

## EAMBES Code of Ethics

### Preamble

Medical and Biological Engineering and Science (MBES) integrate physical, mathematical and life sciences and engineering principles for the study of biology, medicine and health systems and for the application of technology to improve health and the quality of life. It creates knowledge from the molecular to organ system levels, develops materials, devices, systems, information approaches, technology and health care management, and methods for the evaluation of technology, for the prevention, diagnosis and treatment of disease, for the provision of health care and for patient care and rehabilitation.

MBES is a multidisciplinary field with strong relations to many other fields, especially to engineering disciplines based on different technologies, to medical disciplines including nursing and health care management, to natural sciences from basic research to applications, to mathematical sciences including informatics, and to law. Effective cooperation with specialists in those fields requires a fundamental understanding of the respective particularities and sufficient knowledge about the considered problem.

MBES scientists and engineers must be aware that scientific progress and engineering have the potential to violate human rights and the rights of animals, to irreversibly damage the nature, and to disturb social harmony. They should be familiar with:

- the Universal Declaration on Bioethics and Human Rights (first proclaimed by the United Nations in 1948, most recent version from 2005);
- the Declaration of Helsinki (published by the World Medical Association, last version from 2013);
- the Universal Declaration of Animals Rights (UNESCO 1978);
- the Rio Declaration on Environment and Development (United Nations 1992).

MBES scientists and engineers should recognize the paramount relevance of the precautionary principle first endorsed by the United Nations (1982): “Where potential adverse effects are not fully understood, the activities should not proceed”, that clearly defines their responsibility. They should be familiar with technology assessment, with risk assessment, and with risk management.

MBES scientists and engineers should know that technical standards (published as formal documents by domestic, national or international bodies) are generally accepted formulations which represent the technical knowledge and expertise available at the time when they had been formulated. Standards do neither represent the technological progress and the extension of knowledge and expertise which have been reached since that time nor the actual state of science. The primary aim of standards is to establish uniform engineering or technical criteria, methods, processes and practices.

For effective cooperation with experts in other fields the respective field-specific ethical code should be properly taken into account, e.g.

- the Declaration of Geneva (Physician’s Oath) adopted by the World Medical Association;
- the Operational Guidelines for Ethics Committees that Review Biomedical Research, adopted by the World Health Organization;
- international, domestic, and disciplinary codes of ethics since until now natural science and technology professions do not have global codes of ethics;
- the request of the International Council for Science (ICSU) concerning the “scientific responsibility and accountability to society”. Special attention should be paid to sustainable development, and to the protection of human and animal rights;

- codes for professional ethics like the ICN Code of Ethics for Nurses first adopted in 1953 or the IMIA Code of Ethics for Health Information Professionals (2005).

## **Fundamental**

This code of bioethics is not a code of conduct, i.e. it is not a set of written guidelines for professionals how to behave in certain situation. It shall be an aid for making ethics-based decisions between “right” and “wrong”. MBES scientists and engineers shall be aware of their personal responsibility for those decisions and their consequences.

## **Competence**

MBES requires a high level of competence, with special regard to

- professional competence
- methodological competence
- communicative competence
- personal competence
- social competence

## **Responsibility**

- for making decisions, initiating or starting actions, omission of necessary actions or refusal to provide required and possible assistance;
- for receiving the decision-relevant information from other collaborating team members and for providing complete MBES relevant information including warning and risk assessment to the other collaborating team members;
- for continuous learning and training taking into account the rapid progress in scientific, medical, technological, methodological, ecological and legal knowledge;
- for considering all relevant technical standards and Good Practice Guidelines, e.g. Guidelines for Quality Assurance and Guidelines for the Quality of Medicine and Healthcare;
- for avoiding conflicting interests that may concern professional ethical and moral principles, especially conflicts with
  - personal interests
  - economic interests
  - scientific interests
  - political interests
- for acknowledging the own responsibility and for taking the necessary consequences and measures if errors have occurred, including the reporting to the appropriate professional bodies and/or – if relevant – to public authorities.

## **Commitments**

- to understand that bioethics is an individual’s ethics as well as a professional’s obligations
- to respect

- the society;
  - the public welfare;
  - the dignity, safety, health and well-being of all individual human members;
  - the vulnerability and multi-diversity of the ecological system.
- to be aware that sustainable development is the leading engineering challenge of meeting human needs for natural resources, industrial products, energy, food, and transportation, of conserving and protecting environmental quality, of avoiding waste and demolition of natural resources, and of providing liveable conditions for coming generations.
  - to be guided in
    - scientific work by scepticism against unproven hypotheses, by rejection of results which are acquired by non-scientific methods, and by indifferent and fair evaluation of results from competing groups;
    - research activities by employing morally undisputed methods, by thoroughly assessing the potential of advanced, emerging and new technologies, by strictly rejecting participation in tests with patients or animals without clear motivation and morally acceptable aim;
    - developmental work by the strongest effort to consider all relevant technical standards and safety aspects, and to generate a design that excludes misuse or non-intended application;
    - application by using only equipment that fulfils all relevant requirements and safety conditions.
  - to make available own knowledge, experience and skills in order to solve urgent problems, to reach important results, to consider all relevant aspects of sustainability, and to develop high-quality devices, equipment, and methods.

## Commandments

MBES scientists and engineers shall not

- participate in unethical activities or in actions that are not controlled by moral principles;
- be affected in their decisions by individual features, e.g. ethnic, national, political, religious or gender aspects;
- be motivated by considerations that are not helpful to reach the agreed objectives;
- be unable to recognize, articulate, and consider the ethical consequences of their decisions and activities;
- allow sympathy, empathy or other personal feelings to gain control over rational arguments;
- permit the misuse of their specific knowledge and expertise in collaborative research, development and application;
- oppress in conflicting cases deliberations and discussions based on moral justification or refuse to take part in such discussions with experts;
- refuse to consider or to accept evidence-based conclusions;
- reveal confidential information, especially when personal, medical or clinical data or sensitive information about individuals are concerned;
- undertake or support actions that damage the reputation of the MBES profession.