International Conference on

Emerging Ethical Issues in Science and Technology

organized in collaboration with
the Slovak Commission for UNESCO and UNIDO

30-31 May 2013
Bratislava, Slovak Republic

Summary Report
INTRODUCTION

After its 8th Ordinary Session on 27-29 May 2013, which was the first to be held in Eastern Europe, the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), in conjunction with the Slovak National Commission for UNESCO and UNIDO, organized a follow-up conference on Emerging Ethical Issues in Science and Technology.

On the basis of the past work of COMEST and its partners, the conference reflected on state-of-the-art issues in science and technology, namely: a) nanotechnology for development, b) nanotechnology applications in water, c) nanotechnologies and converging technologies, d) ethics of the information society, and e) scientific responsibility. The conference did not only discuss ethical and social challenges in the field, but also examined how new technologies can contribute to sustainable development.

Participants included COMEST members, experts from the UNESCO secretariat, the International Hydrological Programme (IHP) and the United Nations Industrial Development Organization (UNIDO), and local experts.

The organization of the conference was made possible by the support and collaboration of the Slovak Commission for UNESCO.

While the conference was divided into a series of autonomous sessions, each with a specific thematic focus, it was nonetheless unified by a shared perspective on the transformative impact of science and technology. Ethics of science and technology in the 21st century cannot be just a matter of applying consensual and timeless principles to practical issues that might to some extent be new. There is a deeper and more challenging need to consider the ways in which changes in science and technology, and the social changes to which they are connected, require critical review of established principles.

The point is not – or not necessarily – to abandon the legacy of science ethics as framed in the past 50 years, ultimately in response to article 27 of the Universal Declaration of Human Rights. On the contrary, the basic values internal to the scientific process (such as integrity) and external to it (such as the emphasis on human benefits) are as valid today as they ever were. But they may not have exactly the same meaning in the contemporary context, and more importantly taking them seriously may not have the same practical implications. Furthermore, some issues are new, and some of them might require the gradual extension or refinement of established principles – or even the development of new ones.

The various sessions of the conference deliberately considered complementary aspects of one major area in which new issues are undoubtedly in evidence: converging technologies at the level of the fundamental constituents of matter, life and information. Discussing nanotechnologies, information technologies and robotics within the same conference offered a valuable opportunity to assess the ethical relevance of the convergence paradigm, while also drawing out some of its implications, particularly in light of the imperatives of mobilizing science and technology for sustainable development.
In addition, convergence is not an isolated trend. It is intimately connected with other developments, some of which contribute directly to driving it, such as modified and in some ways more pervasive military and security agendas. Convergence is thus both a conceptual and a practical challenge for a vision of science ethically grounded in the human right to in share scientific advancement and its benefits.

CONFERENCE SESSIONS

A) Nanotechnology for development

The session aimed at examining the contributions of nanotechnology to development. Experts participating in the session focused on discussing the following sub-set of issues: a) the use of nanotechnology for development, b) the potential of nanotechnology to either minimize or widen, as in the case of biotechnology and global information technologies, the Global North-South differences and to lead to a new “nano-divide”, and c) the ethical implications of the aforementioned processes and the possible divide.

The session emphasized the need for a balanced approach to nanotechnology research and applications and underlined the need for better standardization and monitoring in both the Global North and the Global South. Another issue of concern was the importance of stronger and more harmonised interventions at the policy and regulatory level, which should be developed with the participation and input of the public. Such participation requires awareness raising campaigns and education programmes targeting both public at-large and more specialized constituency groups.

The panel members were:

Chair: Rajaona Andriamananjara, Vice-President of COMEST, President of the Madagascar Academy of Science, Arts and Letters, President of the Madagascar Committee on Ethics of Science and Technology

Keynote speaker: Prof. Mamoun Muhammed, Head of Functional Materials Division at the Department of Microelectronics and Applied Physics at the Royal Institute of Technology (KTH)
Presentation title: “Ethical and Societal Risks and Challenges of Nanotechnology”

Panellist 1: Dr. Saeed Sarkar, Secretary-General of Iran Nanotechnology Initiative Council
Presentation title: “Nanotechnology in Iran: Policies, Strategies and Achievements”

Panellist 2: Prof. Beitollahi, Iran Nanotechnology Initiative Council
Presentation title: “Nanotechnology in Iran: Standardization, Safety and Ethical Issues”

Panellist 3: Prof. Stefan Luby, Senior Scientist, Institute of Physics, Slovak Academy of Sciences and Center of Excellence, Institute for Forecasting, Slovak Academy of Sciences
Presentation title: “Nanotechnology in Medicine – Some Benefits and Threats”

Panellist 4: Prof. Marie-Hélène Parizeau, Professor at the Faculty of Philosophy of the Université Laval (Québec City), Member of COMEST

Presentation title: “Nanotechnologies for Whom? For What Purpose? An Ethical Perspective”

This session was co-organized by UNESCO’s World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), the UN Industrial Development Organization (UNIDO), and the Slovak Commission for UNESCO.

B) Nanotechnology Applications in Water Purification and Wastewater Treatment

The second segment of the conference focused primarily on nanotechnologies that are being utilized in water treatment and monitoring application. The scope was forward thinking addressing both water issues in developed and developing countries. The larger discussion evolved around the following issues of concern: What is the potential that nanotechnology holds to address these water problems? What nanotechnologies offer the most immediate promise in water purification and wastewater treatment? Which areas of water use are in the largest need of a technological upgrade and innovation?

Experts participating in the session presented research findings on promising nanotechnology applications in water such as improved membrane technologies, removal of bacteria and other pollutants, including pharmaceuticals and trace contaminants, water quality monitoring, remediation of polluted water systems, greater wastewater reuse, desalinization, as well as less-water intensive agriculture. The session did not focus on the optimistic technological aspect alone. Discussions touched also upon how to draw the line between opportunities and challenges that limit nanotechnology applications in water.

The session emphasized the need for a balanced approach to nanotechnology applications in water and underlined the risks associated with toxicology and wider impacts on human health and the environment as of importance for further deliberations given that water is a basic human need and integral to health and well-being. Another issue of consideration was ethical issues of nanotechnology applications in water that arise from uncertainties related to environmental and health risks. Participants of the session also shared experiences on community engagement in making nanotechnologies relevant to local needs by presenting an example of using nanotechnology to provide clean water in a school in a developing country village.

The panel members were:

Chairs: Anders Isaksson, Industrial Development Officer, Programme Development and Technical Cooperation Division, UNIDO
Sarantuyaa Zandaryaa, Programme Specialist (urban water management and water quality), Water Sciences Division, UNESCO
Facilitator: Prof. Rainier A. Ibana, Professor of Environmental Ethics at Ateneo de Manila University, Co-Chair of the Asia-Pacific Philosophy section of the World Congress for Philosophy, President of the Asia-Pacific Philosophy Education Network for Democracy, Vice-President of COMEST and Chair of its Environmental Ethics Working Group

Keynote speaker: Dr Pedro Alvarez, Professor Rice University, Houston, Texas
Presentation title: “Nanotechnology-Enabled Water Treatment (NEWT): Merits and Limitations”

Panellist 1: Dr Mats-Olof Mattsson, Head of Health & Environment Department, Environmental Resources & Technologies at Austrian Institute of Technology
Presentation title: “Ethical and Environmental Health Risks of Nanotechnology”

Panellist 2: Prof. Thembela Hillie
Presentation title: “Application of nanotechnology in water in the developing world: challenges and opportunities”

Panellist 3: Mr Abdoulaye Sene, Member of COMEST, Chairperson of the African Francophone Group of Environmental Ethics; Coordinator of Ethics, Governance, Environmental and Social Responsibility Unit of the Sciences Institute at the Cheikh Anta Diop University in Dakar
Presentation title: "Are nanosciences and nanotechnologies accelerating social and economic factors in changing developing countries towards sustainability?"

This segment of the conference was co-organized by IHP, COMEST, UNIDO and the Slovak Commission for UNESCO.

C) Converging Technologies

Based on the work undertaken by the Pugwash Conference on Science and World Affairs – an ex-officio member of the Commission on the Ethics of Scientific Knowledge and Technology (COMEST) – and the results of its recent Workshop on Ethics of Modern Robotics in Surveillance, Policing and Warfare (Birmingham, UK, 20-22 March 2013), the session explored major ethical issues and basic principles of development and use of robotics in both civilian and military applications.

With respect to military applications, particular emphasis was put in the discussion on autonomous weapons systems, the most prominent of which in public debate are drones. Two main areas of ethical concern were noted. The first, which is already the subject of high-level international discussion, concerns the question of the extent to which they can be programmed to comply with the requirements of international humanitarian law and the standards protecting life under international human rights law. The second, which is more complex and more speculative, relates to the dilution of responsibility in complex systems involving robotic elements that may, in the strictly technical sense, have significant autonomy. It can be argued that their
deployment may be unacceptable because no adequate system of legal accountability can be devised, and because robots should not have the power of life and death over human beings.\(^1\) Alongside the well-established legal and human rights issues, the session also considered the implications of such developments in robotics for the scientific and technological process itself. It was also noted, with specific reference to removal of anti-personnel mines, that robotic systems also have the potential for beneficial military and security applications.

The scientific and technological implications constitute the intersection between issues specific to military or security applications and a set of broader concerns about transformative technologies that can be identified even with respect to superficially benign applications such as in care for the infants or the elderly. On the one hand, as robotic systems grow in functional autonomy, the question how to treat them will become of increasing importance, especially as they interact more closely with humans. (A salutary reminder was nonetheless made that the vast majority of existing robots are special-purpose industrial machines.) Building on public debates that have already occurred in Japan and Korea, the session discussed whether the more appropriate ethical analogy for domestic robots might be coffee machines (which cannot meaningfully be “mistreated”) or pets (which unquestionably can be mistreated). On the other hand, regardless of the ethical standing given to them, robots interacting closely with humans are likely to have effects on relations between humans, through new forms of mediation, that require ethical scrutiny.

Finally, the session considered the more general, and still highly speculative question, of the extent to which developments in robotics, as an aspect of a broader paradigm of technological convergence, point towards potential new understandings of what we understand as “life”, and in particular as the “human”. Many potential applications, some already at the experimental stage, establish a new field of prosthetics in which conventional distinctions between functional restoration and enhancement tend to break down. Such considerations represent a philosophical challenge to a basically humanistic interpretation of ethics – which predominates with respect to science and technology – while also reflecting practical challenges that could in due course become urgent.

The panel members were:

Chair: Prof. John Finney, Emeritus Professor of Physics, University College London, Ex-officio Member of COMEST

Panellist 1: Prof. Noel Sharkey, Professor of Artificial Intelligence and Robotics, University of Sheffield
Presentation title: “Ethics of Modern Robotics in Surveillance, Policing and Warfare”

Panellist 2: Prof. Guglielmo Tamburrini, Professore di Logica e Filosofia della Scienza, Universita di Napoli "Federico II"

D) Ethics of Science and Technology in the Information Society

Building upon the UNESCO report on “Ethical and Societal Challenges of the Information Society” and the associated roundtable organized within the framework of World Summit on the Information Society+10 Review Meeting (UNESCO HQ, Paris, 25-27 February 2013), the session examined a subset of ethical and social challenges and dilemmas in the field of information ethics with an emphasis on exploring these in the context of notions of inter alia intercultural information ethics, moral harm, and the changing composition of the “human”.

Consistently with the background report by Dr S. Romi Mukherjee, which had earlier been discussed during the 8th Ordinary Session of COMEST, the session adopted a broad framing of its subject matter. In addition to ethical issues involved in the use of digital information technologies, emphasis was put on the ways in which such technologies might be reshaping society and thereby shifting the terms of ethical discourse. Of particular importance in this regard are the possible effects of new social-technological interfaces on human identity, considered both reflexively – how agents consider themselves, inter alia through the lens of their technological practices – and objectively, in terms of the modes of ascription and control inscribed in such practices. While many aspects of these discussions remain speculative, and while there was general agreement that the newness of the information society tends – at least for ethical purposes – to be overstated, the session nonetheless considered that ongoing reflection should be maintained on ethical issues in light of the social transformations of the digital age.

The discussion was also informed by the concerns of the UNESCO Information for All Programme, which emphasize appropriate use of technologies and equitable access to their benefits. Rather than identity and social change, this lends itself to a focus on issues of responsibility, its levels and the relations between them. Of particular importance in this regard, in the context of the conference as a whole is the question of the circulation of scientific information in the information society. Examples of ethically questionable practices – such as hype, deliberate misinformation and inequitable barriers to access – are sufficiently numerous to require any ethical perspective on science to pay close attention to the challenges and opportunities of digital technologies.
The panel members were:

Chair: Dr Tafeeda Jarbawi, Director General of Welfare Association (Palestine), Member of COMEST

Panellist 1: Prof. Vasil Gluchman, Dean of the Faculty of Arts, UNESCO Chair in Bioethics, Institute of Philosophy and Ethics, University of Presov

Presentation title: “Ethics in the Age of Information”

Panellist 2: Dr S. Romi Mukherjee, Sciences Po Paris/New York University in Paris

Presentation title: “Rethinking Freedom as Non-Domination in the Age of Technology”

Panellist 3: Mr Andrejs Vasiljevs, Bureau Member and Chair of the Working Group on Information Ethics of the UNESCO’s Information for All Programme (IFAP)

Presentation title: “IFAP and a Global Debate on the Ethical challenges of the Information Society”

This session was co-organized by COMEST and UNESCO’s Information for All Programme (IFAP).

E) Scientific Responsibility

The session set its discussion in the context of the ongoing process to consider possible revision of UNESCO’s 1974 Recommendation on the Status of Scientific Researchers, which offers a powerful but in some respects outdated statement of the necessary connection between ethical principles to guide science and the practical policies and institutions that shape science as a social activity.

Reference to the history of the 1974 Recommendation served as a reminder that scientists have long been concerned about possible misuses of science, e.g., for destructive military purposes, as well as about the tendency for public agendas in areas of scientific concern to be distorted by commercial, ideological and other interests. The idea that science should be insulated from certain pressures that can undermine its core values of integrity, impartiality and rigour lies behind the principle, enshrined in the 1974 Recommendation, that professional scientists should enjoy a status that clarifies and protects their rights and responsibilities.

However, while there is significant continuity in both the pressures on science and the institutional responses to them, there are also a number of new factors. As UNESCO’s Ad Hoc Expert Group has noted in its “Preliminary study on the technical and legal aspects relating to the desirability of revising the 1974 Recommendation on the Status of Scientific Researchers”, any future revision of the Recommendation would need to reflect major changes in the social and institutional organization of science.2

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2 The report is available at
The session considered some of these changes, with particular reference to the relation between science and the policy process – which shapes the complex position of the “expert” –, issues of equitable access and participation, including their gender dimensions, and the ethical values enshrined in (and sometimes violated by) the scientific process.

The panel members were:

Chair: Mr Khalid Abdullah al-Ali, President of COMEST, Associate Professor of Human Genetics in the Department of Biological Science and Director of the Foundation Programme of Qatar University, Member of the Arab Ethics Committee for Science and Technology


Panellist 2: Dr Lubica Lacinova, Senior Scientist, Vice-Director of the Institute of Molecular Physiology and Genetics, Slovak Academy of Sciences Presentation title: “Is Scientific Advice to Policy Makers Value-Free?”

Panellist 3: Prof. Viera Bilasova, Director of the Institute of Philosophy and Ethics, Faculty of Arts, University of Presov Presentation title: “Science and Ethical Values”

Panellist 4: Prof. Susana Sommer, Professor in Bioethics in Science at the Facultad de Ciencias Exactas (Faculty of Exact Sciences) of University of Buenos Aires, Member of COMEST Presentation title: “Scientific Responsibility and The Role of Science in Society”