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Connected

HER VOICE, HER REVOLUTION

Meet Fungai Machirori, Zimbabwe's rising activist

WELCOME

It is my pleasure to introduce you to the 2013 edition of Connected Magazine. Never one to stand still, the University of Reading has been hitting the headlines time and again over the last year, and for all the right reasons. We are joining the fight to mend broken hearts (page 16), forecasting big changes for the aviation sector (page 20) and preserving the heritage of some of the world's finest artefacts (page 32).

Our University continues to educate, inspire and challenge in many different ways – and it is not just those on our campuses doing all the work. You, our alumni, play a huge role in influencing people's lives for the better.

In this issue, we meet two truly inspirational women who have used their education at Reading to make a difference. First, there is Fungai Machirori, whose voice is empowering thousands of Zimbabweans to bring about social change (page 6). Then there is Coralie Bickford-Smith, a designer who has brought some of the world's most loved stories to the attention of a whole new generation (page 24).

Elsewhere in this edition, you can also find the usual mix of news, stories and comment. If you are left feeling inspired by anything you discover within these pages, do get in touch: we look forward to reading, and publishing, your letters.

Before I sign off, I would like to renew my thanks to all of you who are supporting the University. Whether through a donation or volunteering, your involvement and engagement help to make the University of Reading the great institution that it is today.

Sir David Bell KCB

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IN THIS ISSUE

Front cover: Fungai Machirori (MSc Development Studies 2011). Turn to page 6 for our interview.

RESEARCH

FASTEN YOUR SEATBELTS

Earlier this year, a Reading researcher revealed that climate change will double the turbulence risk to aircraft by the middle of the century. This discovery became a huge talking point in the media, much to the surprise of Dr Paul Williams, the man behind the research. Dr Williams had no idea of the scale of coverage his findings would receive in national and international news outlets.

But how dangerous is turbulence? What does this discovery mean for us, as passengers? And what about the aviation industry, which was initially wary of commenting?

Fasten your seatbelts, we're in for a bumpy ride.

Many of us have taken a flight at some stage in our lives: for business, pleasure, or, if you were an international student at Reading, to travel between home and the University. It is also likely that many of us have experienced that familiar unsteady feeling as an aeroplane hits a patch of turbulence. Drinks may spill, cabin crew may slip, and with a 'ping!' the 'fasten your seatbelt' lights tell you to sit back down, even if you have just reached the front of the queue for the bathroom.

If you're a nervous flyer, then it may come as bad news to hear that in the next half-century, the chances of encountering significant turbulence will increase by between 40% and 170%, and the average strength of turbulence will increase by up to 40%.

This study – the first of its kind – has been carried out by the University of Reading's Dr Paul Williams, a Royal Society University Research Fellow in the Department of Meteorology, along with Dr Manoj Joshi from the University of East Anglia. The pair analysed supercomputer simulations of the atmospheric jet stream over the North Atlantic Ocean to investigate the turbulence of the future, as Dr Williams explains:

'We compared the pre-industrial climate with what we predict will be the climate of the 2050s, when the atmosphere is expected to contain twice as much CO_2. We calculated about 20 different ways of estimating turbulence in those two simulations, so we have lots of independent strands of evidence. This gives us a very high degree of confidence in the results.'

Dr Williams' research focused specifically on clear-air turbulence, which occurs at cruise altitudes. It's the type of turbulence we're most used to experiencing but, as Dr Williams describes, it's also the most problematic for the aviation industry and its passengers:

'Pilots cannot detect clear-air turbulence, so it catches them off-guard, typically when passengers are wandering around the plane. As such, cabin crew need to react quickly to minimise any problems arising.'

'Turbulence already costs airlines around £100 million a year. If we are to expect more turbulent flights in the future, then this expense could soar even higher'

With a sound collection of evidence to show that turbulence will increase in strength and frequency, it seems there is very little that can be done to stop it. But just how dangerous is turbulence? Should we be worried?

'Turbulence is usually regarded as an issue of comfort rather than safety,' explains Dr Williams. 'Something like a hundred people are injured due to turbulence each year – usually because they have their seatbelts unfastened and end up being thrown around the cabin. Turbulence has also been known to cause fatalities, but these are very rare and account for a tiny proportion of all those who fly.'

The cost to the aviation industry, however, is significant. Turbulence already costs airlines around £100 million a year. If we are to expect more turbulent flights in the future, then this expense could soar even higher, for reasons Dr Williams explains:

'If there are more patches of turbulence and pilots want to avoid flying through them, then they might have to go on lengthy diversions. This would add to the fuel burn and the general wear and tear on the airframe, increasing flight times and causing inevitable delays at airports. And, since CO_2 is responsible for climate change in the first place, aeroplane diversions would only add to the levels of CO_2 in the atmosphere, but that's another story altogether. Of course, these are all just possible consequences for now.'

When Dr Williams' research was published in April, a frenzy of media interest ensued. While Dr Williams gave many interviews, there was one source that the journalists struggled to obtain any comment from: the airlines. Although this is starting to change, Dr Williams explains why airlines may have been reluctant to comment at first:

'I think they wanted to pretend it wasn't a problem and make it go away. After all, there is nothing good you can say as an airline in response to a prediction that turbulence will become twice as bad. This isn't to say that the airlines aren't taking notice – quite the opposite. They have been very interested in our research and are presumably taking action internally.'

'My advice would be to keep your seatbelt fastened whenever you are seated'

With hundreds of students from around the world travelling to Reading each year for their studies, can Dr Williams tell us if some of them can expect a bumpier ride than others?

'Our research to date has focused on transatlantic flights, simply because this is a very busy flight corridor with 600 crossings a day between Europe and North America. But there's every reason to expect that similar results would apply to transpacific flights, because the jet stream encircles the globe and it is getting stronger everywhere. So I think students from many parts of the world can expect bumpier flights.'

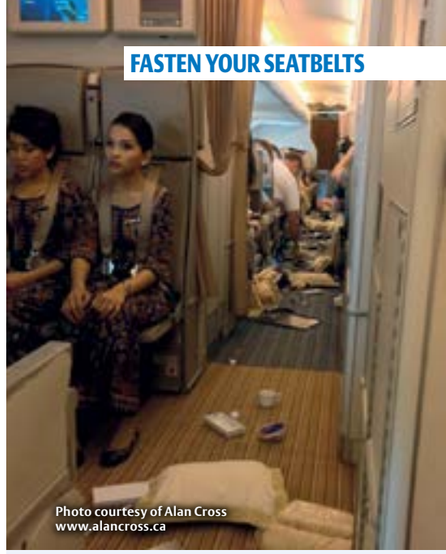
Moving forward, Dr Williams says his research has a lot more to achieve:

'I would love to extend this study to look at other seasons, because so far we have looked only at winter, which is when turbulence is strongest and most dangerous. I would also like to look at different flight levels, climate models and greenhouse gas scenarios, because these are all sources of uncertainty in our calculations. My long-term plan is to try to quantify this range of uncertainty.'

As for the media fascination, Dr Williams says: 'Almost everyone flies these days, so we all have a stake in keeping flights comfortable and safe. Whether you're a regular or first-time flyer, turbulence is never a pleasant feeling.'

And the moral of the story?

'Clear-air turbulence – the type we've researched – is invisible. Pilots cannot see it coming, and neither can the on-board electronics. So my advice would be to keep your seatbelt fastened whenever you are seated. I used to be a bit lazy about it, but this research has definitely changed my behaviour!'



FASTEN YOUR SEATBELTS

Photo courtesy of Alan Cross
www.alancross.ca

BREAKFAST ANYONE?

A few weeks after Dr Paul Williams' research was announced, a Singapore Airlines flight encountered turbulence so severe, that it made the headlines. Passengers on an Airbus A380 from Singapore to London were enjoying breakfast when the plane suddenly encountered severe clear-air turbulence. The plane dropped a least a hundred feet, causing disarray on the aircraft, as documented in this photograph taken by one of the passengers. Fortunately, no one was hurt.

WHAT CAUSES TURBULENCE?

Turbulence is caused by instabilities in the upper atmosphere. Fast air flowing next to slow air is called a velocity shear. If the difference in velocity is too great, the situation becomes unstable and turbulence breaks out.

Climate change is making the instability stronger, by speeding up the jet stream winds. Just like a river of water, the faster the jet stream flows, the more turbulent it becomes.