Professor Ingrid Daubechies Hon DSc

Oration by Professor Pam Thomas
Pro-Vice-Chancellor

Mathematics is a fascinating discipline – methodical and rigorous, certainly. And even more so, capable of generating vivid emotions, curiosity, imagination and inspiration – pleasure and joy that the non-mathematician would envy and find difficult to imagine!

Today, we are joined by someone who perfectly articulated this sensation when speaking at a conference two years ago. She said "Math education should pique curiosity." The career of this esteemed individual is founded on curiosity. It's led to unprecedented insight that has literally changed the way we look at things, whether those things are precious items of classical art or the most disposable of digital images. The world owes a debt to the curiosity of Professor Ingrid Daubechies.

Like most young children, Professor Daubechies was born with a natural inquisitiveness. Unlike most young children, she found fascination in seeing how machinery worked. She would compute the powers of two to help fall asleep, observing how quickly the numbers escalated. Throughout her Belgian childhood, maths loomed large in Professor Daubechies' developing physics education. The Vrije Universiteit Brussel was home for much of her early academic achievements, and was where she achieved a theoretical physics PhD in 1980.

The following year, she left for the US, where she worked at Bell Laboratories, and was inspired by mentors such as Alex Grossman, John Klauder and Yves Meyer. She became an authority on wavelet theory, a topic of pure mathematics that had huge potential and applicability in other fields. During the 1980s at New York's Courant Institute of Mathematical Sciences, Professor Daubechies made a breakthrough that still throbs with significance. By constructing compactly supported continuous wavelets requiring only a finite amount of processing, she helped wavelet theory enter the realm where signals can be manipulated numerically. This 'digital signal processing' can be seen in digital image processing and, within that, we have JPEG 2000 amongst the available image formats. Within the JPEG 2000, you will find use of a wavelet entitled CDF. The 'D' is for 'Daubechies'.

From that point, she has continued to investigate, inquire and inspire. Throughout her time at Rutgers, Princeton and Duke Universities, she has made notable advances in applied mathematics. She is one of the world's foremost experts on time frequency analysis, and created algorithms that have been applied to revealing art fraud.

In the new climate of academic endeavour when the real-world *impact* of what we do is becoming as important as the scholarly papers that we write, this must be one of the best examples around! In fact, she was awarded the Frederic Esser Nemmers Prize in Mathematics for the 'remarkable impact her work has had across engineering and the sciences', which reinforces how Professor Daubechies' work has spread out beyond the confines of her own academic discipline.

Of course, Professor Daubechies' reputation has deservedly earned a raft of awards, not least the title of Baroness awarded by King Albert the Second of Belgium. And her prizes include recognition from the American Mathematical Society on multiple occasions.

The impact of Professor Daubechies' work endures, and is one we gladly honour today. An impact that truly reflects our own ambition within Warwick for mathematics to transcend the classroom.

One that shows how mathematics is more than figures on a chalkboard or squiggles on a page that non-specialists can't decipher. It shows, as she has said herself, how mathematics has "the power to solve problems".

Clearly, our distinguished awardee has consistently demonstrated the power of mathematics, and applied it in a way that we can all be thankful for.

Mr Vice-Chancellor, in the name of the Senate, I present to you for admission to the degree of Doctor of Science, *honoris causa*, Professor Ingrid Daubechies.