

# Responsible Science, Ethical Behavior and Codes of Conduct

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## Key facts about the world

1. Our world is a dynamic and very complex chemical entity.
2. All human activity influences the chemical balance.
3. The impact may be local, regional and global, but almost always complex.
4. Knowledge is necessary to restore and keep the balance.

## Science and society interplay

- The significant value of research for society is undisputable.
- The public trust in science and technology is a pillar in society.
- The strength of this pillar depends critically on the collective reputation of research and researchers.

**Thus:** The research community has to act in a way that is regarded as **ethical** by people.

## Ethical aspects are relevant because

- 1) An independent piece of knowledge or a fact **has no ethical** dimension.
- 2) Knowledge acquired and utilized by a human being **has in principle an ethical** dimension
- 3) Knowledge in certain disciplines is more prone to misuse and abuse than others.

## Consequences of internationalization

- Increased migration due to more multicultural and less homogenous societies.
- Increased tension due to cultural, religious and democratic differences.
- The perception of risks, benefits and ethical behavior has become less uniform.

**Conclusion: Clear ethical guidelines are necessary!!**

## Two categories of ethical norms

### **General norms:**

Ethical norms for all sciences and scientists.

### **Specific norms:**

Discipline-specific norms, which have more far-reaching consequences in some sciences than others.

## General ethical guidelines

- Ethics guiding **scientific experimentation, data collection, and collaborations** (Singapore statement; Montreal statement);
- Ethics guiding **scientific publishing** (Vancouver Convention);
- Ethics guiding **scientific assessment** (San Francisco Declaration):
- Ethical guidelines for **outreach** (ICSU Principle of Universality of Science)

## Dual use – a chemical challenge

Throughout history the dual or rather multiple use of chemicals has been of utmost importance, and examples of beneficial use, misuse, or even abuse are countless.

To communicate this fact is necessary, but a challenge and a risk because without ethical standards even little knowledge in chemistry can turn into a disaster.

## An example of dual use



thiodiglycol



mustard gas



Stabilizing dyed clothes and fabrics



Organization for Prohibition of Chemical Weapons (OPCW)



## Preamble

The value and benefits of research are vitally dependent on the integrity of research. While there can be and are national and disciplinary differences in the way research is organized and conducted, there are also principles and professional responsibilities that are fundamental to the integrity of research wherever it is undertaken.

[www.singaporestatement.org](http://www.singaporestatement.org)



## Societal Considerations

Researchers as well as research institutions should recognize that they have an **ethical** obligation to weigh **societal** benefits against risks inherent in their work.

## ICSU Advice on “Science Communication”

It is the responsibility of scientists

- 1) To communicate research results to society, especially those with an impact on human survival or well being;
- 2) To assist the media in reporting scientific findings correctly;
- 3) To strive for high standards in communication: accuracy, individual accountability, reflect uncertainty, avoid sensationalism.

## Code-of-Conduct

The challenges outlined above call for more focus on ethical norms and standards in the chemical community.

IUPAC and OPCW have discussed composing a code-of-conduct.

So far a **personal, living code** has been proposed.

## Draft elements for a living code

- Ensure that the work is ethical and upholds the dignity, standing and integrity of the profession;
- Work to ensure that knowledge and technologies are used for the benefits of humankind and the environment;
- Ensure that chemicals, equipment and facilities under their care are not used for illegal or harmful.

## More draft elements

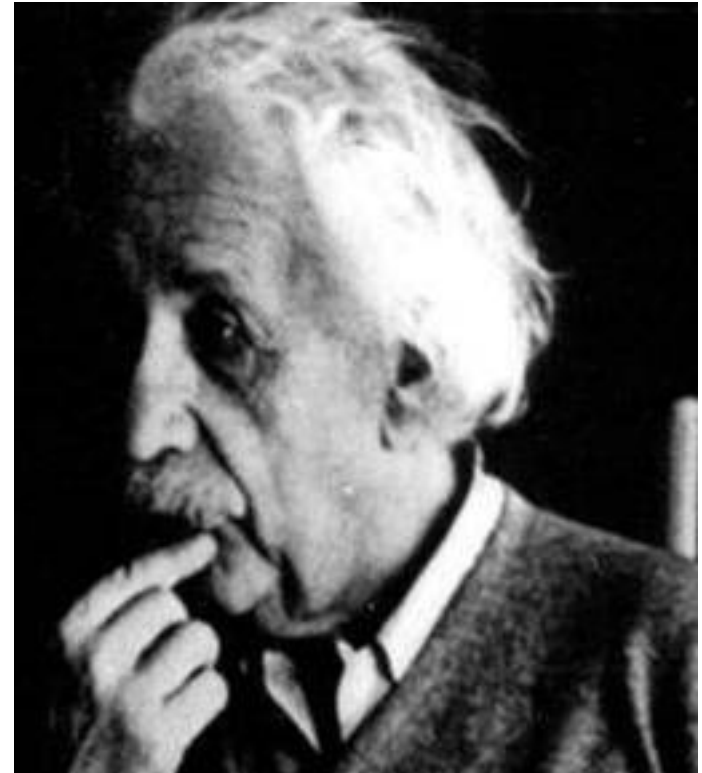
- Minimize risk to people and the environment;
- Make sure the work is in compliance with national laws and international conventions;
- Report misuse of chemicals and facilities to relevant authority;
- Update knowledge on risks of chemicals;
- Conduct regular HES assessments;
- Contribute to educate the public about issues related to chemistry.

## Educational consequences

### **In each and every college and university:**

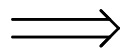
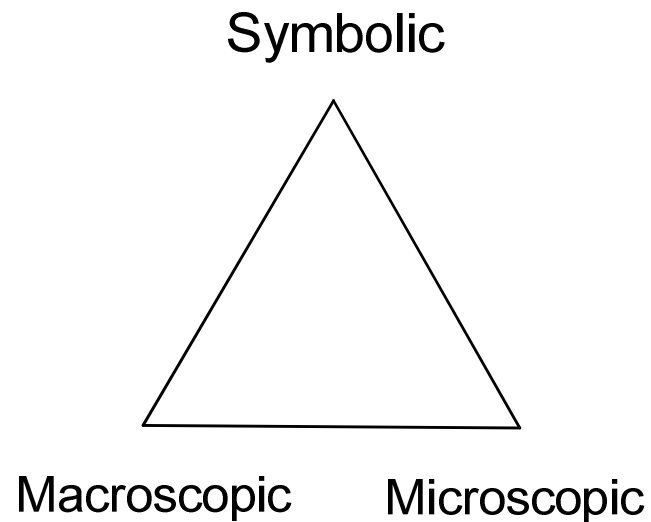
- Reflect on the societal relevance of what we learn;
- Think about if and how new knowledge influences the Nature and our civilization;
- Compose a personal Code of Conduct, a required part of any professional degree programme;
- In the natural sciences, make all the weapons conventions a part of the curriculum.

“The significant problems we face [today] cannot be solved at the same level of thinking we were at when they were created.”



# Chemistry into the real world

Chemists' triangle



Life's pyramid

