Could/should the scientific community be an independent “watchdog” over the formal, government-sanctioned process?   |                 |

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| <b>Session 5</b> | <b>Preventing Misconduct, and Promoting Research Integrity</b>  | <b>2 hrs. 30 mins.</b> |
| <b>5a</b>        | <b>Causes and Contributing Factors</b>  | <b>1 hour</b>          |
|                  | <i>Background</i>   |                        |
|                  | <p>Many observers point out that each act of scientific misconduct is an instance of moral failure, where an individual makes an intentional choice to behave badly. The detailed examination and causal explication of any such act is inherently difficult, and must take into account the complex, unique circumstances of the act. Given identical circumstances, one scientist would commit misconduct, whereas a hundred others would not. Therefore, it can be (and has been) argued that it is pointless to seek causes and explanations, and that the most that can be said is that bad people will behave badly, and good people will behave well. A more moderate hypothesis is that some individuals have a propensity (or susceptibility) to misbehaviour, which can be aggravated (and lead to concrete acts of misconduct) by some of the factors listed below.</p> <p>On a practical level, the identification of causes and contributing factors leads naturally to a consideration of the corresponding remedies and preventative measures. These are subject of Session 5b.</p>  |                        |
|                  | <p><i>Issues and Questions for Discussion by Workshop Participants:</i></p> <p><i>To what extent do the causes and contributing factors enumerated below contribute significantly to the misconduct by scientists?:</i></p>   |                        |
|                  | <p>Factors relating primarily to individual researchers and their careers:</p> <ul style="list-style-type: none"> <li>- Pressure of severe competition for research funds.</li> <li>- Requirements to achieve significant positive results (and to publish extensively) in order to obtain and secure a staff position in a research institution.</li> </ul> <p>(NB. The two factors above are the ones most often cited by experts as the primary causes of misconduct)</p> <ul style="list-style-type: none"> <li>- Lack of knowledge/preparation about the realities and stresses of a scientific career.</li> <li>- Pressure to achieve a desired result in the case of sponsored applied research.</li> <li>- Assorted personal failings (e.g., a craving for fame, a desire to hurt colleagues, a general lack of moral rectitude)</li> </ul>   |                        |
|                  | <p>Factors relating primarily to the evolving nature of science and of the research enterprise:</p> <ul style="list-style-type: none"> <li>- The negative aspects of fragmentation, isolation and specialisation. In some scientific domains, researchers work for long periods without adequate contact or interaction with colleagues who would be in a position to scrutinise and review their results. This can result in the proliferation of “lone wolf” researchers who may lose their grip on proper standards of conduct. But it can occur in large collaborations as well, if the project brings together individuals from vastly different scientific domains, and it if collaborators do not adequately monitor one another’s work.</li> <li>- The proliferation of highly-specialised, custom-built scientific equipment that can only be meaningfully operated by one researcher, thus making it difficult to independently verify that measurements are untainted or, in the event of controversy, to reproduce any questionable measurements.</li> <li>- The ready availability of complex, opaque software for manipulating data (especially images) that make it possible to commit and conceal falsification and fabrication.</li> <li>- Lack of awareness of the rules and standards of correct scientific conduct, and of the investigative measures and punishments for misconduct that is exposed.</li> <li>- Misapplication of mission-oriented research paradigm (where concrete, usable results are expected in the relatively short term) to the traditional curiosity-driven research process.</li> <li>- Expectations from publishers (and funders) for positive, unambiguous and highly significant results for published (or sponsored) research.</li> </ul> |                        |

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| <b>5b</b>   | <b>Practical Remedies and Preventative Measures</b> | <b>1 hr. 30 mins.</b> |
| <i>Background</i>   |   |                       |
| <p>In the course of the expert interviews that were conducted by the GSF secretariat, a number of potential remedies were identified for lessening the prevalence of scientific misconduct. These are listed below, grouped, somewhat arbitrarily into four categories. There is a possible analogy to remedies that society uses to deal with criminality in general, in that there are two basic approaches that can be followed concurrently: (1) repression/deterrence; and (2) prevention. The first approach aims to exclude guilty individuals from the scientific community, thereby also deterring others by demonstrating the dire consequences of committing misconduct. The second approach focuses on the underlying systemic factors that can push susceptible individuals over the threshold of violating established scientific norms.</p>  |   |                       |
| <p><i>Issues and Questions for Discussion by Workshop Participants:</i></p> <p><i>Workshop participants are invited to consider whether the remedies listed below can be effective. They are also asked to describe other measures that are (or could be) useful. Participants may also wish to reflect on whether the design and implementation of practical measures could benefit from greater international harmonisation and cooperation.</i></p>  |   |                       |
| <p>Design and implementation of a formal system for dealing with allegations of scientific misconduct. The system should be tailored to local conditions and requirements, taking into account the factors that are the subject of discussion in Sessions 3 and 4 of the workshop.</p> <p>Making the results of each investigation widely known in the scientific community, as a deterrent to other similar occurrences of misconduct.</p>   |   |                       |
| <p>Adoption of definitions, standards, rules and codes of scientific conduct. These can cover three areas: (1) good scientific practice (e.g., experimental design, laboratory safety, error analysis, data curation); (2) traditional ethics issues (e.g., rights of human subjects, handling of experimental animals, philosophical/moral aspects of research in human reproductive biology, defence-related research); and (3) scientific misconduct as considered in this workshop.</p> <p>Taking steps to ensure the internalisation of the above rules and standards via carefully designed and implemented educational measures. Curriculum design is a key issue, as is the questions of <u>when</u> (at what stage of a scientific career) educational measures can be most effective.</p> <p>Instructing graduate students about the realities of a scientific career, including a realistic description of the pressures that can disrupt and destabilise the lives of postdocs and assistant professors.</p> <p>At the level of research institutions (e.g., university departments, large research laboratories) actively fostering open and frank discussion of misconduct-related matters. Promoting collegiality and networking among colleagues in an effort to discourage isolation of the type that can harm susceptible individuals ('lone wolf' scientists) and to clarify the collaborators' responsibilities within research collaborations.</p> |   |                       |
| <p>In hiring and promotion, reward quality of work rather than quantity of publications.</p> <p>To the extent possible, streamline, rationalise, and simplify the grant application and award system.</p>   |   |                       |
| <p>In scientific publishing (and in grant applications) adopt clear, uniform standards for:</p> <ul style="list-style-type: none"> <li>- authorship criteria for papers, including obligations of co-authors</li> <li>- allowable types of image processing in published images</li> <li>- requirements for making primary and secondary data available to the general scientific community.</li> <li>- conditions under which results will be published (i.e., with or without permission of the sponsor)</li> </ul> <p>More widespread use of computer-assisted tools (software) for detecting plagiarism in publications, proposals, reports, etc.</p>   |   |                       |