

Embrace the ethical dimension

Stuart Parkinson explains how physicists can become more ethical in their careers

When I was applying to undergraduate courses in physics and engineering, I was asked by various admission tutors if I would mind working on military projects. “No,” I replied, thinking it would be quite exciting. Sure enough, a couple of years later I was on an industrial placement and found myself carrying out research to improve the performance of image-intensifiers. These devices are most commonly used as night-sights to help soldiers target their weapons more effectively in the dark.

I then found out that the firm I was working for was selling these night-sights to the Indian army, which was involved in the Sri Lankan civil war. Suddenly, what should have been obvious from the start hit me: my work was being used to help people kill each other. Surely I could do something that made a more positive contribution to the world? After a little searching, I signed up for a PhD in climate physics and so launched my career in a very different direction.

That was 15 years ago. I am now executive director of an organization called Scientists for Global Responsibility (SGR). One of my main tasks is to provide information and advice to students and graduates wishing to choose an “ethical career” in science and technology. By this, SGR means careers that are based on the principles of openness and accountability, and that contribute to peace, social justice and environmental sustainability.

Physics and the military

But what is an ethical career for a physicist? Many physicists work in the defence industry on weapons-related projects, which will, ultimately, help one person to kill another. This possibility alone leads many people – a growing number of scientists included – to condemn such projects as unethical. Others argue that weapons projects are okay as the weapons are intended to defend the scientist’s country from other hostile forces. Regrettably, deadly force may sometimes even be necessary.

However, the ethics of working on such projects become rather more suspect when one considers what happens to the weapons when they are sold. Countries like the US, the UK, Russia and France are, after all, the world’s largest exporters of weapons, and their weapons are finding their way (both legally and illegally) to virtually all of the world’s trouble spots. But if you work on a weapons-related project, it is unlikely that you will have a say on where those weapons end up or whom they will be used against.

Some physicists approach this ethical di-



Black and white – ethics can impact on all careers.

lemma by working only on military projects that are specifically defensive in nature. For example, they might opt to design new materials for more effective body armour or develop electronic counter-measures that can confuse incoming missiles. However, most military projects, whether directly involved with weapons or not, contribute in some way to a war-fighting capability. For example, political leaders might find that military force is a more palatable option if they have improved defensive equipment and so put less effort into finding a peaceful solution to a crisis.

A few physicists, meanwhile, carry out work that has a specific peace agenda. Such work is growing, in particular in disarmament monitoring and verification. International arms-control treaties, for example, will not function without scientists and engineers who can judge if weapons and weapons-related equipment are being properly dismantled and destroyed.

Physics and the environment

Apart from areas like medical physics (see “How to become a life-saver” *Physics World* August 2003 p47), another obvious ethical application of physics is to help protect the environment. You could help to model the Earth’s climate or refine the predictions of effects of climate change at a local and regional level so that protective action can be taken.

Physicists are also needed to help develop renewable-energy sources as an alternative to the fossil fuels that are the main cause of climate change. Materials specialists can improve the efficiency of solar photovoltaic cells, while fluid dynamicists can ensure that wave and tidal power make a growing contribution to our energy demands. Another

growth area involves developing highly efficient hydrogen-powered fuel cells.

Reducing the environmental impact of more mainstream industries is also vital. Many physicists can find themselves working in or with the chemical and electronics industries, both of which are major polluters. It has been estimated that producing just one tonne of a metal, such as aluminium or copper, creates more than 50 tonnes of waste. Are you sure that your research considers and deals with its environmental impact?

Some parts of industry are trying to improve the situation. Some firms are, for example, minimizing the amount of material or energy that they use in their manufacturing processes, or designing products with parts that can be easily removed for repair or recycling. Physicists can also choose to work for or collaborate with companies that can show that they have a strong environmental track record.

Some physicists go further by specifically trying to improve the environmental performance of industrial products or processes. One example is Life-Cycle Assessment, where researchers assess the environmental impact of a product over its life cycle, from production to disposal, and then recommend how improvements can be made.

Further ethical concerns

Even if you are in a job that does not seem to have any ethical issues, there are various questions that you should ask yourself. Are you working in or with large corporations that gear their work towards narrow economic objectives at the expense of wider concerns? Is electricity from nuclear fission an important way of helping to tackle climate change, or should you be worried about issues of waste disposal or weapons proliferation? Is nanotechnology important in helping to reduce pollution, or will it create more problems than it solves?

Ethical issues can appear daunting, but physicists cannot detach themselves from society and shelter inside an ivory tower. Even physicists carrying out basic research can find that they, or others, very quickly apply their work for practical ends. Physicists can no longer say that they have no responsibility for the consequences of their actions. That is why the ethical dimension of your career is so important.

● SGR’s guides entitled *Thinking About an Ethical Career in Science and Technology* can be found at www.sgr.org.uk/ethics.html

Stuart Parkinson is executive director of Scientists for Global Responsibility, e-mail stuartp@sgr.org.uk