Professor Ingrid DAUBECHIES
Citation

Next time you scroll through your photo collection on your smartphone, you are likely to look at what you see differently. For today, you are fortunate enough to be in the presence of the creative mind which enabled you to do this: Prof Ingrid Daubechies, James B Duke Professor of Mathematics and Professor of Electrical and Computer Engineering at Duke University in the United States.

Your personal portable image library is just one of millions of consumer and technical products to have scaled new heights or come into being since Prof Daubechies' discovery on how to construct compactly supported wavelets. The breakthrough in the 1980s, providing a mathematical bridge from the abstract to practical application, went on to spark a data signal and digital image compression revolution, including the JPEG2000 standard.

From communication systems to seismic exploration to movies and beyond, Prof Daubechies has shown just how much math can count in the real world and how many different areas it can inform. Her work has contributed to making medical scans faster and safer, helping art historians spot forgeries through digital analysis, and reducing the storage needs for the FBI's huge e-database of fingerprints. Indeed, given the breadth and depth of her on-going contributions to time-frequency analysis, especially wavelets, discrete geometry, and computational mathematics, few have had such fundamental impact and applied influence.

Earlier in life, Prof Daubechies was drawn more to physics, gaining a PhD in quantum mechanics from the Vrije Universiteit Brussel (Free University Brussels) in her native Belgium in 1980. However, through her collaborative studies with wavelet pioneer Alex Grossmann in France, she became increasingly intrigued by this previously little highlighted area of pure mathematics and the significant possibilities if it could be applied. In 1987, a landmark year professionally and personally, she achieved her seminal contribution to the field of wavelets, went to work at AT&T Bell Laboratories in New Jersey, and got married. She joined Princeton in 1994 and moved to Duke University in 2010.

When unable to sleep as a child, Prof Daubechies would not count numbers but multiply by the power of two. Later in life, she became closely associated with the number one: first female full professor in the Mathematics Department at Princeton University, first woman to win the US National Academy of Sciences Award in Mathematics, in 2000, and first female president of the distinguished International Mathematical Union, serving from 2011-2014.

The truly outstanding nature of her work is reflected in her extensive list of prestigious awards and grants. Among many others, these

include the Leroy P Steele Prize for Mathematical Exposition from the American Mathematical Society for her well-received book *Ten Lectures on Wavelets*, published in the 1990s, a MacArthur "Genius Grant" Fellowship, and more recently the Nemmers Prize in Mathematics, and Jack S Kilby Signal Processing Medal. Earlier this year, she was awarded a Math + X Investigator award from the Simons Foundation through which she will further assist palaeontologists by seeking to apply ideas from machine learning to fossils to chart evolutionary changes. She has eight honorary doctorates from universities in Europe, including Oxford University, and is an elected member of not only the US National Academy of Sciences but also the American Academy of Arts and Sciences, the American Philosophical Society and the US National Academy of Engineering. In 2012, she was made a Baroness by the King of Belgium.

Yet, unlike many of her eminence who prefer to stay within their field, only supervising at graduate level, this is not the case for Prof Daubechies. She has taught non-mathematicians how to think like mathematicians, given many public lectures to convey the theoretical beauty and applied relevance of her area of expertise, and willingly assisted with ideas for the school mathematics curriculum that can reflect contemporary math applications.

As such, she is highly respected for her immense contribution to mathematics in teaching and her agility and foresight in opening up cutting-edge research fields and applications. She is also immensely well thought of as a person for her selfless commitment to the field, her tremendous broadening of the appeal of mathematics beyond its traditional frontiers, and the brilliant role model she provides for all mathematicians, male and female, present and future.

Mr Council Chairman, on behalf of the Council of the Hong Kong University of Science and Technology, I have the high honor of presenting to you, Prof Ingrid Daubechies, James B Duke Professor of Mathematics and Professor of Electrical and Computer Engineering at Duke University, for the award of Doctor of Science *honoris causa*.