

## Gender in Ecology: Where are the female professors?

Alison Holt & Tom Webb

### Introduction

Despite a number of initiatives since the 1970s, academic institutions are still not retaining the women they have trained as scientists. There is a lack of women occupying senior positions in science and as a result institutions are coming under increasing scrutiny. A growing body of evidence attests to this imbalance, from the Greenfield report in 2002 to a spate of recent articles in *Nature* and *Science* (see Box 4). In 2006, the European Commission reported that in the natural sciences although 40% of PhD students are female, only 11.3% of the professor, research director and other top positions are occupied by women (Wutte 2007). Ecology is certainly no exception to this trend and in the UK it is common to see more females than males at undergraduate to PhD level. However, there is a steep drop in numbers of individuals making the conversion from post-doctoral research positions to lecturer or independent research fellow, and statistics show that more of those dropping out at this stage are women. Losing trained scientists, of any gender, constitutes a waste of talent and of resources, and is ultimately a loss to society. Loading the dice against half the qualified candidates cannot be the best way to proceed.

In this article we leave aside unhelpful biological hypotheses regarding innate differences between the sexes (see Barres 2006), and consider instead some of the societal reasons for this gender imbalance in ecology. We base it on our conversations with ecologists, from interviews with successful academics in the natural sciences (who happen to be female; Box 1), and from the results of a questionnaire filled out by BES members at the recent annual meeting in Glasgow (Box 2). We also discuss if there are any institutional and cultural shifts we can make to create a level playing field for women to achieve a successful career in ecology.

### Why does a gender imbalance exist?

Here we outline a number of barriers that inhibit the progress of women in ecology and the biological sciences.

### Child rearing

Family responsibilities consistently emerge as the overriding factor influencing the careers of women in ecology (see Box 1, 2). Maternity leave in academic institutions is well established but returning to work after this period can be problematic.

Child care fees are expensive and often it is not cost-effective for both parents to work. The parent with the lower wage often forfeits their job, which is still often the mother. Child care facilities at Universities are on the whole quite poor but having facilities in close physical proximity to the parents' place of work can make a huge difference to career choices (Box 1). Should a career break be taken, it is exceedingly difficult for individuals to return to science as little formal support is offered.

As child rearing responsibilities still rest on the whole with women, it is females that most often experience problems that are a consequence of the scientific work culture. Working practices in ecology can be highly informal, which frequently means that meetings are arranged late afternoon and ideas are often discussed in the pub. Part time work is often not openly offered as an option and it can be hard to remain productive enough to be successful. Finally, negative attitudes persist towards women working more flexible hours to fit in family commitments (Box 1, 2).

### Unintentional discrimination

There may of course still be cases of outright gender discrimination but this is not something that is common. What is more common is that males are puzzled as to what the barriers are that women face that may hamper their career progression, or in most cases they just don't give it any thought. We're going to be really unfair here by giving a couple of examples. Consider the highly publicised '100 questions of high policy relevance' recently published in *Journal of Applied Ecology* (Sutherland et al. *Journal of Applied Ecology* 43: 617-627, 2006), resulting from a UKPopNet workshop aimed at canvassing the opinion of leading UK ecologists and ecological policymakers. Is it really an accurate reflection of the role of women in UK ecology that only 2 of the 39 authors of this paper were female? Likewise, at the BES Annual Meeting in Glasgow this year, only 14 of 48 session chairs were female – the ratio has been similar or lower at every meeting since we started noticing these things a few years ago, despite the fact that this is not a role which requires any great seniority. Nobody would suggest that there has been any intentional discrimination in either case, and as we said, it is unfair to pick on these two examples when almost any workshop or meeting would offer the same results. Yet the question remains as to why so few women end up attending influential workshops or being asked to take positions of responsibility or authority. Anne Glover (Box 1) highlights the role of male-dominated informal social networks in perpetuating this imbalance. It seems likely that

this effect will be seen in other areas too, for instance with involvement in collaborative grant applications.

### The 'Old Boys' network'

The concept of 'implicit bias' is well known to social scientists. This is where individuals will show a preference towards other individuals who are like themselves. In ecology, where those at senior levels are generally male, such behaviour will perpetuate the imbalance. Men have different relationships with women than with other men and when they are not used to interacting with women at work it is going to be hard for women to be included in that all important informal social network that defines academia. Several respondents to our questionnaire (box 2) recognised that this 'old boys' network' still exists within ecology, and that this can make women feel alienated. Networking and collaboration form an absolutely

essential part of a successful career as an academic ecologist, and as outlined above the handing out of responsibility that can help raise one's profile often occurs within this culture, leaving it harder for women to progress.

### Double jeopardy?

There is some evidence that women are more drawn to applied and interdisciplinary sciences, teaching and communicating ecology. These activities are not currently rewarded in the promotional system (see feature on Interdisciplinary Research in the August edition of the Bulletin (38:3)), which acts as a double blow to women. In this case the system as it exists at the moment, promoting academics based on number of papers, where interdisciplinary papers are less common and in lower impact journals, excludes both genders, but potentially more females.

**Box 1.** At this year's BES Annual Meeting in Glasgow, both the BES Lecture and the Tansley Lecture were delivered by women. We took advantage of this unusual situation to talk to two highly respected and extremely successful scientists about their take on issues surrounding women in science.



Professor Anne Glover,  
Chief Scientific Advisor for Scotland

#### Do you recognise that there is a gender imbalance at the higher levels of the biological sciences?

Yes, women definitely disappear. Academia isn't a very attractive place for women with families. A young family is hard to bring up on a salary that might be quite low and the nursery care costs are high. Women may take time out at this stage to save on the costs and then find that it is really difficult to get back into an academic job. There is no proactive support system to help people, male or female, return to academia.

#### Is it this imbalance important?

From a personal perspective, I do get tired of being the only female in the room and it can be awkward. It's like not being part of the club. Interaction and conversation is often better in a mixed group. It would bring a lot to science if there was more of a balance and women are often better at communication, particularly verbal communication. Men can certainly learn from that in a scientific environment. From a more practical perspective, it is a problem because the money invested in training these women to post-doc level is then wasted. We need to keep benefiting from this investment by supporting women's career progression, and even if they leave academia there could be support for career changes where they will still use their science – for instance, taking their skills and expertise into teaching, where they could be inspirational.

#### Why don't women progress as far or as rapidly as men?

People with young kids often have to leave work early, and work flexible hours. The strain on parents, male or female, is immense, because their colleagues are working long hours and they are trying to keep up. There are no obvious solutions to the lack of work-life balance in science. There is not the support in society to ensure a sharing of maternity and paternity leave.

## Feature: Gender in Ecology

*Bulletin of the British Ecological Society 2007 38:4*

It would be interesting to compare data on females returning to academia/work after kids in UK with somewhere like Sweden – one would think the rate would be higher in Sweden due to their better support system for working mothers and fathers.

Cultural expectations also play a part. In my department, staff meetings are usually at about 4 in the afternoon and if you need to go and pick up the kids this is a really bad time. Attitudes towards parents leaving early can be revealing – a female colleague put it like this: if a woman leaves a meeting early to pick up the kids, she isn't serious about her job, but if a male does it makes him a great father! On the other hand, the language that is used to describe women who do get on in their career is very different (and can be somewhat negative) compared to their male counterparts – 'pushy', 'aggressive', etc.

### **Do you think this is a hangover from senior academics or something that is persisting in the next generation of biological scientists?**

Young people definitely have different attitudes which is to be welcomed. Senior academics are often inadvertently sexist because they just don't give the matter any thought, it is a learnt behaviour over the years, all their colleagues are male and they are used to interacting with men and have different relationships with men than with women. Perhaps they find dealing with women and female issues more awkward or it is just unusual for them to have to do it. Women may therefore find it difficult to get senior positions, or get nominated for membership of committees, because they are excluded from situations in which informal interactions occur. For instance the chair of a committee looking for a new member might ask a colleague he bumps into in the loo! Likewise, guys often go for lunch together, whereas women often eat lunch at their desk if they have to spend time picking up kids later so some of the important social time that females might have with males is lost. Consequently, women have a lower profile than men and committees have fewer women.

### **Do men and women pursue their careers in different ways?**

I don't think that women have different aspirations from men – we all want to be good scientists. However, women often won't stretch themselves to skip logical steps in their career progression whereas men tend not to be so constrained by the roles, are more opportunistic and will apply for jobs where the job specification is actually for someone more senior than themselves. They feel they have nothing to lose, and at the very least it's an opportunity to get themselves known and get good feedback. In fact, I think this is the right attitude. Women tend to be more respectful of the established system, and perhaps they fear the rejection more.

### **Is mentoring a good approach to supporting women in science?**

Mentoring is really important in career development. I've had a series of informal mentors through my career, although interestingly none of them have been female. I actually worry about the idea that women should be mentored by women – it's more important to be mentored by someone (male or female) who knows the system, who has succeeded, so you get more practical advice on how to get on in your career. A most important mentor for me was Prof. Allan Hamilton (Emeritus Professor in microbiology at Aberdeen University), he was well balanced, experienced, could perceive difficulties, was positive and supportive but never unconditionally supportive, and he made me think for myself. I found this incredibly helpful and useful for my career. I think that young people, male and female, need that back-up.

### **What do you think of initiatives like Athena Swan [Box 3]?**

Fine as long as it is balanced and not aiming just to favour females. Positive discrimination is undermining – I would hate to think that I had got on because I was female rather than the best person for the job. However, it should be ensured that everyone is on a level playing field (which is very different from positive discrimination).

DIUS [Department for Innovation, Universities and Skills; see Box 4] also run mentoring programmes. They have looked at women sitting on senior committees e.g. on research councils. I sit on NERC and out of 20 people there are only 4 women. The four women were asked to mentor other women as to what it would be like to sit on such a committee, I agreed, but also asked why they are not asking the male committee members to mentor women too – they agreed that this was a good idea. The mentoring involved helping the women to fill out applications for committees that they want to sit on. Women tend to think about themselves learning rather than giving (e.g., 'I think I would learn a lot by being on this committee'), whereas men are better at promoting themselves than women (e.g. 'I would bring x to this committee'). Selection based on

people pushing themselves forward is going to favour men because they are better at it, but once women realise that this is how things work then they can adapt.

**Are there any interesting contrasts between policies and science in terms of gender issues?**

12 month view is that politics appears less sexist than academia. Perhaps this is because academia is very traditional. There are a good number of women ministers, cabinet secretaries and senior civil servants and the proportion of women with careers in politics is likely to be higher than in academia, even though the hours of parliamentary sittings are not good for people who have kids. This may be because it is easier to return to work after kids in these areas. There is a more transparent career structure in the civil service, which may benefit women because if they know precisely what is required to achieve a certain grade, they can set about acquiring the skills and experience. Also government looks at training as an investment and if they have spent money on training anyone then they support them and get the best out of them. There is no mechanism to make this happen in academia.

**Did you have any positive role models of women in science?**

There weren't many. My parents were very influential in what I did and they instilled in me the belief that I could do what I wanted in life if I worked hard enough, nothing was ruled out. My lecturers were all male, as were my peers, although there were some impressive female senior academics at my university so I knew it was possible – but then I never questioned that anyway. When I go to schools and ask kids what they think scientists are they describe a man with a white coat, bad hair, glasses and a beard! When I tell them that I'm a scientist suddenly they realise that it is possible to be one, even as a woman!

**What's the way forward?**

I think women need to be keener to talk about the whole issue, and hopefully the situation will change. We need to keep on supporting the people we have trained through the system and if women are dropping out we need to be a bit more proactive ensuring that there is an easy way for them to get back into science. Things like pay structure or flexible working hours would be a start. It is a problem that can be solved as it has been in other countries.



Professor Gretchen Daily,  
Stanford University

**Do you recognise that there is a gender imbalance in ecology in the US?**

Certainly there are not many women in tenured positions compared to postgrads in the States. In terms of meetings and so on, a colleague at Princeton told me that as soon as there are more than about 30% women in a group then gender ceases to be an issue in terms of making decisions and general group dynamics, but dropping below that there can be problems. It struck me that I actually had never been in a working group where there were more than 30% women!

**Are there any reasons that stand out to you as to what might cause this imbalance?**

I didn't have such a feeling for what might be some of the problems until I had kids and then it really hit home. It is like there is a glass wall between parents and non-parents, you just don't understand it until you get there! Prior to becoming a parent I didn't perceive a lot of barriers, I mainly felt very supported by senior males that wanted to see more females in academia. In fact, I wasn't really interested in having these kinds of discussions at all. But now I realise that it might take a more unusual type to take all the trade offs you need to take to get on. I had kids late so had already established my career. It would definitely be more difficult to do it before having established a career. And it's especially hard in conservation because of the amount of travel, which is necessary if you want to have more than a superficial understanding of the forces

## Feature: Gender in Ecology

*Bulletin of the British Ecological Society* 2007 38:4

at play. That kind of travel is hard to do with kids, which might be why there are few women who do it. It is possible, though. Especially as more men are now becoming equally active as parents.

### **Are there any specific examples of barriers to career progression for women?**

Career choices are a little starker when childcare payments come up, decisions have to be made. There is a role for better family orientated policies, support that is flexible, near work – this would make things a thousand times easier than if these kinds of facilities are distributed in a wider area. If people talked about this issue more it would help. I was the first woman in my department to go on maternity leave – although in the US it's classed as disability leave! So I had to sign up for disability leave, and I was prohibited from going to the office during that time – so I had to sneak in to keep things ticking over. These are mad policies. I know of post-docs still who just presume that they will have to quit their jobs when they have kids. This perception is still out there.

### **Are there initiatives to address these issues in the US?**

I'm not aware of any formal initiatives. Carl Djerassi (of birth control pill fame) has suggested to the NSF that fellowships should be available, just to provide help in the lab for women if they have kids. I think support should be available for men for child rearing too. But basically, there should be money available so it's not such a break and so that there's more support. Personally, I benefited from a great deal of general career advice from good scientists. Importantly, they spent a great deal of time telling me what the rules of the game are if you want to progress in your career. Many people don't get that, but it's really important for both men and women. My advisors were mainly male but they did talk about these gender issues and were really supportive. The important thing is to recognise that men as well as women would benefit from better policies. For instance, people have found that family planning programmes that involve men are more successful than those concentrating only on women. The same applies in other areas. If we can discuss these issues openly and involve everybody in the discussions, that will really help.

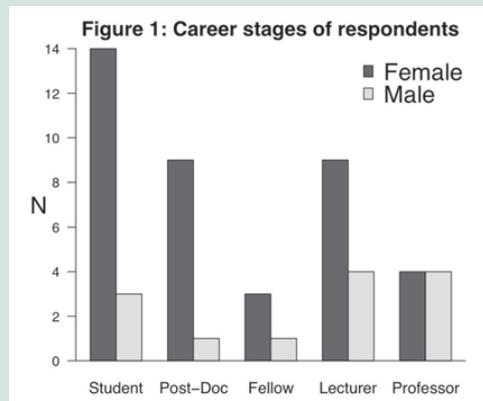
### **Should we and can we redress the balance?**

Society is changing, and it may be that this alone will be sufficient to redress the gender balance over time. For instance, Professor Georgina Mace, Director of the NERC Centre for Population Biology at Imperial College and Fellow of the Royal Society, says "I am really encouraged to see a strong cohort of early and mid career female ecologists emerging in the UK, and I believe that as these people progress in their careers the current imbalance in the most senior levels will disappear in the next decade or so." This optimistic viewpoint is shared by several of those who responded to our questionnaire (Box 2). However, we are less hopeful that this critical mass theory will apply to ecology. Large numbers of women have been gaining PhDs in ecology for years, yet still the transition from post-doc to independent research career is rarely made. Of course, reaching a tenured position in ecology requires persistence, unfailing self confidence, strength of character, thick skin and good luck, qualities which vary within as well as between genders – the main reason why so few post-docs of either gender actually establish successful academic careers is that there *has* to be a strong filter at this stage. But as ecologists we of all people should realise the huge difference in 'population size' of

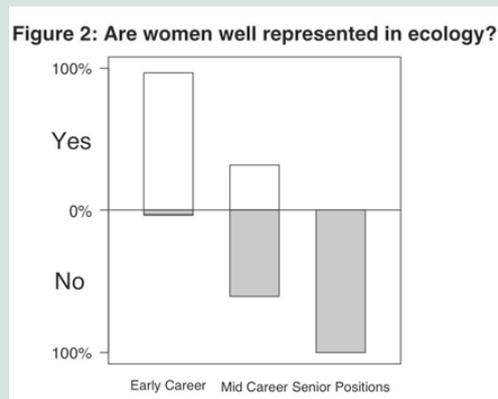
successful senior academics which can result from a tiny difference between the sexes in rates of 'recruitment' at the post-doc level. Any factor which results in an uneven playing field – of which we have outlined several – will perpetuate the imbalance at senior levels. More and more women are gaining PhDs, but adding extra challenges resulting from a male-dominated profession to those present for everyone may be enough to tip the balance and make the female post-doc wonder, is it worth it?

**Box 2.** Women in Ecology Questionnaire, BES Annual Meeting, September 2008, Glasgow

Many thanks to those of you who filled in our questionnaire on women in ecology distributed at this year's annual meeting in Glasgow. Overall we received 63 responses, 48 from women and 15 from men. The responses represented people at various career stages, summarised in figure 1. This issue clearly interested women at all stages of their career, whereas we drew scarcely any responses from men at early-mid career stage.



All respondents recognised that there is a gender imbalance in ecology, particularly at senior levels (figure 2), whereas most felt that there was no imbalance at early career levels. Most respondents (68%) were in favour of affirmative action to address this imbalance, if uncomfortable with the idea of positive discrimination. Female respondents were significantly more likely to favour action than males (75% c.f. 47%). Issues of flexibility (including more part-time research positions), better mentoring, and more imaginative ways of assessing academic achievement were consistently highlighted as areas which need addressing (see below).



Family responsibilities consistently emerge as the overriding factor influencing the careers of women in ecology, as outlined in the comments below and elsewhere in this feature. Twenty of the respondents to our questionnaire had children. Of the 13 women with children, nine were principal carers, of whom five combined this with being principal earner. The remaining four mothers shared care duties approximately equally; three of these women also contributed approximately equally to household income. This contrasts with the seven fathers, all of whom were the principal earner in their household whereas none was the principal carer (although one shared care duties approximately equally).

## Feature: Gender in Ecology

*Bulletin of the British Ecological Society* 2007 38:4

Here we present a selection of your comments on various facets of gender in ecology; a more complete listing will be posted on the BES website.

### Family life

"The only two women I know of in high-up ecology careers do not have children – surely not a coincidence? Men with children *can* make it to the top, so women with children should be able to do so as well."

"Having children and an academic career as a woman seems to be an impossible goal."

### Discrimination and the 'old boys' network

"The BES itself could be more proactive in promoting the role of women – e.g. *inviting* women to play a role in Council (why so few?), as editors of journals, and recognising their achievements in awards. There is arguably still too much of an 'old boys network' at senior level in the BES, but no 'old girls network'. How many former BES presidents can you name that were women?"

"We need to challenge the discriminating views of some of the 'old boy' network, not make excuses for them."

### It's a matter of time

"Recruitment of women into senior level posts will proceed as the demographic wave of young investigators grows older and develop mature programmes of research."

"Looking at university intakes more women than men are entering into biology / ecology so I think it's not an issue. I don't feel I'll have a problem due to being female."

"I think it's just a question of time to change a historically predominantly male academic world."

### Measuring achievement

"Calculation of measures of esteem / publications etc. should take account of the time period actually worked, rather than a general overview of the whole career, in recognition of career breaks e.g. for childcare."

"Recognition and credit should be given for other roles that women in science tend to adopt more often than men, e.g. admin, nurturing / mentoring, organising events."

"The profession needs to be better at rewarding people for work pro-rata, i.e. if you work half time accepting half outputs."

### Positive action

"More assistance with returning to work / science after children. The Dorothy Hodgkin grants provided by the Royal Society [see Box 4] are a great idea in this respect."

"Provision of crèches at conferences would enable women to pursue careers more fully. Also decent childcare or opportunities for children alongside (e.g. child-friendly field trips)."

"I wouldn't like to see women discriminated *for*, because this implies discrimination *against* men – also I feel that this would be patronising to women. However, there are things that could be done to help both men and women combine career and family – e.g. more flexible working hours, crèche facilities, more generous maternity / paternity leave."

"Providing childcare (possibly subsidised for students and staff) at universities would be fantastic. I know ours doesn't have any facilities and I think this would make a real difference to women planning to have or with children."

"The Daphne Jackson trust [see Box 4] is good for women scientists generally who have taken time out and wish to return to work."

**Other suggestions:** Mentoring of women ecologists... Flexible working... Working from home... Same salary for same positions... Extend the length of contracts... Positive role models... Media coverage of 'good' stuff that scientists do, both men and women... More training and careers advice... Encouragement of promotion applications... Short-listing of job candidates blind to sex... Girls should be encouraged early on in life... Affordable, good quality childcare provision at work... Crèche facilities... Facilitate job opportunities for partner scientists... Equal periods for maternity and paternity... Positive discrimination... Not positive discrimination!

### The way forward

It is important to raise awareness at all scales – departmental, university, national and international – in order to promote change. We hope that this article will contribute to this process within ecology, by presenting arguments raised by the ecological community itself. Respondents to our questionnaire identified many steps that could be taken at the departmental level to help level the playing field for women in ecology (Box 2). Key among these were the need for greater flexibility in working practices; better mentoring of all young ecologists, including practical information on how to plan a successful career; fairer and more transparent promotional structures and ways of recognising achievement; and a more sympathetic working environment for those with family commitments. Georgina Mace agrees: “My view is that the best way to deal with this is to create opportunities: more flexible patterns of working with an appropriate emphasis on what people do rather than where and how they do it. Positive mentoring, supportive environments, strong role models and good advice to young scientists are important.” We would add that positive steps to increase the gender balance on interview panels and peer review committees would be very welcome, and would provide a fairer way of ensuring that the best candidate is selected in any one situation.

There are also changes that we can all push for in our respective departments and there are national initiatives that can help us do this. The Royal Society’s Athena SWAN Charter for ‘the advancement and promotion of the careers of women in science, engineering and technology in higher education and research’ is an excellent example (Box 3). The Biology Department at the University of York won a Silver Athena SWAN Award in March of this year. Dr Nathalie Signoret, who was responsible for much of the co-ordination of the Silver award application, is convinced that such initiatives can make positive changes within University departments. “In practice an award application is a great deal of work. It takes time and the commitment of a working group, that in Biology contained both male and female members across the senior levels, and support from the University is paramount.” In York, the University had already won a Bronze award so the commitment was already there. “The Human Resources department for Biology was also an important factor in our success,” says Nathalie. She also emphasised that the changes necessary need to come from the scientists themselves but that in order to put solutions in place “you need to work within the University systems and co-operation from the administrative departments is necessary.”

The process from application to award need not be very long. In the case of Biology at York it was 10 months. Nathalie found that the most time consuming aspect was the self-assessment procedure, gathering the department level statistics in order to see if and where the gender imbalances lay. The application process made people realise that there were issues that needed to be addressed, even though the imbalance was not as grave as it is in some departments. In terms of outcomes, Nathalie says that “it is still a little early to tell if the award has made real improvements, but some positive changes to the departmental systems to give support at key career transition stages and decision making processes have been made”. Changes include mixed-gender interview panels, improvement of performance reviews for staff and post-docs to receive advice on development needs and career aspirations, the employment of a skills development co-ordinator for post-doctoral researchers and postgraduate students to receive career and professional development advice, introduction of a nationally advertised fellowship day, part-time and job share arrangements being made explicit on recruitment literature, and we regularly arrange activities to raise the profile of women in science and to inspire young researchers. Details can be found in the Submission Report (see Box 4). Nathalie maintains that the main reason for Biology’s success was that “we wanted to make conditions more favourable for women specifically, but we also wanted to improve them for everyone”.

Of course, winning an award is by no means the end, and the charter requires that continuing work on positive changes for women be outlined in annual reports to the Royal Society. Hopefully there will be more female applicants for senior posts if such changes are replicated at universities both nationally and internationally, and if they can remove the misconceptions that prevent women from applying in the first place. However, it also seems likely that there will be little support for such initiatives in departments that are particularly male-dominated, and where the need is therefore greatest.



**Box 3. Athena SWAN: A Charter For Women in Science**  
Julie Ashdown, Athena SWAN Charter Coordinator

The Athena SWAN Charter is a recognition scheme for universities and research institutes which demonstrate excellence in science, engineering and technology (SET) employment for women. It is funded jointly by the UK Resource Centre for Women in Science, Engineering and Technology (UKRC) and Equality Challenge Unit.

The SWAN Charter developed out of the work of the Scientific Women's Academic Network and was launched in June 2005 with 10 founder members. The Charter now has 26 members. Any university which is committed to the advancement and promotion of the careers of women working in SET in higher education can apply for membership. Charter membership enables universities to identify themselves as employers of choice.

Charter members have to endorse the following six principles and incorporate them into their action plans:

- ☉ To address gender inequalities requires commitment and action from everyone, at all levels of the organisation
- ☉ To tackle the unequal representation of women in science requires changing cultures and attitudes across the organisation
- ☉ The absence of diversity at management and policy-making levels has broad implications which the organisation will examine
- ☉ The high loss rate of women in science is an urgent concern which the organisation will address
- ☉ The system of short-term contracts has particularly negative consequences for the retention and progression of women in science, which the organisation recognises
- ☉ There are both personal and structural obstacles to women making the transition from PhD into a sustainable academic career in science, which require the active consideration of the organisation

Charter members are encouraged to apply for SWAN recognition awards which are assessed on five key areas:

1. knowing the baseline and the SET academic profile
2. providing positive support for women at key career transition points
3. changing the culture and gender balance in decision making
4. work-life balance practices, their introduction and uptake
5. champions, responsibilities and accountabilities

Bronze awards recognise a university's achievement in the collection and analysis of key data and the development of action plans on gender equality in SET in the first three areas. Silver awards recognise achievement in the collection, analysis and comparison of key data, the development and implementation of action plans, and a clear demonstration of progress on gender equality in SET in four of the five key areas. Gold SWAN awards recognise achievement in the collection, analysis and benchmarking of key data, the development, implementation and evaluation of action plans and a clear demonstration of significant progress on gender equality in SET in all five key areas.

Bronze awards are available at university level, but individual departments can apply for awards at Silver or Gold level. This enables them to profile their own achievements, as well as set out an action plan which takes account of differences between departments within a single university. The awards are judged by an independent panel of experts drawn from academia, industry and professional bodies.

The first awards were presented in March 2006 and, since then, 15 universities have won recognition awards, along with 6 individual departments, including the first ever and, so far, only prestigious Gold award, to the Chemistry Department at York University, for excellence in recruiting and progressing women. Their employment policies have enabled talented women to rise to senior levels in the department and for the university to make the most of their talents.

York University is also distinguished by having the most awards to individual departments, Biology and Psychology having attained Silver this year as well.

The awards provide an opportunity for universities to profile their activities on gender equality in SET and each award winner has a case study on the Athena SWAN website ([www.athenaswan.org.uk](http://www.athenaswan.org.uk)). These provide inspiration and ideas to other universities, as well as helping to promote the activities of individual departments within the university itself.

Those universities which have had the most success in promoting gender equality in SET are those where the very top management have not only been committed to gender equality but have clearly demonstrated that commitment and held their staff to account. Many of these have set up a university Athena SWAN Working Group, attended at Head of Department level. Working Groups can also help in the sharing of best practice between those departments ahead of the game and others where women are more isolated and attitudes less enlightened.

Culture change is essential in helping to change attitudes. It's not something which can be done overnight. But SWAN award winners have shown that small steps can lead to real changes in working conditions for women. Making sure that women are represented on decision-making committees, such as finance is important. But some universities go a step further and make sure that where there are small numbers of women in their departments, those women don't have to sit on too many committees at the same time as maintaining a high workload.

Another thing which helps to change the culture of an organisation is making sure that women's achievements are recognised and celebrated. So, some Charter members have organised exhibitions and lectures about women of achievement, or have sponsored artwork featuring leading women. Others organise 'Women in Science' days to raise the profile of the success of women in science, particularly among students and post-doctoral researchers.

Other initiatives have included:

- ☉ appointing a Graduate and Postdoctoral Training Officer to support post-graduate students and post-doctoral researchers with a range of career and professional development advice and support, including an informal mentoring system for postdoctoral researchers
- ☉ sharing female academics between science departments to ensure that there is always gender balance on interview panels
- ☉ a web-page for researchers to post their CV when they are available for future projects, and a policy of not advertising externally where internal appointment would prevent a redundancy
- ☉ allocating a light load of teaching and administrative duties for new appointees to allow them to settle in and establish their research projects
- ☉ setting up and funding a Post-Doc Forum to reduce isolation and help early career researchers network more widely
- ☉ producing a Roles and Responsibilities document for Principal Investigators

Annette Williams, Director of UKRC, said "Seeing successful women in university science and engineering departments has an enormous influence on attracting girls to study and work in SET. The SWAN awards highlight the ways in which universities and research institutions can recruit, retain and promote women to all levels in their SET departments. They show that there is a place for women in science and they can succeed."

Nicola Dandridge, Chief Executive at Equality Challenge Unit, said "Science cannot reach its full potential unless it can benefit from the talents of the whole population; until women and men benefit equally from the opportunities that it affords."

For more information about the Athena SWAN Charter, including advice about signing up, please see the website [www.athenaswan.org.uk](http://www.athenaswan.org.uk) or email Julie Ashdown at ECU on [Julie.ashdown@ecu.org.uk](mailto:Julie.ashdown@ecu.org.uk).

## Feature: Gender in Ecology

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For a more general perspective on the issues surrounding gender imbalance in science, and strategies to overcome this imbalance, we talked to Alison Phipps, a lecturer in sociology in the faculty of gender studies at the University of Sussex and author of a forthcoming book describing initiatives for women in science since the 1970s (Phipps 2008). The book will provide an overview of what has been done and to stop institutions and groups reinventing the wheel. It will do this by detailing initiatives but also documenting any evaluation that has been done. Alison sees this book as a starting point and a source of reference for groups or institutions that want to put in place measures to help women progress in science.

We asked her for her views on Athena SWAN, which she thinks is a very good initiative as it is at the University or institutional level and therefore aims to change institutional culture, rather than change girls or women to fit the institution. This has parallels with a wider feminist critique of the idea of 'equality', and particularly 'equal representation', for its own sake.

Germaine Greer, for example, has said that "to be equal with men in an unchanged world is my idea of hell". Clive Hamilton (Hamilton 2003), commenting on Greer's *The Whole Woman*, is equally blunt: achieving equality in the current system would just mean that women can "...feel alienated and exploited the way men do"! Many of the responses to our questionnaire (Box 2) also highlighted the need for institutional change. Of course, different situations may require different responses, and Alison Phipps worries that some of the bigger initiatives are 'one size fits all' and do not address the deeper issues. She sees the key as being to raise the consciousness of men and women about this issue in order to activate need for change at grassroots level, and then support these local groups so that they become co-ordinated nationally.

### The role of Research Councils and the BES

It is not just University departments that have to address gender issues but it is also the responsibility of learned societies and funding bodies to make sure their selection processes involve a fair representation of scientists. The Natural Environment Research Council continues to monitor and analyse the structure of their funding schemes, eligibility and assessment criteria. They also compile statistics on who applies for various grants and what the success rate is by gender (see NERC vital statistics 2006-7; Box 4). Despite this several people have commented to us that the NERC peer review college is still overwhelmingly male.

The BES also recognises that there is a gender imbalance issue in ecology and therefore in the society's business. BES Council

has discussed these issues at their meetings and have actually been quite unsure about how to tackle them, especially without the use of the controversial positive discrimination tactic. They have however, reviewed their systems and tried to make them much more unbiased.

The gender imbalance in ecology is highlighted starkly by two statistics. First, until recently there has been no female editor of a BES journal. This has been largely due to a lack of suitable applicants, and a first female editor in the history of the BES – E.J. Milner-Gulland – has now been appointed at the *Journal of Applied Ecology*. This breakthrough may reflect the new selection system that has been put in place. Whereas the editors used to meet and select who they wanted the job to go to – a real 'old boys' network' – now the post is advertised, and for the recent vacancy 3 out of 4 shortlisted applicants were female. However, the vast majority of applications are still from men.

Second, there has never been a female president of the BES – although the Society hopes that in the future this may change, and some of the BES committees now have female chairs. Regarding plenary speakers at BES meetings, ten years ago it was an all male show, but more recently there has been more of a balance. In the same way BES prizes have always been biased towards men. There is now a rule that there has to be at least one female nomination on the list that is given over to council, from which they choose the winners. The BES has begun to monitor its grant applications and awards. Large volume grants with online application forms now have gender monitoring questions. Small volume grants with paper applications now have gender and ethnicity questions. So, these issues are being addressed – belatedly, some might argue – and early signs are hopeful. Perhaps soon, as one of the questionnaire respondents puts it, there might be an 'old girls' club' to rival the old boys!

### Conclusions

It is clear that the issue of gender imbalance is a complex problem. Systems and attitudes need to change within institutions and in society at large. However, most of the people we've talked to feel that some affirmative action is needed to kick-start this process. We've highlighted a number of positive changes that could be made to create a level playing field for women establishing a career in ecology. All of these changes would be beneficial to everyone, both male and female. Importantly, although we've only dealt with gender imbalance in this article, there are obviously other imbalances in ecology. As one of the respondents to our

questionnaire puts it, 'the greatest challenge for ecology is recruitment of minority students – black, asian, east indian, and other cultures. Ecology is currently the province of middle-class whites. Our discipline would benefit from greater diversity.' We wholeheartedly agree, and feel that any of

the actions discussed above designed will have the effect of making ecology a more attractive career choice for everyone, and would create a more diverse, stimulating and talented research community.

#### Box 4. References, Links and Further Reading

Athena Swan Charter: <http://www.royalsoc.ac.uk/athenaswan/>

Barres, B.A. (2006) Does gender matter? *Nature* 442 133-136

Bornmann, L. (2007) Bias cut. *Nature* 445 566.

Ceci, S.J. & W.M. Williams (2007) *Why aren't more women in science?* American Psychological Association, Washington D.C.

The Daphne Jackson Trust enables scientists, engineers and IT specialists to return to work after career breaks: [www.daphnejackson.org](http://www.daphnejackson.org)

DIUS, The Department for Innovation, Universities and Skills: [www.dius.gov.uk](http://www.dius.gov.uk)

The Dorothy Hodgkin Fellowship scheme offers a recognised first step into an independent research career for excellent scientists and engineers for whom career flexibility is essential: [www.royalsoc.ac.uk/funding.asp?id=1122](http://www.royalsoc.ac.uk/funding.asp?id=1122)

Goodman, S. (2003) Europe attempts to promote women scientists *Nature* 426 210-211.

The Greenfield Report on Women in Science, Engineering, and Technology: [extra.shu.ac.uk/nrc/section\\_2/publications/reports/R1182\\_SET\\_Fair\\_Report.pdf](http://extra.shu.ac.uk/nrc/section_2/publications/reports/R1182_SET_Fair_Report.pdf)

Hamilton, C. (2003) *Growth Fetish* London: Pluto Press.

Handelsman, J., et al. (2005) More women in science *Science* 309 1190-1191.

The InterAcademy Council Advisory Panel on Women for science, with the mandate to review previous studies, provide examples of effective projects already implemented, and issue a set of actionable recommendations addressed particularly to the world's science and engineering academies: [www.interacademycouncil.net/?id=11228](http://www.interacademycouncil.net/?id=11228)

Linn, M.C. (2007) Can evidence inform debate? *Science* 317 199-200.

Livesey, R. (2007) Engineering a place for women. *Nature* 448 222.

NERC Vital Statistics 2006-7 [www.nerc.ac.uk/publications/annualreport/2007/vital\\_stats.pdf](http://www.nerc.ac.uk/publications/annualreport/2007/vital_stats.pdf)

Phipps, A. *Women in Science, Engineering, and Technology: UK initiatives from the 1970s to the 2000s*. Trentham Books, Stoke on Trent. Out in early 2008.

UK resource centre for women in science engineering and technology (SET), the official website funded by the Department for Innovation, Universities & Skills as part of their Strategy for Women in Science, Engineering and Technology: [www.setwomenresource.org.uk/](http://www.setwomenresource.org.uk/)

Wutte, M. (2007) Closing the gender gap. *Nature* 448 101-102.

York University Athena Swan Submission Reports [www.york.ac.uk/research/athena/athena\\_submission.html](http://www.york.ac.uk/research/athena/athena_submission.html)

The gender-environment relations have valuable ramifications in regard to the understanding of nature between men and women, the management and distribution of resources and responsibilities, and the day-to-day life and well-being of people.[4]. Contents. 1 Women's connection with the environment.Â The definition of sustainable development is highly debated itself, but is defined by Highcourt as a way to "establish equity between generations" and to take into account "social, economic, and environmental needs to conserve non-renewable resources" and decrease the amount of waste produced by industrialization.[5] The first discourse that emerged in relation to women was Women in Development (WID) Abstract: Political Ecology has become one of the most relevant approaches to ecological-distributive relations in Latin America, generating an intellectual and political current with its own strength. However, its conceptual debates have tended to focus on the class axis, with less development in other axes, such as gender. Considering that environmental disputes have demonstrated differentiated effects and responses between men and women, this article raises the need for a Feminist Political Ecology (EPF) within Latin American Political Ecology.Â I analyze 37 semi-structured interviews carried out with male and female grassroots leaders and state workers during 2014 and 2015. The analysis is based upon the concept of environmental suffering (Auyero and Swistun, *Inflamable*. Gender equality is a human right, but our world faces a persistent gap in access to opportunities and decision-making power for women and men. Globally, women have fewer opportunities for economic participation than men, less access to basic and higher education, greater health and safety risks, and less political representation. Guaranteeing the rights of women and giving them opportunities to reach their full potential is critical not only for attaining gender equality, but also for meeting a wide range of international development goals. Empowered women and girls contribute to the health an