



A conversation with Chris Langley, London

'Soldiers in the Laboratory'

Chris Langley, a former neuroscientist and Research Officer of 'Scientists for Global Responsibility', talks about the funding of university research by government ministries of defence and military companies.

Is 'Scientists for Global Responsibility' an old and established organisation?

Langley: It was formally set up in 1992 as a coming together of several smaller organizations comprising scientists who were concerned, at that time, about the nuclear threat and nuclear weapons proliferation and, more generally, the search for a more responsible science and technology.

You have written several reports, for them, notably Soldiers in the Laboratory, which you followed up with More Soldiers in the Laboratory. Can you give an overview of the presence of the military in our contemporary research system? I don't think most scientists are aware of just how huge this presence is.

Langley: The reports that we've published tend to focus on the UK but this is a global phenomenon. Certainly in the United States there is far more military involvement in the university sector, comprising government and corporate interests in science and technology. It is also present throughout Europe, particularly now that the European Union is keen on developing programmes of 'security research', as it's called. There has been quite a lot of opposition to this in the European Parliament. So the phenomenon is not limited to any one country.

You quote some impressive figures in your report. Many people might not be aware that spending on arms has increased in real terms since the end of the Cold War.

Langley: It is not a linear thing; it's gone up and down over this period. It went down immediately after the end of the Cold War, then it began to creep back up again and post-'9/11' (in 2001) it has rocketed up, with most of that expenditure coming from the United States and, to a lesser extent, from countries within Europe, and Japan.

For 2006, you quote a figure of \$1.2 trillion dollars spent globally for military purposes, of which about 45% is spent by the United States, followed by the UK with a budget of around £33 billion. Just today, the UK



Chris Langley

obtained his PhD in Neurobiology at the University of Cambridge, and pursued post-doctoral research on giant fibre membrane events. Subsequently he worked as a project officer for the UK's Medical Research Council. He then specialised in science policy, science communication and information at the Novartis Foundation. Since 1999, he has been an independent consultant, providing access to science, engineering and technology for the non-profit sector. He has produced critiques of science and medicine and gives presentations on science communication, ethical science and the military influence in science and engineering. He was commissioned by the organisation, Scientists for Global Responsibility (SGR), to research on the extent of military research funding in UK universities, and has written the reports: *Soldiers in the Laboratory: Military involvement in science and technology – and some alternatives* (2005), *Scientists or Soldiers?* (2006), *More Soldiers in the Laboratory: the militarisation of science and technology – an update* (2007), and *Behind Closed Doors – Military influence, commercial pressures and the compromised university* (2008) (downloadable as .pdfs at: <http://www.sgr.org.uk/>).

government announced that it is writing off yet another £150 million on a military R&D project that had failed to come to fruition.

Langley: Although a figure of £33 billion for the UK military budget doesn't actually take account of a whole variety of military expenditure. You've just mentioned one of them. I don't know if the latest figures now show the amount spent by the UK in Iraq and Afghanistan, but previous figures did not – it was considered to be a special write-off. In fact, it is terribly difficult to get an entirely accurate figure. In our latest report, *Behind Closed Doors*, we show that, based upon our own investigation, the official government figure for the amount of so-called defence spending on research

and development within the UK university sector is underestimated by a factor of five. There is around £2 million spent in each university in the UK on military R&D and not the £400,000 per institution that is presented in government data.

This is something you address in More Soldiers in the Laboratory when you describe the hopes you had that with the new Freedom of Information Act [which came into force in the UK on 1st January, 2005] you would have greater access to information, but in fact you seem to have been quite frustrated. So, does a lot of information remain hidden?

Langley: Yes, it's hidden because people simply are not entirely open with us or

won't talk to us. It is side-stepped because if you ask the question under the Freedom of Information Act and you do not make your question absolutely precise, the universities will only provide you with a "window" that represents a partial answer to the total question. So it's very, very hard to actually pin people down, and that's if they bother to respond to you at all. Additionally, some of the data supplied was out of date or incomplete.

Another aspect you mention is the spending limits, where if authorities decide that it's going to cost them more than £450 (for universities) or £600 (for government) to get the requested information they can simply refuse to look for it.

Langley: We also had the experience of some universities refusing to supply specific data that we had asked for under the Freedom of Information Act. They also used copyrighting to stop us using the material they did supply in the public domain – we checked this with the Information Commissioner and he said it was nonsense, that this was not the case particularly when we made

it clear to the universities how the information was going to be used.

Are you aware of similar problems in other European countries?

Langley: I do have some anecdotal evidence that it is quite difficult, particularly when trying to get information related to budgetary issues for European Union spending on 'security research'. The latter is a fairly new initiative but it's hedged around with all sorts of complexities when trying to get information.

Are there reports from other European countries similar to the ones you've written about the military presence at universities?

Langley: Quite recently there has been a report from Spain on their military expenditure including on R&D, although I don't think it goes into as much detail as our reports. But there has been a good Transnational Institute/Statewatch report called *Arming Big Brother*, by Ben Hayes, about the European Union's Security Re-

search Program, that details how the EU has decided that European multinational companies need up to €1 billion per year so that they can compete with US companies that receive new funding, for example, for 'Homeland Security' research, for example. But he's looking more at the broader picture of where corporate interest plays a key role in shaping military funding rather than military research and development programmes at universities.

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Coming back to the figures, the proportion of publicly-funded UK research and development for military purposes is very high, around 35%?

Langley: Yes, around 30-35% the government spends on military-related R&D as a total of all their R&D funds.

With the employment of some 40 per cent of all government scientists and engineers being by the Ministry of Defence?



Langley: This figure from a few years back may be changing because QinetiQ, which is now a privatised company (until 2001 it was part of the Ministry of Defence Defence Evaluation Research Agency), comprises people who used to be employed at government defence establishments and we simply do not know how many of them have since been made redundant, changed jobs, or moved to other projects. But one of the things I think it's important to consider is that these figures relate to a large extent to people employed by government, they were government scientists who were working on research projects in the Defence Science and Technology Laboratory and perhaps may be a few other laboratories undertaking R&D of a military nature. What it doesn't tell you is how many people in the universities have research portfolios which are very largely military in nature. That's to say, they are involved in research projects for military corporations and/or for the Ministry of Defence, the outcome of which is likely to be military. Of course, there are going to be 'dual usage' issues – their research may have some civilian use, but they are largely military. So the actual figure for the number of people who are working on military R&D is significantly higher than the figure you quoted.

In your reports, you present an interesting equation, showing that the commercialisation of UK universities has resulted in their militarisation. This sounds quite dramatic, as though the universities are prostituting themselves to the highest bidder.

Langley: Those are your words! I would largely echo them, but to be absolutely objective I would say that the commercialised university has been developed by successive governments essentially to help research and development both within the corporate sector and for government purposes, so in a sense they are selling their goods (research, training and teaching) within a knowledge economy. This is a situation which is very different from the role of universities, even ten or fifteen years ago. I'm agreeing with you, but I have to be very careful in my choice of words because I'm sometimes accused of being political when all I'm doing is reporting things as we find them.

What proportion of university funding comes from military companies and the Ministry of Defence?

Langley: Again, it's a terribly difficult question to answer. I couldn't pick out a single figure but to give you an idea of the sort

of scale of military funding, one of the military-university consortia we talk about are the Defence Technology Centres. The Ministry of Defence has earmarked over 90 million pounds for these centres over their projected 5-6 year lifetime. There are four of these centres currently running, comprising 15 to 20 universities, so it's quite a sizeable income for them. However, SGR is less concerned about simply the size of funding, but more about the military influence that it represents – there's this 'Old Boy' network of scientists who have expertise that they have obtained with financial support from the taxpayer that is going to help an endeavour related to both profits and to a security agenda that nobody has had a chance to debate properly. Basically we have a narrowly-defined defence structure for the UK that very much answers the needs of corporate interests and the Ministry of Defence without it ever being open to a public discussion. That is the most important point.



One area of military funded research: how people best interact with machines

You describe a new military philosophy, the 'Revolution in Military Affairs', based upon an obsession with high technology: everything has to be directed towards the highest possible input of technology into new weaponry and battlefield platforms. And this costs a lot of money.

Langley: Yes, it's a bit of a golden egg for a rather large goose, because if you tie up your security stance as a high technology one then the people who are 'locked' into it are the corporate interests and their friends in government with a corresponding R&D process. In the *Soldiers* report (on page 36), there's a rather dense diagram that shows the ways in which many of the decisions taken to frame the UK's security

stance has a major input from people in business. This is fine if it is open, if it is balanced and accessible to public scrutiny, but unfortunately it isn't. Decisions are made about future weapons and their platforms entirely free from any kind of objective analysis. We do not think that this is a good idea.

Isn't the UK the world's fourth largest commercial arms supplier after the US?

Langley: In 2007 the UK was the fourth after Russia and France. We have however been the second largest arms dealer for a number of years.

While the UK's largest military company, BAE systems, is the world's fourth largest?

Langley: Yes, fourth or fifth, it tends to vary. But these military corporations are enormously powerful and they have a presence in lots of countries, including the UK and USA.

Another point you make is that the military are pushing the idea that there will be great advantages later when the fruits of military research are converted to civilian applications. You argue quite convincingly that this is nonsense.

Langley: There's a lot of data to support our contention. A number of quite impressive studies have shown that in fact the pathway between military funding of a particular idea to its usefulness in civilian life is long and often not followed through. I asked a question recently at a meeting organised by the MoD about their latest plans for funding and whether there was going to be any kind of benefit-cost analysis of the size of the R&D budget. And so get an idea of likely civilian utility and I was told quite clearly by the then Chief Scientific Advisor to the MoD that in fact the money for R&D was entirely for weapons or as he put it 'for military use only'. So this argument doesn't stand up, whether in the UK or the United States. You will notice that if you ask anyone about spin-out from military funding they will always give you the same examples: radar and plasma screens. Well, this is a very, very expensive way of getting articles which are of public value or use by putting trillions of pounds into a military budget. It would be much more sensible to plan directly for civilian need using civilian funds and civilian companies.

This brings us also to the counter-argument, which says that instead of pursuing an aggressive high technology stance, claiming

that this is the best solution for future world peace and national security, it might be better to dedicate these resources towards finding more environmentally and socially desirable solutions to defusing tensions that are leading to wars.

Langley: Again there is a lot of data to support that argument. The Oxford Research Group brought out a report several years ago which showed that small projects based on what used to be called the 'barefoot doctor' approach, that's to say very simple, low technology approaches, getting people together who can look at the conflict from their own perspective rather than that of their government or people who are very keen to sell arms. This was a way of defusing conflict and addressing the kind of problems which are real problems in the world today, not the least of which is climate change. There's a whole suite of things which are very closely related to the fact that governments throughout the world tend to talk about security in extremely narrow terms. They look at it as aggression from a third-party and that really isn't what is endangering the future of the planet today. It's much more to do with disempowerment, climate change, resource depletion, pollution and poverty – these are the kinds of things that cause conflict.

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Furthermore, less than 1% of the UK research budget is going towards questions of climate change, alternative energy etc. compared to the military budget.

Langley: That has slightly changed. The UK government has, at long last, seen that in fact climate change might indeed be a problem (in the UK National Security Strategy for example) and there have been some changes in the level of funding, for example, through the EPSRC (engineering and physical sciences research council) to address research about climate change mitigation, but it is a bit late in the day. That figure of \$1.2 trillion annually for global military spending – if you look at how much is spent globally on alternative energy R&D, it's only \$1 billion annually, so there's a sense of the disproportion of research priorities.

Yes, plans to replace the UK's Trident nuclear weapons system are estimated to cost at least £20 billion – and it already costs £2 billion annually just to maintain the existing system.

Langley: And it's not even an independent deterrent. The UK argue that these weapons of mass destruction are a good way of securing global peace but it's not even 'ours' since it's integrated into the US defence system. So there are many questions here to be answered.

Can we now turn towards the biosciences in military research? What are the principal areas of bioscience research covered by military interests?

Langley: Well, obviously, most of the military R&D spending is on the physical sciences and engineering, but there are two areas or, depending on how you define biosciences, three, if you include psychology, that are concerned with life sciences. However, there is a lot of research activity in the corporate world or in classified areas where we simply don't know what is involved. In terms of the biosciences, the Home Office and the MoD both fund security research projects **in the biosciences**. There is also something, if you include psychologists, called the Haldane-Spearman consortium. This consists of small businesses plus university researchers who are looking at how to prepare people in the armed services for conflict. QinetiQ – a major military company – works with the Consortium.

There's one Defence Technology Centre which is concerned with human resources research that looks at how you fit people with machines within conflict situations, so it is a bit like the DARPA [US Defense Advanced Research Projects Agency] programme looking at humans in conflict situations and how they best interact with machines. I don't have a figure for these areas because they come and go, but it was about 1.3 million pounds in 2005/6 for the Defence Technology Centre for Human Factors Integration that comprised three universities. But biosciences are also covered by the Joint Grant Scheme, which addresses research with possible military objectives. The scheme is supposed to be replaced as a result of the Defence Technology Strategy, that was bought out in 2006. These are basically the main areas where the biosciences in universities in the UK receive financial support from the military.

You also discuss the double-edged weapon dilemma, where on the one hand you are developing a weapons technology and on the other hand developing a defence against the possibility that someone else might also



have this technology. In the case of biological weapons there has been an international treaty banning biological weapons for many years and yet we are continuing to do develop things that could be considered to be biological weapons with the argument that if we don't develop them we won't be able to defend ourselves in the eventuality that someone else does.

Langley: This argument is particularly used where people are looking at increasing virulence of particular micro-organisms. I quote the example of the mousepox virus in *Soldiers in the Laboratory*. It's a real problem. The Royal Society and other learned societies have actually been giving a lot of thought to how you have a system of oversight without hampering research within the biosciences, but at the same time you give the UK and its allies the edge to address potential problems with bioweapons. It's quite frankly a nightmare. They couldn't come out with any solid guidelines. They talked about codes of conduct and about having publication guidelines that would involve some independent group looking at the contents of research papers before they're actually published to see if they had any potential for development by third parties, be they state terrorists or individual terrorists. There's quite a large body of research looking at the difficulties of what's called 'dual use' in the biosciences.

"In the biosciences we have a number of potential security problems calling for urgent oversight."

And then there's Porton Down, the defence establishment which has been working on chemical and biological weapons for many years.

Langley: Well, I think the MoD would say that Porton Down's (now part of the Defence Science and Technology Laboratory) function these days, in the light of the international Biological and Toxin Weapons Convention (in force since 1975) is not limited to developing effective antisera and other defences but that it is also monitoring for the possibility that people might be bringing 'dodgier items' which could possibly be bioweapons into the UK. So they would say that they are a kind of point of surveillance both in terms of research and ways of finding potential bioweapons. I think, to be honest, the real issue is weaponisation rather than the development of the actual bioweapons themselves. That's to say, ways in which you can put something that will kill enough people into a weapon which can be delivered accurately and

with devastating effect. I'm sure that these are also being studied at Porton Down but getting information on what is going there is very, very difficult because of the Official Secrets Act and because of the way in which the UK government doesn't believe in public scrutiny or debate over practically anything it does.

Do you think there are many people in the university context working on similar projects related to this area?

Langley: Yes, I do. We had some information supplied from Imperial College London, and there were biosciences projects supported by military funds which had the potential to produce information on modifying bacteria and viruses that could conceivably be of interest to both the scientific community and those with sinister intent. But such research is not only supported by the military – research councils and corporations also support identical kinds of research. So in the biosciences we have a number of potential security problems calling for urgent oversight.

Do such military connections lead to problems when university researchers want to publish their research?

Langley: Well, it can be legitimate to filter publications. Do you want to tell the world how to make potentially lethal biological materials or do you want to have information which puts European countries at an advantage in the face of terrorism? There are a whole set of fairly substantial ethical issues here that I think people are pretending do not exist.

At the moment who decides whether, for example, research with possible military applications, can or cannot be published?

Langley: I think editors of journals and the researcher are the key decision makers, but that depends upon the Journal. *PNAS* had a forum to discuss how potentially dangerous material including that with increased virulence (citing the engineered mousepox virus toxin). Editors vary in how seriously they take the subject. In the US, there have been several researchers who have had papers withdrawn simply because they were considered too 'dodgy' for wide dissemination. In the UK, there have also been Acts of Parliament passed defining limits for the free access to information. But security researchers looking into the effects of potential bioweaponisation and bioterrorism say that science isn't badly served

by the mechanisms presently in place, that it is not holding up research. However, there is still a risk that bioscience research with a potential security dimension may be stalled by ill-thought-out oversight procedures.

Is there also research on performance enhancement for soldiers, whether physical or mental, in the quest for the 'perfect soldier'?

Langley: That tends to occur more of this in the US. It's not such a major research objective in the UK but there is a grey area in the UK, particularly in the neurosciences, with respect to military interests in enhancement. Several of the Defence Technology Centres touch on this, especially the human factors one I mentioned earlier, where they are looking at how to 'improve' the interface between the soldier and his or her weapons system or vehicle for instance. But the big push in that domain is in the United States, for example, at MIT, where they look at how to enhance and add a robotic device directly to soldiers.

In your reports, you present recommendations to the UK government and to universities and institutions, but you also offer advice to individual scientists and engineers on how to decide whether what they're doing is morally valid. However, many scientists may not be aware of the end point of the research they are doing, that it has military applications.

Langley: Yes, this is a common problem not only with military involvement but also in terms of environmental impact or the societal consequences of research. I think SGR's position would be that people really should take responsibility for the research that they are doing and own the outcome. This is one of the things that scientists are very bad at doing – having any sense of being concerned as to what the outcome of their research is going to be. The British government is obsessed about the economic outcome of funding research and we would like to see some consideration given for scientists in their grant applications to say, 'what do you see to be the potential positive or negative impact of this particular piece of research?' Of course, they can say it's terribly difficult to do this. Giving money to mathematicians, you don't necessarily know if the outcome of their research is going to be used for guiding more efficient missiles or looking at turbulence in beer manufacturing. It's difficult, but scientists are pretty informed people, they can make a pretty good guess as to the likely outcomes of their research.

And when they are faced with a moral dilemma, you offer three lines of advice: one is to avoid working with the military altogether, to choose some other research domain that provides civil benefits to society; another is to support lobbying for changes, for example, by becoming a member of a group like Scientists for Global Responsibility. Finally, they might encourage discussion of these issues within their institution. Do you get a good response from scientists?

Langley: They are very, very good if you tell them that what you're talking to them about is going to be kept confidential. And, if they are sufficiently senior, they will tell you exactly what they think and most of the people with whom I've spoken who have come out and talked about ethical and moral dilemmas, are definitely concerned about it. In my experience, if they receive mili-

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tary funding scientists are more coy about talking to us, but once they start talking they seem to be aware that there are ethical problems, and they come up with all sorts of ways in which they deal with that – some better than others! Nevertheless they are aware of it. Senior figures we've spoken to in both the military funded and non-military funded areas do think it's about time for this whole issue to be discussed openly and with independence rather than it being continually pushed under the mat and ignored.

In what context would they like to discuss this openly?

Langley: One of the suggestions is for a Royal Commission to determine what is the role of the university or what are universities for. And to try and reorientate where

the expertise is most useful to face and deal with the problems of the world and society today, to have discussions amongst their peers. Unfortunately, rather than fostering a more open kind of science, most scientists that I have spoken to are too busy trying to find money for their research or working with commercial clients who have a slightly different view of deadlines than maybe some scientists do to foster a more open kind of science. They need to actually spend some time stepping back from their research and trying to assess all of its dimensions, whether they are ethical, practical or scientific. A little bit more internalisation of the issues and more reflection would also be a good idea.

Do you speak publicly about your report? Have you spoken at most UK universities?

Langley: Well, SGR is a small organization but we do the best we can. I'm talking at Cambridge next week and at a conference in April on universities and the problems they are facing today for instance. The SGR website receives visits from many people who use the military project pages and download the Reports. But it takes a long time for change to come about. We've now published three reports about this issue which we have sent to the government, who seem reluctant to engage about the concerns we raise. But this is a problem with the government in general. There are many people who have voiced support, including many Members of Parliament. People are becoming much more aware and there is an extensive network of concerned scientists who are trying to make a change and they use our reports to point out some of the things which they would like to see changed. There's a sort of multiplier effect that we have started.

INTERVIEW: JEREMY GARWOOD

ONE FINE DAY IN THE LAB...

BY LEONID SCHNEIDER

