UNESCO Bangkok Consultation Workshop on Codes of Ethics in Engineering, Science and Technology

Venue: UNESCO Bangkok,
15-16 May, 2006

Workshop Report: Executive Summary.

Workshop Outcomes

The participants agreed that:

• There are a range of codes or guidelines in different associations and in different countries relating to engineering, science and technology, and there are some common elements. These can provide useful guidance to researchers, professionals, scientists and engineers, but these are not sufficient to ensure good conduct. Ethics education is even more important to ensure professional responsibility.

• To build capacity in the research community, any guidelines/codes should highlight education on ethics and professional responsibility across all ages, in many different learning environments, and at all stages of career development.

• For codes of conduct to be effective, the guideline/code should provide options for monitoring and sanctions.

• A regional or global code of conduct would be useful to address to governments, institutions, professional associations and universities, and scientists, and the participants agreed that it would be useful for UNESCO to explore common elements and a framework for such a code.

Workshop Statistics

Fifty participants representing a range of professions including: Science, Technology, Engineering, Architecture, Agriculture, Education, Government, Law, Nursing, Medicine, Social Science, and Philosophy attended the workshop. Participants were from 14 nations:

Australia,	Malaysia	Singapore	USA
Canada	New Zealand	Sri Lanka	Vietnam
Indonesia	Norway	Republic of Korea	
Japan	Romania	Thailand	

Main Discussion Topics

1. Mapping Existing Codes of Conduct in the Asia Pacific Region
2. Review of the 1974 UNESCO Recommendation on the Status of Scientific Workers
3. Publication Ethics and the Internet
4. Commercialization of Research Results
5. Scientific and Professional Responsibility
6. Intellectual Property Ethics and Free Trade
7. Ethics Education for Scientists, Technologists, and Engineers
8. Ethics in the Public and Private Sector
9. Implementation and Sanctions
10. Provisions for “whistleblowing”

The background presentations may be requested from RUSHSAP, UNESCO Bangkok. The agenda and participant list are available on the UNESCO Bangkok website: http://www.unescobkk.org/index.php?id=639

Workshop Report

Monday, 15 May

***Session 1*: *Ethical Codes of Science and Technology*.**

Prof. Darryl Macer (Regional Advisor in Social and Human Sciences for Asia and the Pacific, UNESCO Bangkok), workshop chair, opened the workshop with a presentation on UNESCO Programmes in Ethics of Science and Technology and Consultation Goals.

The workshop was linked to the recommendations of the 1999 World Conference on Science, and contextualized as a response to regional calls to examine the issue.

The workshop objectives were:
1) To generate a list of national, regional, and international codes of ethics in science, technology and engineering currently implemented,
2) To evaluate these codes and summarize their origins and evolution,
3) To cross-culturally review the UNESCO 1974 Recommendation on the Status of Scientific Researchers, and
4) Recommend to UNESCO and COMEST on the needs for codes of conduct for scientists, technologists and engineers, and their scope in topics and geographical alliances.

Prof. Warwick Anderson (Dean, Faculty of Life Sciences, Monash University, AUSTRALIA; from 7 June, Chief Executive Officer, National Health and Medical Research Council), presented the forthcoming Australian Code for the Responsible Conduct of Research.

The National Health & Medical Research Council (NHMRC) has been responsible for research in Australia for 40 years since being established by its own Act of Parliament. The forthcoming Australian Code for the Responsible Conduct of Research is being jointly developed by the NHMRC, the Australian Research Council (ARC), and the Australian Vice-Chancellors Committee (the council of Australian University Presidents). To date, two public-reviewed drafts of the code have been produced. The revised code will not be legislated, but adherence will be required via contracts between the NHMRC and ARC, and institutions in receipt of research funds. The current code targets the public sector, with the revision to include the private sector. The process of review and revision of the content of the code was presented.

The Australian Code for the Care and Use of Animals for Scientific Purposes, and the National Statement on Ethical Conduct of Research Involving Humans were also presented. Ongoing international consultation on these codes, and development through networks with UNESCO and other organizations was welcomed. It was noted that the code development process has a strong lay person representation, with additional input from wide research disciplines sought through The Australian Society for Humanities.

A legally endorsed independent committee has been established to address research misconduct.

Dr. Nadja Tollemache (Commissioner, NZAPEP Quality Commission Office, NEW ZEALAND; Member—World Commission on the Ethics of Science and Technology, COMEST) spoke on Codes of Ethics in New Zealand.

The 2003 revision of the Royal Society of New Zealand Code of Professional Standards and Ethics and the 2005 Institute of Professional Engineers of NZ Code of Ethics were the focus of the presentation. For codes to be effective in controlling the conduct of those bound by the code and in instilling a feeling of trust in the public, they must be available to the wider community. In addition a clear and transparent process for addressing complaints and applying sanctions is required.

The need for ethics education for scientists, technologists and engineers, as well as the general public was highlighted. Unfortunately research in New Zealand has shown that ethics academics may not be fully abreast of the specific codes of conduct.

The New Zealand Institute of Food Science and Technology code's provision for advocates or "buddies" to advise and, if requested, support individuals who make an ethical stand vis-à-vis an employer or other influential person was suggested as a possible model, particularly in the case of young or inexperienced professionals. As a statutory authority gives support in such whistle blowing situations, it was concluded that effective codes of ethics require the credibility of legal or at least influential sectoral, backing.

Other codes presented include;

- The Code of Ethical Conduct under the Animal Welfare Act 1999 enforcing institutional Code of Ethical Conduct and an Animal Ethics Committees.
- The Ethics Code of the New Zealand Institute of Agricultural and Horticultural Science.
- The mandatory New Zealand Institute of Medical Laboratory Science (NZIMLS) Code of Ethics.
- The Code of the New Zealand Institute of Food Science and Technology (addresses conflicting loyalties).

Dr. Somsak Chunharas (Secretary General, National Health Foundation, THAILAND; Member—COMEST), gave Reflections on the Feasibility of Codes of Ethics in Science and Engineering in Thailand.

In Thailand "professional laws" attempt to ensure quality of education, personal conduct, and service standards (licensing and investigation of misconducts) rather than guide ethical conduct. And where personal conduct is governed it is generally with in the services provision industry as opposed to research. For example, engineers follow ethical conduct guidelines to ensure safety of clients and the public, but the codes do not cover research ethics. Teachers have educational standards, while architects are meant to keep good quality standards. Other than debate on bio-safety concerns, scientists have not yet been discussed.

In the 1990's the Ministry of Public Health attempted to pass a law to administer the research sector. There was great resistance from medical and clinical schools, especially on the issue of centralization: they were concerned about the possibility of manipulation and unethical conduct by the central committee.

The National Research Council drafted guidelines on fair treatment on animals, but they have not been disseminated or enforced as they were considered a lower priority for research oversight. There have also been inconclusive government discussions on GMO and stem cell research. The concept of stewardship had been discussed in the National Research Council with linkage to WHO, in order to strengthen the national health functions. Dr. Chunharas concluded that work with the media to develop ethical science was necessary. In discussion, there was consideration of ethical oversight of new surgical procedures, benefit sharing, and interactions with the private sector.

Dr. Amru Nazif (Secretary, National Bioethics Committee, INDONESIA; Indonesian Institute of Science (LIDI)), spoke on Codes of Ethics in Indonesia.

In Indonesia, all scientific fields have their own organizations, from anthropology to mining and engineering, which adopt codes of ethics included in their respective statutes. Codes of ethics are usually not considered as recipes for decision-making, but as considerations to bear in mind—an ethical framework rather than specific solutions. Adherence to them is prerequisite to membership of the professional organizations.

Indonesian scientists promote the issue of biodiversity as a bioethical concern; threats to biodiversity include population pressure, unsustainable logging, and others. The commitments under the Rio Summit of 1992 overrode other codes of ethics such that those using the environment should conserve as much biodiversity as possible to slow the loss of primary forests; to expand data and information; and to foster utilization of biological resources. The issue is not so much to focus on illegal and unethical logging, but to recognize that it is an unethical practice of *science and engineering*.

In the following discussion, the participants unanimously called upon UNESCO to continue work on environmental ethics, as had been discussed during the consultations on the Universal Declaration on Bioethics and Human Rights. There was also discussion of local communities embodying the lifestyle and traditional knowledge concept, and the participants called upon UNESCO and the World Intellectual Property Organization (WIPO) to be more active in this regard. The Convention on Biological Diversity (CBD) group working on Article 8(j) to agree upon ethical principles for these issues was suggested as a starting point as they have been in the discussion stage for over a decade.

Following each presentation, there was discussion with a focus on mapping existing codes of ethics and conduct relating to engineering and science in the South East Asian and Oceania region.

***Session 2*: *Discussion and Review of the 1974 Recommendation on the Status of Scientific Researchers*.**

Prof. Song Sang-Yong (SOUTH KOREA; Vice-Chair, COMEST) gave Reflections on the 1974 Recommendation and International Codes of Ethics.

The theoretical foundation for the presentation was based on how the traditional view of science, with the norms of 'objectivity' and 'disinterestedness', had shifted since the 1970s. The UNESCO recommendations should reflect this changing concept of science. The two cultures of C.P. Snow and post-modern understandings of science were discussed. The change in emphasis from rights to responsibility of scientists was also noted: the Standing Committee on the Freedom in the Conduct of Science (SCFCS) in 1963 had focused on the freedom of science and the rights of scientists, whereas from 1996 to 2002, the focus was on the social responsibility of scientists and the ethics of science.

Prof. Song called for the inclusion of animal rights, animal welfare, and the concept of sustainable development to be added to the recommendations. The bioethical issues should be a top priority, even though the questions of military research remain very important and sensitive. Some ethical codes should address new problems such as privacy, alienation, cyber crimes, inequality driven by the internet, and international security. The inclusion of the precautionary principle was also suggested as misconduct cases have caused public anxiety concerning research integrity. Prof. Song also called for inclusion of gender concerns, and guidelines against any form of discrimination. Ethics education was noted as a priority area for COMEST.

In the discussion, participants agreed that this presentation and accompanying paper offered important points for UNESCO to address. In addition to educating science students about ethics, there is also a need to teach basic science to those who will not be scientists to facilitate understanding and trust. The stereotype that science has nothing to do with society was reinforced as fallacious. Training to connect science and society was supported; for that, education in humanities and social science is important, and education in science, technology, and society (STS) in interdisciplinary fields is essential.

The participants noted that since the 1974 document had been accepted by the member states, any future revision could be politically difficult. It is, however, important to assess what is missing. The 1974 document is a progressive document for those times, but it omitted issues of women and science. In the 1974 document, the scientist is always a "he"; throughout the document, "mankind" must be changed to "humankind". The lack of public trust is an important issue.

Dr. Siti Nurani Mohd Nor (Dept of Science and Technology Studies, University of Malaya, MALASIA) talked on Philosophical and Practical Reflections from Malaysian Science.

The national policy on S&T in Malaysia, which sets out broad objectives for science, was presented. Scientists rank among the top professions that Malaysians trust. Some cultural issues were discussed regarding the universality of codes. For example, the giving of gifts for research partners is not coercion in many developing countries: it is custom. The religious implications of bioethics were presented within the context of

the human genome. In Malaysia, religions groups have agreed that alterations to the human genome interfere with the heritage of God. Although the religious leaders all opposed reproductive human cloning, organ transplant was supported as an act of charity. It was noted that an integrated ethics course (12 credits in addition to 108 in science; the courses are taught by science professors) is compulsory in the science degree at the University of Malaya.

Dr Chan Chee Khoon commented that the Malaysian government does not appear to have a monolithic policy in science and technological development, maintaining instead a flexible balance between needs-driven research (e.g. as a founding partner of the Drugs for Neglected Diseases Initiative, DNDi; invoking TRIPS flexibilities for compulsory licensing of essential medicines), and market-driven research for product development (incentives for the commercialization of patents arising from publicly-funded research).

There was broad support for the initiatives Dr. Siti described in education of ethical issues in science in Malaysia, with calls for UNESCO to help in the teaching of ethics across the region, as well as in developed integrated curriculum for including ethics across all subjects in science and technology.

Dr. M.C.N. Jayasuriya (Director, National Science Foundation, SRI LANKA) described how senior scientists in the community came up with A Guidebook on Research Ethics, published by the National Science and Technology Commission (see electronic copy).

The Guidebook covered a number of issues and commitments that scientists should make. The National Science Foundation in Sri Lanka is in the process of training school students on general ethics, as all students require an ethical foundation to become good citizens. Dr. Jayasuriya expressed his concern about the increasing reproductive technology "shops" in Sri Lanka which is a serious ethical concern to the medical services industry.

The rise in the use of personal websites by biomedical researchers challenges controls on **publication ethics**, as the content does not go through peer review. Thus the term "dissemination of knowledge" is more appropriate than "publication" (in its traditional sense) for the way research results are now distributed. It was also noted that in conventional journals results can only be published once, but the internet allows the publication of the same information in multiple places. Questions were raised on the contribution required by researchers to be listed as an author on papers, particularly the inclusion of the head of department as an automatic last author. It was noted that the traditional research journals still play an important role in the research community as the citation index is still being used to measure scientific output. Although there is a general concern on the credibility of the information available on the internet, participants acknowledged that there are some credible internet journals that are as good as mainstream hard copy journals.

The discussion also validated the suggestion that the digital divide is growing, because, just as in the past developing countries could not get hard copies of journals, due to expensive subscription fees now they are not privy to electronic copies. Meanwhile, researchers in richer countries can instantly access digitized journals that were previously in only central locations.

The legal perspective of patenting research results was discussed. It was agreed that the patent developer should have rights to the patent, but the same owner should have a responsibility to publish freely. It was noted that in many countries, a criteria for patenting is that the information cannot be made available to the public. Dr. Paul Teng used the term "scientific constipation" to describe cases where information was blocked from public view for years to ensure patents grants, which created a waste of funds in establishing the same knowledge. There was agreement on a responsibility to publish appropriate research results. The issue of who decides what is appropriate was discussed within the example of military research, which has traditionally claimed privacy protection from public dissemination. This area of publication ethics remains controversial.

Dr. Graeme Bristol noted that publication and patent issues are not uniform across all disciplines, using the example of architecture, where publications are primarily picture books and magazines.

The ethical issues evolving from public and private funding of research was raised. Dr. Chan Chee Khoon mentioned that since the 1974 recommendation we have shifted from a reliance on government to a larger contribution by the private sector for research funding. In the example of clinical trials, with public funding there is an obligation to publish; but contractual agreements between researchers and private organizations can include restrictions on the distribution of results. In market-driven economies, the only scrutiny is the stock exchange. The underlying ethical issue is: Should the scientist under contract be bound by public ethics? Dr. Warwick Anderson mentioned that the Australian code requires scientists to maintain public research ethics. It was noted that in Thailand most of biomedical research is reliant on private sector funding, and in the case of Mahidol University, a clause has been included in contracts leaving the discretion of publication with the researcher as opposed to the funding group. This was a result of positive pressure from medical journals' editorial policies, and preserves some scientific ethics in publication rights. Prof. Watanalai Panbangred gave a Thai example of how sponsors had asked her to delete some results when writing a paper. Dr. Pakapun Skunmun highlighted the role of the Thailand Research Fund (TRF) in promoting the publication of science.

Another component of "dissemination of knowledge" with ethical consequences is feedback to the participants in the research. This was contextualized in examples of people being subjected to research without their consent, and in an anecdote from Sri Lanka, without their knowledge. Dr. Tollemache noted that in New Zealand part of funding and ethical approval applications require participants to be notified of the outcomes of the research. All workshop participants agreed that there is a responsibility to share information with participants, and international sanctions should be in place to stop such human rights violations as were described in Sri Lanka.

Dr. Mattias Kaiser reported that government discussions at the 1999 World Conference on Science also addressed the issues of publication, patent and public versus private funding. It is important to apply universal standards in order to enforce the checks and balances for scientists through the accountability of governments. Without these frameworks it will be difficult to have ethical research in science, technology and engineering. However it can not be denied that while one statement on

ethics of science may attempt to cover all, there are many practical issues for those in different sectors.

The discussion moved onto the issues of **commercialization**. Some important biological discoveries were delayed some years due to patents, as discussed above. In Singapore, funds are industry driven but actually from the government. Among the workshop participants, less than ten persons said they had actually done research for private companies. More robust ethical principles could assist privately funded scientists in dealing with issues such as conflicts between the researcher and the funding group on the publication of results. Binding contractual agreements at the outset of research between the parties can clarify this. Dr. Watanalai Panbangred noted that researchers were at a disadvantage in negotiating contracts with large, multinational companies as they are unable to acquire suitable legal representation. There was a call for fairness to all, with Dr. Tom Gionis suggesting UNESCO could coordinate an ad hoc advisory body to support researchers in legal and ethical issues. Dr. Miyako Takagi mentioned that there was controversy in Japan regarding the large number of venture capital companies that arose as a result of government-funded research from tax revenues.

There was discussion of several examples of international partnership with Intellectual Property Rights (IPRs). While exclusivity is a problem, the publication delays in Asia are not excusable. Drug resistance is one example, and the delay of research publication indirectly tolerates a large number of deaths of regional inhabitants. Even if the discoveries are eventually made public after patents are awarded, there is also the issue of access to affordable patented drugs. A regional study of the impact of commercialization that would include qualitative case descriptions as well as quantitative research context was encouraged. As scientists in Asia are in a situation of dependency, a normative ethical instrument addressing these concerns was suggested. There was a call to develop codes of ethics on intellectual property (IP), and to implement the 2002 recommendations of the UNESCO IBC report on Ethics, Intellectual Property and Genomics.

Regarding the question on whether ethical standards inside companies are lower than in academia, it was noted that the potential financial and business cost of inaccurate or unethical research to companies is great. These factors are significant drivers for ethical science. In Universities, the consequences of ethical breaches are based in damaged reputations.

Several issues of **professional and scientific responsibility** were discussed. There is a perception that the use of science is less ethical in the military, and an assumption that some research is attributed to “defense” to bypass standard ethical checks. Other examples of potential violations of professional or scientific responsibility discussed were the use of pesticides, and handling of data. Dr. Miyako Takagi flagged the rapidly advancing field of neuroscience as an area where potentially ethical concerns may need to be addressed. Dr. Amru Nazif suggested the use of an ethical matrix, with roles and stakeholders versus the ethical principles (which could be those in the Universal Declaration on Bioethics and Human Rights) to solve moral dilemmas over the responsibility of scientists. Dr. Jayasuriya noted that there may be a role for the media to play in both the public and private sectors as journalists raise awareness which can benefit people.

The workshop agreed that ethical codes should inform future generations through the context of the **teaching of ethics**. Education is a primary source for humankind to maintain dignity, and is supported by all religions. Teachers need to teach professionals what to do as well as how to do it in the context of their professional life. With teaching of environmental ethics, it was considered important to introduce learners to a range of world views. There was also a call to teach ethics to politicians. UNESCO could continue to collect cases and examples of ethics materials, with examples of good and bad practices, as a regional and global contribution. The ongoing text/resource book project of UNESCO Bangkok was applauded, and more chapters should be added to broaden the coverage of chapters. Dr. Jackie Street mentioned that it is not sufficient to teach students ethics, ongoing professional development is required. There is also a need to develop courses for graduate students, as they are going to do thesis research. Dr. Warwick Anderson noted that most working early career scientists learn from the ethics of those around them. Participants highlighted the importance of ongoing professional development.

Dr. Graeme Bristol mentioned that there was limited awareness of ethics codes and laws in university students taking his courses, and that in teaching a particular code the inadequacies should be identified. Part of the architecture ethics course allows students to see the role of ethics in building and design by visiting slum areas around Bangkok and discussing the consequences of city development. The relationship between human rights and architecture was presented. This practical approach to teaching ethics highlighted the general workshop view that students have to realize ethics themselves.

Dr. Siti described how a problem-based teaching style is used in the University of Malaya: students visit laboratories related to their field to assess practical issues. Dr. Teng noted that science teachers for Singapore schools are required to complete a course on science and society. Dr. Juraporn Pongwecharak (Prince of Songkla University, Thailand) uses movies to teach ethics. UNESCO could nurture such models and adopt the idea of the Third World Academy of Science, which promotes awards from a national level in order to train ethics teachers. There was also support for the UNESCO Bangkok initiatives to work on ethics displays in museums, and to work with science educators.

Tuesday, 16 May

Session 3*: *Implementation and Practicality of Ethical and Professional Codes.

Prof. Paul Piang-Siong Teng (National Institute of Education, Nanyang Technological University, SINGAPORE) presented Codes of Ethics, Communication, and Genetically Modified Plants.

The Bioethics Advisory Committee (BAC) was appointed by the Cabinet in December 2000 to develop Singapore's bioethics framework for biomedical research. It aims to provide the public with information on key biomedical research areas such as stem cells and cloning, and their related ethical, legal, and social issues. In Singapore there is no overriding code of ethics for all sciences or technologies; rather, ethics oversight is provided by specific government/academic entities, including: Genetic Modification Advisory Committee (GMAC); Agri-Food & Veterinary Authority (AVA); Institution Animal Care and Use Committees (IACUC); and Institutional Biosafety Committees (IBC). The Biosafety Act and Animal Protection Act were also approved in the past few months.

Prof. Teng emphasized the role of risk communication as an approach developed to deal with situations where uncertainty, suspicion, and even fear has been created in people's minds about an issue or technology. It is a set of tools based on scientific, empirical research to provide more targeted, understandable, and effective communication without inadvertently provoking hostility and mistrust. It can provide skills for those who need to communicate in low-trust, high-concern, and controversy-laden situations**.** Risk communication theories were discussed, including the trust determination theory; risk perception theory; mental noise theory; and negative dominance theory. The trust determination theory proposes techniques on how to "win" another person's trust in order for one's views to be accepted. As stated by Dr. Teng, "People need to know that you care before they care about what you know!" The risk perception theory increases effective communication by minimizing the perception of risk as a factor that reduces trust and acceptance by another person. Dr. Teng: "When people feel there is no risk, they are more likely to accept something new." The mental noise theory crafts messages in simple ways that people under stress can readily accept. Dr. Teng: "When people are stressed, they miss 80% of incoming messages and only accept simple language which is repeated." The negative dominance theory teaches how to avoid negativity in your communication. Dr. Teng: "When people are upset or stressed, they tend to put more weight on negative information." The media and government use different theories for communication.

In general discussion, tobacco advertising was given as an example of a risk linked to, in this case, sex appeal. Another example of skiing was used to illustrate how risk can be countered by the allure of adventure. These communication techniques modify risk perceptions. The modification of risk through communication can influence people, and can be used for good or bad. In this context the public perception and science behind GMOs were discussed.

Dr. Thomas A. Gionis (St. Thomas University of Law, USA) contributed a paper on Violations of Human Subjects Protection.

Dr. Gionis has professional experience in both the profit and not-for profit sector. The origin of the Joint Study Committee on Clinical Research Ethics was presented. Examples of the transition of clinical research into big business were given from the USA with significant funding from both the National Institute of Health (NIH) and private companies. The oversight of protection of human subjects was discussed, given that there are insufficient funds allocated to the monitoring of research ethics. The Food and Drug Authority (FDA) has acknowledged it's lack of awareness of the amount of Institutional Review Boards (IRB) currently active in the US. The average IRB meets for 2.5 hours and reviews so many applications that questions are raised over the quality of review. While the FDA performs some site visits, the other oversight body, Office of Human Research Protection (OHRP), mainly completes phone and paper reviews of research practices. There have been multiple ethical lapses in all countries, which argues for better monitoring of ethics review. The Joint Study committee has examined the violations of human subject protection in 503 letters between institutions and OHRP; a total of 3,150 violations were reviewed in this study. The types of violation were analyzed and presented; the research presented noted that the most common type of violation of human subject protection consisted of insufficient informed consent.

In general discussion, there was a call for funding organizations to take more responsibility for paying for ethical review oversight, in order to enhance the quality of research and to maintain human dignity and the protection of human research subjects. Workshop participants felt that the results presented for the US are probably indicative of the situation in other countries. Although under no government body to accredit them, private IRBs are appearing, resulting in variations in quality.

Prof. Paungphen Choohapran (Faculty of Nursing, Chulalongkorn University, THAILAND) talked on Professional Nursing Ethics Principles and Practice, to give a practical picture from inside clinical practice in Thailand.

Prof. Paungphen prefaced her presentation with the contention that nursing care is the most important care given to a person. Professional nursing ethics guidelines in Thailand have been revised several times (1955, 1979, 1987, 2005). There were eleven principles of ethics of professional nursing outlined in her presentation. Practical illustrations were used, for example, confidentiality to protect women with HIV was needed, to avoid being ostracized from the family. In October 1974, during violent clashes between police and students in Bangkok, Prof. Paungphen recollected how, as head nurse at the Intensive Care Unit (ICU) in Police Hospital, she lied to the police to protect injured students who would have been arrested and thus unable to receive medical care.

The ethics of health care funding that has resulted in the same nurse to patient ratio that existed 50 years ago (3:60) was discussed, with attention drawn to under utilization of the political strength of the nursing council in Thailand. Nurses also have to counter social misunderstandings and misleading pharmaceutical adverts with concerned patients. Ethnicity, stigmatization and lack of understanding of elderly patients are important issues for communication in Thai hospitals. Beyond the clinical

ethics, other issues, such as use of disposable equipment which pollute the environment, were also raised.

In general discussion, the divide between private and public care was raised. Labour shortages in public hospitals are contributed to by lack of funding and nearly across the board retirement by nurses at age 50. Dr. Suthin Nophaket from the National Human Rights Commission queried the rate of human rights violations in medicine in Thailand. Dr. Choonhapran replied that the multiple layers of management and supervision resulted in tough regulations that limit such violations. Dr. Wasinee Wisesrith added that nursing schools have developed intensive graduate courses in ethics, which address sensitive issues such as palliative care, end of life care, and spiritual care.

Education in human rights and ethics was commended as areas to develop. The challenge of embedding ethics in the hearts of students rather than just teaching with books was raised.

A call was made for the construction industry to protect the rights of manual labourers, as many construction workers are hospitalized due to fall from buildings, electric shocks from welding, iron and wood splinters in eyes, etc. There are additional ethical issues as many of the workers are migrants.

Dr. Matthias Kaiser (National Committee for Research Ethics in Science, NORWAY) contributed a paper entitled, "From rights to responsibility of science: Comments from Norway, with a focus on the new Norwegian ethical guidelines."

The proceedings of the World Conference of Science, held in Budapest in 1999 were presented. The consultation at the Conference on an Oath for Scientists and the drafting process of the declaration was discussed. It was agreed that ethics and responsibility should remain central to the declaration, but an Oath was not adopted. The Conference called for COMEST, in co-operation with ICSU's Standing Committee on responsibility and Ethics in Science (SCRES), to work for follow-up. Dr. Kaiser then described the SCRES study of 115 documents, discussing aspects of individual and community responsibility.

The Norwegian situation was reviewed, where the goal was an overriding ethics code. In the Norwegian guidelines (electronic file available), science is committed to securing peace. Examples of misconduct, issues of alternative knowledge and traditional knowledge, whistle blowing, contract research, and giving credit to scientists who popularize science were discussed. There was positive support from the workshop participants to use of the proposed Norwegian oath when obtaining a PhD. Dr. Darryl Macer suggested the oath could be taken at Bachelors degree level based on the impetus that the Sarin gas attack created in including ethics in Japanese general science degrees.

Dr. Ioan Voicu mentioned that as codes were often inspired by public international law they may not always reflect community values. This could result in codes not being based in reality, thus limiting their practicality. He suggested, for example, respect for nature to be included in ethical guidelines as the UN listed it as one of it's six fundamental pillars. There was also discussion of solidarity. Popularization of

science is important to attract good students to sciences, instead of the recent trends towards business studies.

Dr. Supot Teachavorasinskun (Associate Dean, Faculty of Engineering, Chulalongkorn University, THAILAND) talked on Codes of Ethics in Engineering.

Many types of engineering were introduced including Chemical, Civil, Computer, Electrical, Environmental, Industrial, Mechanical, Metallurgical, Mining, Nuclear, and Water Resources. In Thailand, there are different councils controlling each specific area particularly through the granting of engineering licenses. Although there are many ethical issues, the principle difficulty is conflict of interest in questions of safety versus cost. Dr. Supot discussed the Council of Engineering, and the Engineering Institute of Thailand, that have produced a preliminary code of ethics. Engineering curriculum at university level is controlled, but there are no ethics courses currently in the curriculum, with no mention of ethics in course syllabi. The materials used in class are very teacher dependent. There is a motto, however, that students with good ethics will be engineers with good ethics. Comments on case studies were starting to be used, and the Engineer community welcomes assistance in integrating ethics into the curriculum. In discussion, it was noted that social responsibility is not just by law but by heart.

Dr. Suchinda Chotipanich (Deputy Permanent Secretary, Ministry of Science and Technology (MOST), THAILAND) talked on Follow-up to the Bangkok Declaration on Ethics in Science and Technology.

The workshop participants were reminded that the Declaration that arose from the Ministerial meeting at the Fourth Session of COMEST, agreed on the following principles:

1. To enhance S&T co-operation, which emphasizes fair trade over free trade;
2. To develop co-operation in intellectual property (IP), which aims to benefits humanity over commercial interests, especially in the least developed countries that have less ability to access IP;
3. To promote the role of youth in S&T to encourage early career scientist's professional development; and
4. To urge mutual understanding of the importance of ethics in emerging technology (such as nanotechnology, radiation, satellite, biotechnology, and human organ replacement) based on public understanding, and due care for the impacts of technology.

Dr. Suchinda presented examples of the work of MOST in meeting these objectives, especially with regard to helping rural and poor communities share in the benefits of science and technology. The plans for regional outreach were being developed in discussion with UNESCO and other countries. Youth camps are also being held to help promote the role of youth in S&T, where students study ethics at the same time as learning science. MOST urges mutual understanding of the importance of ethical standards and steadfast development of technology. Examples of such developments include research reactors, rice genome, satellites, and biotechnology. Dr. Darryl Macer thanked MOST for the ongoing collaboration with UNESCO, growing out of the cooperation in hosting the Fourth Session of COMEST in Bangkok in March 2005.

There was general discussion on the comparison of fair trade and free trade. It was noted that it is difficult to satisfy both fair and free conditions for trade. Thailand has a particular interest in these issues within the region. Respect for dignity in trade is important to avoid advantage being taken of smaller world players and developing nations. Dr. Macer gave some examples of ethics guidelines being used by some rich countries as trade barriers with the developing world. Awareness of cheap imports (coffee production discussed as an example), and the ethics of their production which may exploit workers and compromise safety, is recommended. While ethics guidelines are important, they must be culturally appropriate and applied fairly in solidarity with people across the world.

Dr. Pakapun Skunmun reinforced the difficult nature of discussions about ethics in trade due to the diverse issues involved, but as Thailand signed bilateral free trade agreements with developed countries, we should wonder whether it is *fair* trade. It affects the people in Thailand, especially given that 60% of people are involved in agriculture

Session 4: General discussion

Dr. Somsak Chunharas suggested there are at least three different approaches to making ethical issues more relevant to scientists. A top-down approach would be an overriding code of ethics that scientists could follow. An alternative approach is the creation of an enabling environment with a focus on capacity building. When we talk of ethics, we are generally talking about principles and standards. The dimension of the system has a lot to do with practice, thus scientists have to deal with these issues. The third approach is access to S&T. A framework for ethical conduct in science, technology and engineering was endorsed.

Indeed, the Bangkok COMEST consultation witnessed a tension (dialectic) between a perspective on ethics which fore-grounded the individual and her/his responsibility ("the morally culpable sentient individual/professional"), and a perspective which gave due regard to an "enabling environment" for ethical behavior. Graeme Bristol offered an inspiring notion of the "extended responsibility" of the professional (e.g. the responsibility of architects and engineers to anticipate the likely social and ecological consequences of their practice norms and milieu, etc), but some participants nonetheless felt that the onus should not be solely or largely an individual responsibility. CK Chan acknowledged that “individual effort and acts of conscience undoubtedly can make an important difference in many instances, but too often, it is progress achieved despite the system, not because of the system. It's not unreasonable to tweak the system to make it more ethics-friendly. Hence, I think COMEST should also address the institutional and systemic contexts for individual choices, and embrace a more "embedded" ethics which encompasses the ethical consequences of the operations of institutions and systems. In the area of health systems, a fusion of the social ecology of health and disease (social epidemiology), together with ecologically-responsible human rights, is the substantive content of what might be called public health ethics”.

“What does this mean concretely? Some proposals have emerged, e.g. from the numerous task forces and commissions (WHO, Nuffield, UK DfID-Barton commission, MSF-DNDi, etc), in the area of intellectual property regimes, in relation to developmental priorities and human needs - a greater role for public production and

ownership of intellectual property (plus nonexclusive licensing), alternative reward systems for researchers and inventors, viable business models for open access publishing (PLoS, BioMed Central, Bioline, wikipedia, etc), patent pooling to get around serious obstacles to follow-on research, open access software (e.g. Linux). These are feasible and working alternatives which can get avoid some of the serious deficiencies of mainstream IP regimes, which these commissions were convened to address".

Science ethics needs to include the benefit of all people. Dr. Amru Nazif discussed the concept of monitoring of greenhouse gases and how G77 and ASEAN said this was a new added cost to development. Despite 14 years since Rio, there are no clear new funding sources to cover these additional costs. Dr. Alongkorn Laowngam gave some information about the technology being developed by MOST, which was close to real people's lives and helping in rural areas.

Dr. Tran Han Giang described practices and surveys being conducted in Vietnam among many companies. Some issues included: no forced labour; no child labour; right to organize; collective bargaining; no excess working hours; and health and safety. There was improvement in the results of surveys and interviews with workers between 2002 and 2006. The 2002 violation of codes of conduct was used by FNV, a Netherlands Trade Union, to report these results to the International Confederation of Free Trade Unions, and put it on the internet. In 2006, when she revisited the factories and made a comparison, the working conditions had improved. This was an example of the role that codes of ethics can play in technology and industry, and how international codes were important to protect people. Dr. Suthin Nophaket called for networking of human rights. Consumer complaints were identified as crucial steps in stopping abuse of human rights.

Dr. Graeme Bristol used the example of construction workers to reinforce the need to do something to protect the rights of workers. Some construction workers in the developing world are housed in conditions less than the UN accepts for refugees, can work 15 hour days with little or no training, in dangerous conditions, and for very low wages. As an architect, he proposed that not insisting on adequate conditions for sites under his supervision would be professional and ethically negligent. In these issues, the consumer is well downstream, whereas in the examples of companies that make or sell products, the consumer is directly in contact.

Sanctions could be part of a code if an association adopts it. Dr. Jayasuriya mentioned that as a funding agency NSF, Sri Lanka, has the options of "punishing" ethical violations by making the grantees "defaulters" or making them no longer eligible for grants. The most common default on the current Sri Lankan code that the NSF deals with is researchers not supplying a final project report on time. Dr. Kaiser endorsed making examples good standards and practices rather than publicly sanctioning defaulters as a more effective means of securing compliance. If the scientific community adopts a code, then those acting outside of this framework are easily identified as "bad scientists".

Dr. Nadja Tollemache pointed out that it is important to distinguish between different professional associations' codes of ethics and guidelines. These codes vary in the features and extent to which they hold members accountable, with internally agreed upon injunctions for violations specific to the association in question. Guidelines can

be positive in terms of making recommendations on how professionals should act. In Thailand, a risk management committee works in the hospital to oversee the treatment of patients and potential risks that they may face.

The provision for whistleblowers is also important. Procedures need to be developed to deal with whistle blowing fairly and accurately. A lot of analysis has gone into this area.

Dr. Jayasuriya mentioned that the National Science Foundation in Sri Lanka has identified the need for penalties for the defaulters, but has also taken into account methods for identification of "good scientists". The Foundation has a scheme to reward the people who do well, by encouraging (financial support through national awards) the publication of research results booklets and technology transfer.

Prof. Song highlighted the useful comments in the Delhi meeting report where participants agreed that we need a code of ethics. Workshop participants unanimously agreed that a common document on ethics would be useful. It should set a standard, and act as a checklist. There were, however, discussions on whether it should be called a guideline, code, oath, or pledge. There was also consensus that education for students and as professional development should be a focus of the code. Popularizing research also means sourcing funds for post-research review.

Conclusions of the meeting were given by Dr. Darryl Macer, UNESCO Bangkok, who thanked everyone for participating. He described how there was expressed need for both descriptive and prescriptive approaches to codes of ethics. Model guidelines might be possible after more documents were mapped. In response to calls from member states UNESCO Bangkok and Paris are currently working on the important task of mapping codes. As participants have stated, the 1974 document is a recommendation rather than a code of ethics. Any follow-up should be developed with the National Commissions to UNESCO in the region, and the COMEST committee. The participants supported UNESCO's initiatives in this area as being very relevant to the regional needs. Dr. Macer said that the feedback given in the workshop had been very useful for the work of the Division of Ethics of Science and Technology and the regional programmes out of UNESCO Bangkok, and UNESCO would try to meet the needs expressed by the participants by continuing collaborations.