anyone who asked not to pursue a career in science, and I think it is misleading to push it as a career option."

It would be wrong to paint a uniformly grim picture of UK science today. But its world-class reputation will be lost unless it is valued and nurtured by decision-makers and funders.

Prospect is not opposed to change and this is not an anti-science government – far from it. But the voices of those who are best qualified to comment should give us all cause for concern. Prospect is bound to conclude that there is a strategic failure across government to take on the key responsibility of care for the national science base.

If the Prime Minister is serious about encouraging more people to take up science, he must also answer why they should do so when jobs are limited, poorly paid and highly competitive.

Our survey demonstrates that while newer entrants still have a reasonably positive outlook, the subsequent reality is that: ***"Many people can only stay in science if they make personal sacrifices and work very long hours."***

However much the Prime Minister might wish it, this is not the way to build the path to the future.

'There doesn't seem really to be any joined up thinking with regards to the UK public sector science base. Many scientific organisations are undergoing major downsizing, while being hit by the double whammy of government departments that fund much of this research freezing their own research budgets. This has an immediate impact on the viability of research centres which have been structured to depend on such income.'

SCOTTISH SCIENCE

SCOTTISH respondents are notably less satisfied than others in the UK with their level of pay; and slightly less satisfied with opportunities to make contact with others and to influence the nature of work. However, they are more satisfied than other respondents with training provision, opportunities to develop their own ideas and opportunities to publish research (Table 15).

Table 15 – Job satisfaction in Scotland and UK-wide (% of respondents)

	Scotland		UK-wide	
	Satisfied	Dissatisfied	Satisfied	Dissatisfied
Level of pay	27.6	37.2	34.2	34.5
Training	45.7	20.3	38.2	27.9
Opportunities to develop your own ideas	43.6	21.3	36.2	29.8
Opportunities to influence the nature of work	34.0	29.8	34.9	32.6
Making contact with others in the same field	41.9	23.7	42.3	24.1
Opportunities to publish research	36.4	25.0	30.9	28.9

Scottish respondents are more likely than others to have their expectations of skill level and interest met – 84 per cent and 81 per cent respectively. They are also slightly more positive than others about wanting to stay in science (77 per cent) and expecting to do so (62 per cent).

However, more than one third of Scottish scientists would not advise their children to pursue a career in science or technology, a higher number than their counterparts across the UK – see Table 16.

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Table 16 – Would you advise your own children to pursue a career in science or technology (% of respondents)

	Yes	No
Scotland	64.1	35.9
UK-wide	67.7	28.8

Funding

More than one third (36 per cent) of Scottish respondents spend up to half their time trying to secure funds for their work, rather than doing science.

As in the rest of the UK, 43 per cent of Scottish respondents report that the proportion of core funding for their work has decreased over the past five years. And seven out of ten respondents consider that the limited duration of project funding interferes with the quality of science undertaken.

A higher proportion of respondents (91 per cent) work in the public sector and are core-funded by public money. However at a time when research facilities in Scotland are on the receiving end of several concurrent reviews, this also leaves them uniquely vulnerable to short-term pressures on the public purse.

Independence

Although contracting out and privatisation has had less impact in Scotland than elsewhere on providing independent advice in the public interest, where it has taken place the impact is more severe – 12 per cent of Scottish respondents no longer provide such advice at all compared with 8 per cent UK-wide.

Scottish respondents also find it more difficult to maintain independence from research sponsors – 16 per cent in Scotland say it is easy to do so compared with 21 per cent across the UK. A smaller proportion of Scottish respondents feel that their own organisation controls the key decisions about their work – 38 per cent compared with 48 per cent UK-wide.

Half the proportion of Scottish respondents compared with those across the rest of the UK have been asked to tailor their research conclusions or resulting advice – 13 per cent in Scotland compared with 25 per cent UK-wide.

Thirty-four per cent of respondents in Scotland spend up to half their time on work that is commercial-in-confidence, compared with 39 per cent UK-wide. However, only 7 per cent spend more than half their time on such work compared with 36 per cent across the UK.

Over 73 per cent of Scottish respondents (compared with 63 per cent UK-wide) have seen their volume of work increase, but fewer report a decline in promotion opportunities – 37 per cent compared with 51 per cent overall.

There is a lower level of awareness in Scotland about the government's strategy for science and innovation (36 per cent of respondents).

Scottish respondents

A higher proportion of respondents were female (38 per cent compared with 23 per cent UK-wide) and have a slightly younger age profile. As in the rest of the UK, just under half of respondents are aged 36-49, but 26 per cent in Scotland are under 35 (20 per cent UK-wide) and 27 per cent are 50 or over (30 per cent UK-wide).

'The budget continually drops, therefore work becomes increasingly short-term and less rigorous.'

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prospect

POLITICAL rhetoric about the health of the UK science base does not match the reality, according to a survey of almost 1,000 scientists and technologists. More than four in 10 working scientists are either unsure they will be able to stay in science or certain they will leave.

The State of Science 2006 survey, which was carried out by the trade union, Prospect reveals a huge level of anxiety about their personal future among both public and private sector scientists.

The figure is all the more disturbing when more than three quarters of all respondents – 77 per cent – say they would prefer to stay in science.

A total of 952 members from both public and private sectors responded to the union's survey, using the questionnaire on the Prospect website or printed in the union's national journal, *Profile* in October 2006 (Table 1).

Table 1: Respondents by age/gender/sector (%)	
Under 35	20
36 to 49	49
50 or over	30
Male	76
Female	23
Public sector	69
Private sector	28

Overall just 58 per cent of respondents say they expect to stay in science, with a slightly higher level of confidence among the private sector (62 per cent) than the public sector (57 per cent).

The reason why 42 per cent are fearful for the future has nothing to do with the work itself. An encouraging 70 per cent find their work interesting, and 78 per cent consider they are working at an appropriate skill level.

But a significant group expect to be forced out through redundancy or early retirement, while a desire for better pay and conditions is the most common reason cited for leaving. Others are low morale; lack of confidence in the long-term prospects for their organisation; better career progression; more control over their own work; and more family-friendly employment (Table 2).

"In a climate in which scientific skills are in increasingly short supply, this seepage of talent must be a major concern," said Sue Ferns, head of Prospect research who analysed the survey results.

Of those who have already left, the majority are either engaged in or seeking work on a self-employed, consultancy basis. Others have moved into administrative roles or "any other job that I can do to keep employment."

Table 2: Reasons for planning to leave (%)	
Redundancy	6
Early retirement	10
Superior career prospects	8
Better pay and conditions	10
More satisfying work	10
More secure employment	3
Closure/merger/relocation	7
Other	9

Why are so many planning to drop out of science?

One major cause of career dissatisfaction leaps out from the figures: a dramatic decline in promotion opportunities, reported by more than half of all respondents compared to just 7 per cent who say they have increased (Table 3).

Table 3: Promotion opportunities in the last five years (%)	
Increased	7
Decreased	51
More or less the same	36
Don't know	6

This decline has taken place in the last five years, pointing to an accelerating squeeze as round after round of cutbacks, relocations, reviews and contracting out take their toll of job opportunities.

Younger respondents were more upbeat in their assessment as were respondents from the private sector: 12 per cent of those under 35 and 11 per cent from the private sector reported an increase in promotion opportunities.

But overall, 51 per cent of members say promotions have declined, easily outweighing any other issue of concern.

Next on their list of personal gripes is pay. Thirty-five per cent of respondents say they are dissatisfied with their rate of pay, and that dissatisfaction rises with age (see Tables 4 and 5). But professional issues are almost as important:

- one in three scientists does not believe they have opportunities to influence the nature of their work

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- lack of training is a major demotivator, rated as insufficient by 28 per cent of respondents
- more than one in four say they do not have the opportunity to develop their own ideas
- almost as many are dissatisfied with the opportunities to publish research
- one in four say they do not make enough contact with others in the same field of research.

Table 4: Career dissatisfaction by age (%)

	TOTAL	Under 35	35-49	50 +
Level of pay	35	33	34	37
Training	28	19	30	31
Opportunities to develop your own ideas	30	23	31	33
Opportunities to influence the nature of work	33	29	33	35
Making contact with others in the same field	24	27	24	23
Opportunities to publish research	29	30	27	31

Public sector scientists derive greater satisfaction than their private sector counterparts from training provision and opportunities to publish research, but are less satisfied with pay levels. Also, the initial investment in public sector training is not always followed through: ***"They do invest in training, which is to their credit, but they do not care at all for our career progression."***

Table 5: Career satisfaction by age (%)

	TOTAL	Under 35	35-49	50+
Level of pay	34	37	34	33
Training	38	51	37	31
Opportunities to develop your own ideas	36	41	36	34
Opportunities to influence the nature of work	35	38	36	32
Making contact with others in the same field	42	43	43	42
Opportunities to publish research	31	33	31	32

On a positive note, apart from pay and promotion more respondents are satisfied with training and other professional opportunities than are dissatisfied, showing that standards are still being maintained in a good many bodies, however great the funding problems.

Funding

Whatever the government and industry may say about putting more money into research and development, that's not the experience of Prospect members.

More than two in three of all respondents – and 63 per cent of those in the private sector – report that their team's work has been affected by funding cuts over the past five years (Table 6). The range of work in the public interest which has been lost because of funding cuts is illustrated in Table 8.

Table 6: Has your team's work been affected by cuts in funding over the last five years? (%)

Yes	68
No	17
Don't know	13

Fewer than one in five have not been affected by cuts, and the number voicing concern over this issue rises with age, probably reflecting additional managerial responsibilities acquired with seniority.

The consequence of this financial squeeze is that large numbers of scientists have to chase funding for science rather than doing science.

'Several opportunities to collaborate with new US and European projects have been lost due to lack of pump-priming funding.'

A quarter of all scientists now spend one day of each working week trying to secure funding, and one in ten respondents spend a staggering 20-50 per cent of their time seeking funds. Again, these pressures increase with age (Table 7).

Table 7: Time taken to chase up funds (%)

Up to 20%	28
20 to 50%	10
50% plus	4
Does not apply	57

New patterns of funding come at a price. Seven in ten say that the limited duration of project funding interferes with the quality of science undertaken (Table 9). This trend is consistent across both public and private sectors.

Table 8 – Loss of public interest work
National measurement standards.
Signals intelligence and intercept capability.
Landmine clearance technology.
Wild geese and agricultural damage.
Bio-inorganic chemistry research.
Mineral surveys. Collection of long-term data for climate change modelling and biodiversity changes.
Pathogenesis and treatment of arthritis and related conditions.
Propulsion development and testing.
Quantum roulette noise thermometer – a superconducting device exploiting the properties of quantum mechanics to measure temperature in the range 15-40K.
Materials life and reliabililty.
Long-term research into animal genetics.
Fish biology. Native salmon populations. Parasites in Atlantic cod and haddock. Predator-prey interactions between commercial fish species. Surveys of mackeral stocks.
Plant breeding for agronomic yield.
Specialist robotic and automatic equipment.
Endemic disease of farmed livestock. Welfare of animals on farm, at market and in transit. Grazing behaviour.
Anaerobic bacteriology.
Maintenance of Sites of Special Scientific Interest (SSSI) and failure to designate others.
Use of innovative technologies to destroy asbestos wastes – 'converting' asbestos into an inert form that can be used as an aggregate in construction rather than consigning it to landfill.

Almost half of those surveyed report that the proportion of core funding for their work has decreased over the past five years, making it less secure.

Table 9: Does the limited duration of project funding interfere with the quality of science? (%)	
Yes	68
No	27

Overall, 78 per cent of the work of respondents is core-funded through the public purse, compared to just 10 per cent with core private funding and 11 per cent which has no core funding at all. It is interesting that 54 per cent of private sector respondents rely on public money to fund their work.

Over the same period, nearly two-thirds of respondents report an increase in the volume of work, (Table 10) in part because ***"budget constraints have resulted in fewer staff to do the same amount of work as before."***

Table 10: Change in the volume of work (%)	
Increased	63
Decreased	11
Remained the same	24

This problem is widespread across the private sector (52 per cent) as well as the public sector, though a higher proportion in industry have seen their work volume fall (17 per cent, compared to 8 per cent in the public sector).

'All work is now required to have a gold-plated guaranteed result. This is not the nature of meaningful research.'

1 IN 4 IS ASKED TO FIX THEIR FINDINGS

Exactly one in every four respondents to the Prospect survey has been asked to tailor their research findings or advice – and these pressures are greatest in the public sector Usually scientists are asked to tailor their findings to suit the customer's preferred outcome, but often they have to do so to obtain further contracts or to discourage publication (Table 11).

Table 11: Have you ever been asked to tailor your research conclusions or resulting advice to: (%)			
	All	Public Sector	Private Sector
Suit the customer's preferred outcome	17	15	20
Obtain further contracts	8	6	14
Discourage publication	3	3	3
Never been asked	75		

The same proportion reports that it is difficult to maintain independence from their sponsor, and this has been a consistent finding of Prospect science surveys for the past 15 years (Table 12).

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Table 12: How easy is it to maintain independence from your sponsor? (%)	
Easy	21
Difficult	25
Neither	48

Equally disturbing is that half of all respondents say that contracting out or privatisation has impacted negatively on their ability to provide independent advice in the public interest, including 8 per cent who simply don't do it anymore (Table 13).

As one respondent noted: ***"The continual push towards privatising public sector science is undermining the independence it was set up to achieve. If it is not stopped soon there will not be enough left to save."*** ***In the words of another: "Government is making a business out of something that is not naturally so."***

Table 13: Has contracting out/privatisation made any difference to providing independent advice in the public interest? (%)	
No difference	39
Takes longer	17
Don't do it anymore	8
Only do it if there is a budget	25

Commercial-in-confidence

Almost four in ten (39 per cent) of all respondents, and 25 per cent in the private sector, spend up to half their time on work that is commercial-in-confidence. More than one third (36 per cent) in the public sector spend more than half of their time on such work, compared with 60 per cent in the private sector.

Decision-making

Less than half of all respondents feel that their own organisation is fully in control of the key decisions about their work: ***"Research only seems to get the go-ahead when topics become 'political'"*** and: ***"We find it very hard to get funding for basic research and data-gathering to support the applied science that we are expected to do."***

Perhaps unsurprisingly this is of less concern in the private sector, though even here only just over half (58 per cent) believe that control does lie with their own organisation.

Government's strategy for science

The survey results suggest that the government has failed to communicate its strategy for science. Less than four in ten respondents (38 per cent) are aware of the *Ten Year Science and Innovation Investment Framework*, published in July 2004. If scientists are not aware of it, what hope for the wider public?

Respondents over 50 are more likely to know about it, though still less than half (42 per cent) do so. Only 15 per cent of private sector respondents are aware of the strategy, despite its emphasis on commercial application. However, as one respondent commented: ***"Despite the Science and Innovation Strategy there is a tendency for funds to be allocated to subjects that grab the most media attention or make the most money."***

The future in jeopardy

Despite all the frustrations, scientists remain dedicated to the work they do and maintain a strong commitment to the public interest.

Two thirds of all respondents would advise their own children to pursue a career in science and technology, though it is clear that disenchantment increases with age and is higher in the public than the private sector – see Table 14.

Respondents give a sense of being caught between their own enjoyment of science and the reality of working in it:

"I would advise my children to become well educated about science, but it is honestly difficult to recommend it as a career choice. My experience is that careers that involve working in a laboratory or making calculations are seen as less valuable than management roles. This is reflected in pay and status within the organisation and the absence of any scientists from the senior management team."

Table 14: Would you advise your own children to pursue a career in science or technology? (%)		
	Yes	No
Under 35	77	21
36-39	67	30
50 and over	63	33
Public sector	66	31
Private sector	73	24

Another commented: ***"Although I have provided relatively positive feedback, I would strongly advise***