

## Twitter Careers Q and A - 2014

A selection of questions and answers is below, but more can be seen via our twitter account [@RMetS](#) <sup>[1]</sup> and on [Storify](#). <sup>[2]</sup>

### **Q: What is catastrophe risk modelling?**

Within the insurance industry, catastrophe modelling is a process for assessing and quantifying the impact of natural and man-made hazards on insured assets. This will involve replicating, using a computer model, the action of the hazard (earthquake, hurricane, flood), the vulnerability of the asset which is exposed to the hazard (e.g. a building, an oil-rig) and the financial mechanism of the insurance policy in place. The model output takes the form of a probability of a loss exceeding a specific financial amount.

**Fiona Shaw, Global Analytics, Willis**

### **Q: What are the benefits of a risk management job**

Catastrophe Modellers help Insurers and Capital Markets decide how to accept risk in intelligent ways providing a supporting platform for companies to protect themselves against natural or anthropogenic disasters. Without this support companies, housing authorities, insurers, capital markets may not be able to adequately deal with a severe financial loss. The Northridge Earthquake for example, created a ripple across the United States; Insurance companies collapsed, some Homeowners didn't receive capital to rebuild/repair, and the US Government had to step in with a big disaster relief effort. Post analysis revealed a significant proportion of properties in California were poorly engineered in relation to the hazard they were associated with and insurance companies were unaware of their actual risk.

Since this event and Hurricane Andrew in the early 1990s Catastrophe Modelling has become an integral part of understanding and quantifying risk. As an individual Catastrophe Risk Modelling is extremely exciting and motivating. Every project we work on at Willis is unique to the client. We are expected to fully understand the hazard and vulnerabilities associated with client property portfolios. This can often involve research into multiple disciplines, not just the one a modeller studied at university.

**Dominic Sindall, Head of Faber Analytics, Willis**

### **Q: In your industry what proportion of risk is due to environmental or climate factors?**

A considerable proportion of the risk insured by insurance companies arises from environmental and weather related hazards. The insurance companies are regulated in such a way as to ensure that they remain solvent when catastrophic events take place and large volumes of claims have to be paid at the same time e.g after Superstorm Sandy or the recent flooding in England. Approximately 75% of the Solvency Capital Requirement will relate to the risks underwritten, and approximately 80% of that, will be to take into account the catastrophe component. So environmental and weather related factors are of great significance to the insurance industry. Increased understanding of weather and climate hazard present an opportunity to the business of risk management as the Insurance and Reinsurance industries are both local and global in scale, so understanding global climate and environmental linkages, and how local weather extremes can be affected by longer term and broader scale climate features can be invaluable information.

**Geoffrey Saville, WRN Atmospheric Hub Leader, Willis & Fiona Shaw, Global Analytics, Willis**

**Q: As a Catastrophe Risk Modeller what are the advantages of working in industry rather than Academia**

Part of the appeal of working in Industry rather than Academia is that when research is undertaken, it is done with a business focus in mind. This means there needs to be a business case for the research to take place, and it has to be practical to the business and to the real world. Willis have their own areas of research, undertaken by the Willis Research Network (<http://www.willisresearchnetwork.com/> [3]), whose main aim is to enable both the risk and reinsurance sectors to integrate the world's leading science and information into its decision making and operational systems. The Willis Research Network supported the first freely available extreme windstorm catalogue for Europe, which contained both storm tracks and 3 second gusts, as you can see on the University of Reading website. Furthermore research conducted through the Willis Research Network, has been applied to the reinsurance industry in a way that gave a competitive edge to early adopters and is now part of the norm. It proves that there is also a space for careers that bridge academia and industry - it is this application of science through close collaboration with business that can produce truly game-changing results.

**Stephen Sheehan, Catastrophe Risk Modeller, Faber Analytics, Willis & Geoffrey Saville, Head Meteorologist, Willis**

**Q: How is studying Geology different from studying Physical Geography at university?  
@TheAbbeySchool [4]**

There's lots of overlap between Geology and Phys Geog and each university has a different take on the degree of overlap. As a general rule, after the introductory year, few geography

departments deal in any detail with plate tectonics, earthquakes and volcanoes. There are done notable exceptions, do you need to check honours module lists carefully, since there's often an advanced Geohazards module on offer. But the nitty gritty of how the planet works (as understood from studying its history) tends to be the central thrust of geology. In Geography it's more how the planet's actions affects society. But, as I mentioned above, each department interprets the two slightly differently do the key is to check that the advanced modules on offer reflect what you are interested in.

**Prof Iain Stewart** [@ProflainStewart](#) [5]

**Q: What careers lead on from a degree in Geology?** [@TheAbbeySchool](#) [4]

The obvious Geology careers are the oil and gas industry and the mining industry, both of which often mean travel abroad. In the UK the civil engineering (geotechnical) and environmental sectors are a strong employer. More general the broad science mix, the emphasis on critical thinking with incomplete data and the self-reliance that fieldwork brings makes a geoscience degree a flexible foundation for lots of jobs, even crunching numbers in the City.

**Prof Iain Stewart** [@ProflainStewart](#) [5]

Geology requires a broad analytical skill set that can be widely transferred to any industry that seeks to quantify risk and uncertainty. Within the insurance industry, the knowledge acquired by completing a Geology degree would be of value is assessing the risks of subsidence, liquefaction, flooding and drought as well as the more obvious seismic hazards of earthquake and volcanic eruption. The statistical component of all science degrees is of applicability in the assessment and modelling of catastrophe risk.

**Geoffrey Saville, WRN Atmospheric Hub Leader, Willis & Fiona Shaw, Global Analytics, Willis**

**Q: Was it a meteor that killed the dinosaurs?** [Kat Daman @TheAbbeySchool](#) [4]

A: The Chicxulub crater in Mexico ([http://en.wikipedia.org/wiki/Chicxulub\\_crater](http://en.wikipedia.org/wiki/Chicxulub_crater) [6]), formed by an asteroid, is the correct age and would, quite literally, have had a serious impact. There are other competing theories about why the dinosaurs died out, but this is the current best explanation.

**Prof David Stevenson, University of Edinburgh**

Meteor impact is just one of a number of theories that led to extinction of the dinosaurs, including cataclysmic volcanic eruptions, rapid climate change, or multiple huge tsunamis.

Many of these natural catastrophes are interlinked and so it may even have been a combination of these types of events that left the dinosaurs unable to adapt the changes that occurred during the time of their extinction. Today, the insurance and reinsurance industries work hard to understand the changing facets of these source of catastrophic risk, working with scientific communities around the world to understand how we can be more resilient to high impact but low frequency events.

After the recent meteor struck Russia, H el ene Galy, who is Managing Director of Willis Global Analytics and Head of Proprietary Modelling, wrote a blog describing the risk of meteor strikes: <http://blog.willis.com/2013/02/russian-meteor-begs-the-question-can-we-prepare-for-asteroid-strikes/> [7]

**Geoffrey Saville, WRN Atmospheric Hub Leader, Willis**

**Q: How do we know it's going to be a sunny day from what's going on in the stratosphere? Gabi Young @TheAbbeySchool** [4]

A: Knowing the state of the stratosphere (~10-15 km upwards in the atmosphere) can help improve predictions lower down. The development of some weather systems (e.g. storms) are strongly influenced by the temperatures and winds at high levels.

**Prof David Stevenson, University of Edinburgh**

The interesting thing is that there does appear to be a link between stratosphere conditions and the "regime" of weather we have at the surface. For example, the UK can experience a blocking high pressure system, or be at the end of a "storm factory" conveyor belt depending on the position of wiggles in the jet stream which is also related to the strength of the polar vortex in the stratosphere. It may also be that if a change in the stratospheric conditions occurs, it might make it easier to predict the surface weather on timescales of a few weeks, but it's much harder to link the weather and stratosphere on any one particular day. It's an active area of research though, as being able to predict cold periods in winter due to a blocking high a few weeks in advance would be very useful (although the stratosphere is not the only important feature).

**@EllieHighwood** [8] **Professor of Climate Sciences, University of Reading**

**Q: Is it possible that future technological inventions will allow us to pre-determine weather systems? Rosie Brady @TheAbbeySchool** [4]

A: Weather forecasting is quite accurate out to 3 days -- there are some definite limits to prediction though. I'd expect a general improvement in forecast skill with time.

**Simon Tett Chair of Earth System Dynamics, Head of Global Change Research Institute, School of Geosciences, The University of Edinburgh**

Weather modification is not currently considered very feasible, and given the chaotic nature of weather this is unlikely to change. We will just be able to better predict weather.

**Prof David Stevenson, University of Edinburgh**

**Q: What A levels are the best combination if a student plans to study Geology at university? @TheAbbeySchool [4]**

Most geology departments like a strong science background - ideally some combination of Maths, Chemistry, Physics, and Biology. Geology is not expected and in fact some departments don't like it although most recognise that it's the A level that most turns students on to an Earth science degree. A level Geography is also a popular route way in. But to be honest, the importance of geoscience for society means that we should be looking for a broader background from our future geoscientists, even including A levels from the social sciences.

**Prof Iain Stewart @ProflainStewart [5]**

Maths, Physics, Chemistry, Biology, Geography (probably in that order of preference)

**Prof David Stevenson Professor in Atmospheric Chemistry Modelling, University of Edinburgh**

**Q: Is there a book on the introduction to mathematics in Meteorology? Errol de Leon by email**

Some books that introduce the mathematics in meteorology are:

1. Introducing Meteorology: A guide to weather by Jon Shonk
2. The Development of Atmospheric General Circulation Models by Leo Donner, Wayne Schubert and Richard Somerville
3. Numerical Weather and Climate Prediction by Thomas Tomkins Warner

A more advanced book would be Atmospheric Dynamics by Mankin Mak

**@DrLizBentley [9] CEO Royal Meteorological Society**

**Q: Should I choose my degree based on the reputation of the university as a whole, or a course in particular? @TheAbbeySchool [4]**

Both are important. For more specialist courses such as Meteorology where there are relatively few places offering degrees then the reputation of the course perhaps carries more weight than in other subjects. It is also important to make sure that it is the right course for you. If you are enthusiastic about the course and the place then you will do better.

**Andrew Ross University of Leeds**

It is important to choose a course which does what you want and you will enjoy doing. Employers tend to know roughly which universities are good for the area they are looking to

hire in. Of course having a "big name" university on your CV will be helpful, but if that hasn't trained you in what the employer is looking for, then that doesn't help as much as you need. Unfortunately, this means it is a balance between the two.

**Dr Robert Dunn, Met Office @rjhd2** [10]

University reputation matters only if it matters to employers -- alas, for many I think it does. I'd chose a programme that seems best for you and look for one that will challenge and stretch you.

**Simon Tett Chair of Earth System Dynamics, Head of Global Change Research Institute, School of Geosciences, The University of Edinburgh**

First choose based on what you are interested in. If courses have reputations, then this is probably more useful than the University as a whole. If you are unsure of exactly which course, it may make sense to check how flexible it is to change courses, e.g. after one year (e.g. from Geophysics to Physics or Geology or Meteorology). Some University's allow this, others don't.

**Prof David Stevenson, University of Edinburgh**

To help you decide some useful websites for comparing degrees in general are <http://university.which.co.uk/> [11] and <http://unistats.direct.gov.uk/> [12]. For physics degrees specifically you can compare degrees using [www.myPhysicsCourse.org](http://www.myPhysicsCourse.org) [13].

**Dr Taj Bhutta, Careers and Student Officer, Institute of Physics @PhysicsNews** [14]

**Q: What kinds of industry placements should undergraduates be looking for? Is there a central resource that can be accessed? @TheAbbeySchool** [4]

Ideally something related to your future career aspirations. Many degrees offer the option of a year-long industrial placement or opportunities for summer placements. This is definitely worth considering. It can often lead to job offers with the company on graduation, or strengthen your CV when applying for other jobs.

**Andrew Ross University of Leeds**

Placement experience is highly valued by potential employers and is a great way to stand out in a competitive job market. Placements (otherwise known as internships) can be relatively short (eg a month or two during vacations) or a year-long integral part of a degree programme. It is great if they relate to your degree subject of course but that isn't essential - valuable workplace skills, such as time management and commercial awareness, can be developed in any work setting which you can then transfer, build on and use as evidence of your capabilities later in your career. While some industry placements are advertised, everyone else will have seen these and so the competition is likely to be stiffer. My advice is to also go looking for placements by pro-actively contacting organisations and, in the politest way, making a nuisance of yourself. Be bold and stand out from the crowd. Follow up a letter or e-mail with a phone call just to show you mean business. Make sure you always come across professionally in the approaches that you make and take advantage of the advice that

is on hand in a university careers service and university department.

If the university has an established placement or year in industry programme, many links will already exist with employers from previous student placements and you should thoroughly research these too, contacting previous placement students where that is appropriate. Employers will expect you to already know quite a lot about them from online research, before you make contact – so don't forget that crucial step.

### **Steve Dorling, University of East Anglia / Weatherquest Ltd**

Undergraduates should be looking for industries where their degree will be relevant in the future. This will help the undergraduate decide how to kick start their career. A view of an industry from the outside looking in is very different to actually experiencing one. For example, modelling the impact of natural hazards is a growing discipline within the insurance industry, with roles for analytical minded individuals with academic backgrounds in Meteorology, Geophysics, Seismology, Volcanology, Mathematics, Engineering, Chemistry, Finance, Computer Science, to name a few, mainly focused around London. Most insurance companies, the major insurance brokers and model vendors now offer placements, internships or job roles to graduates from the aforementioned disciplines. The key is to identify market leaders within the industry and then research the associated/supporting companies. Don't be put off by companies not advertising temporary or permanent roles. Willis have a graduate scheme but also offer undergraduate and graduate internships each summer, see <http://www.willis.com/Careers/> <sup>[15]</sup> for more details.

### **Dominic Sindall, Head of Faber Analytics, Willis**

**Q: What more can industry do to redress the gender imbalance in STEM careers? Does the panel feel that this is a problem that needs to be solved?**

**<http://www.theguardian.com/commentisfree/2014/mar/15/> <sup>[16]</sup> women-equal-but-not-treated-equally? @TheAbbeySchool <sup>[4]</sup>**

A: Meteorology and Environment Sciences have a much more even gender balance than many STEM subjects at undergraduate level (at Leeds we are approximately equally split), but there is still an imbalance at more senior levels. Having said that the current President and Chief Exec of the Royal Met Soc, the Chief Scientist at the Met Office and the joint Head of Department in Meteorology at Reading are all examples of women with successful careers in this area.

### **Andrew Ross University of Leeds**

I don't think it is just an issue for Industry -- women are a minority in our Geophysics/Geophysics+Met programmes. However, our PhD programmes in the School of Geosciences, University of Edinburgh are about 50:50 women:men. So I think at that level women and men are about level. But within our institute there are a small number of women in senior positions. We are trying to change this but it is a slow process and probably requires changes across society.

**Simon Tett Chair of Earth System Dynamics, Head of Global Change Research Institute, School of Geosciences, The University of Edinburgh**

Yes, this problem remains. However, there has been a considerable effort to understand and address this issue and so the situation is improving. The IOP's work focuses on schools (see [www.iop.org/girlsinphysics](http://www.iop.org/girlsinphysics) [17]) and universities (see [www.iop.org/juno](http://www.iop.org/juno) [18]). The key is for all to adopt best practice for both men and women by allowing, for example, flexible working and ensuring work-life balance for their employees so that both men and women have equal opportunities.

**Dr Taj Bhutta, Careers and Student Officer, Institute of Physics [@PhysicsNews](#) [14]**

Some industries are aware of the gender imbalance and are seeking to address this. As an example, CERN and Selex have recently held careers events for women physicists. These events aim to show women the range of careers available to them within these organisations, and encourages them to apply.

**Vishanti Fox, Careers Manager, Institute of Physics [@PhysicsNews](#) [14]**

Meteorology has a better gender balance at student and early career researcher level than some other STEM areas.. however in common with those other areas, there are fewer at senior level. However, as other people have said, there are several key positions across the Met Office, academic departments and RMetS that are all held by women at the moment, which is great.

A consequence is that senior level women do get asked to do a lot of things.. so we tend to be very busy. Sometimes this means we aren't able to respond as quickly as we would like to things (including twitter questions!), but there are quite a lot of us out there.

**[@EllieHighwood](#) [8] Professor of Climate Sciences, University of Reading**

Female role models send a powerful message that help to redress the gender imbalance in STEM careers. For example, look at the Royal Meteorological Society which has a female Chief Executive [@DrLizBentley](#) [19], a female President Prof Jo Haigh and a female Vice-President [@Ellie Highwood](#). [20]

**Dr Liz Bentley, Chief Executive RMetS [@DrLizBentley](#) [19]**

The IOP's work with schools and universities is good. However, there needs to be more done at the level of leadership roles. We see a fall in the percentage of women holding leadership posts in general. The reasons for this "leaky pipeline" are complex but nationally there are big efforts at the moment to change this. Flexible working, diverse definitions of success and leadership all help.

**[@EllieHighwood](#) [8] Professor of Climate Sciences, University of Reading**

**Q: Climate change is 'big business' but what is the best route in?  
Geography, Environmental Science or Meteorology? Question from Abbey School Reading**

A: In my department people come in from all kinds of backgrounds: those listed above but also maths/physics even chemistry or biology has applications to climate change. The most important thing is to study what you're interested in and if you then want to apply it to climate change there will be opportunities.

**@TreacherousBuzz [21] Sammie Buzzard PhD Student at Reading University**

This is a very multi-disciplinary area and there is no single best route in. Meteorology / Climate Science will give a more in-depth scientific understanding of the issues while Env Sci / Geography will give a broader perspective often including more emphasis on the social science / policy aspects. There is a need for graduates from both backgrounds.

**Andrew Ross University of Leeds**

I came to Climate Science from a background in Astrophysics, and others I know also have degrees and even PhDs in subjects other than Meteorology, Geography or Environmental Science. What is important are the skills you have (problem solving, computer coding, determination) as knowledge about a subject you can pick up as you go along (and you'll have shown that by learning during your school/degree). When I was applying to University, I was told that doing a basic science (Physics in my case) gave you most options and you had a good grounding, and you could specialise after that, be that into the area you had intended or something new that turned up along the way. Remember, what appears to be a good route now may be totally different when you come out of university 4 years later.

**Dr Robert Dunn, Met Office @rjhd2 [10]**

I'd strongly recommend Meteorology but make sure it has a strong physics and mathematics basis.

**Simon Tett Chair of Earth System Dynamics, Head of Global Change Research Institute, School of Geosciences, The University of Edinburgh**

Of those 3, Meteorology, but a degree in Physics, Maths, Computing, Engineering or Environmental Science are more mainstream good options.

**Prof David Stevenson, University of Edinburgh**

Climate change is a big issue for risk management in business. As a result, there are many examples of companies appointing specialists in the climate and/or sustainability space, in the retail, utilities, energy and insurance sectors for example.

**Steve Dorling, University of East Anglia / Weatherquest Ltd**

**Q: I'm currently studying a foundation year in E&E sciences and hoping to progress on to meteorology next year. I'm quite career focused but would like some more info on career possibilities that would allow me to travel a little or be working outdoors, with a more hands approach rather than data analysis. Could you help with any direction?**

**It would be a dream to be involved in making documentaries like those of Dr Iain Stewart I'm a big fan! from [@robbiesow](#) [22]**

Many branches of meteorology and environmental physics or environmental science offer unique opportunities for travel and hands-on experiences. For example I have been involved in several fieldwork campaigns measuring aerosol in the desert and elsewhere. There are observational roles in forecasting as well. Highly skilled and knowledgeable technical scientists are always in demand.

[@EllieHighwood](#) [8] Professor of Climate Sciences, University of Reading

You could consider going into meteorological instrument design, build and sales. Anything from satellite sensors to automatic weather stations and everything in-between. You can find some of the companies involved in this space listed on the RMetS website:

<http://www.rmets.org/membership/corporate-members> [23]

**Steve Dorling, University of East Anglia / Weatherquest Ltd**

**Q: Hi @RMetS Do you know of any development NGO's who have a great need to use a meteorologist's skills? Where would u go to work in deve work? from [@JoshTalib](#) [24]**

A: We have a number of research projects working with NGOs, particularly in rainfall forecasting for Africa. There is a network AFCLIX <http://www.afclix.org/elgg/groups/all> [25] that might give you an idea of the kinds of places and organisations involved. Some might offer an internship?

[@EllieHighwood](#) [8] Professor of Climate Sciences, University of Reading

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**Source URL:** <http://accsys.rmets.org/our-activities/twitter-careers-session/twitter-careers-q-and-2014>

#### Links

[1] <http://www.twitter.com/RMetS>

[2] <http://storify.com/RMetS/rmets-careers-session-2>

[3] <http://www.willisresearchnetwork.com/>

[4] <http://www.twitter.com/@theabbeyschool>

[5] <https://twitter.com/ProfIainStewart>

[6] [http://en.wikipedia.org/wiki/Chicxulub\\_crater](http://en.wikipedia.org/wiki/Chicxulub_crater)

[7] <http://blog.willis.com/2013/02/russian-meteor-begs-the-question-can-we-prepare-for-asteroid-strikes/>

[8] <http://www.twitter.com/@EllieHighwood>

[9] <http://www.twitter.com/@DrLizBentley>

[10] <http://www.twitter.com/rjhd2>

[11] <http://university.which.co.uk/>

[12] <http://unistats.direct.gov.uk/>

[13] <http://www.myphysicscourse.org/>

- [14] <http://www.twitter.com/PhysicsNews>
- [15] <http://www.willis.com/Careers/>
- [16] <http://www.theguardian.com/commentisfree/2014/mar/15/>
- [17] <http://www.iop.org/girlsinphysics>
- [18] <http://www.iop.org/juno>
- [19] <http://www.twitter.com/@LizBentley>
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