NUS National University of Singapore | **IMS** Institute for Mathematical Sciences

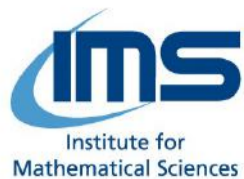**NUS** National University of Singapore | **Department of Mathematics Faculty of Science**

IMS DISTINGUISHED VISITOR LECTURE SERIES/ COLLOQUIUM LECTURE

Ingrid Daubechies

Duke University , USA

Photo Credit: Duke Photography: Les Todd

Mathematicians helping Art Historians and Art Conservators

14 June (Wednesday), 4.30 - 5.30 pm

In recent years, mathematical algorithms have helped art historians and art conservators putting together the thousands of fragments into which an unfortunate WWII bombing destroyed world famous frescos by Mantegna, decide that certain paintings by masters were "roll mates" (their canvases were cut from the same bolt), virtually remove artifacts in preparation for a restoration campaign, get more insight into paintings hidden underneath a visible one,…

The presentation will review these applications, and give a glimpse into the mathematical aspects that make this possible.

Venue: Department of Mathematics, NUS

Seminar Room 1 , Block S17, Level 4

10, Lower Kent Ridge Road, Singapore 119076

(Refreshments are provided before the talk from 3.30pm) @ Staff Lounge, Level 4)

FREE ADMISSION

Institute for Mathematical Sciences, National University of Singapore

3 Prince George's Park Singapore 118402

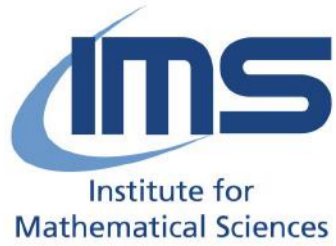Tel: 6516 1897 Website: ims.nus.edu.sg

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IMS DISTINGUISHED VISITOR LECTURE SERIES

Photo Credit: Duke Photography: Les Todd

Ingrid Daubechies
Duke University , USA

Biologically relevant distances between morphological surfaces representing teeth and bones

15 June (Thursday), 3 - 4 pm, IMS Auditorium

The talk describes new distances between pairs of two-dimensional surfaces (embedded in three-dimensional space) that use both local structures and global information in the surfaces. These are motivated by the need of biological morphologists to compare different phenotypical structures, to study relationships of living or extinct animals with their surroundings and each other. This is typically done from carefully defined anatomical correspondence points (landmarks) on the teeth and bones. We are working on building algorithms for automatic morphological correspondence maps, without any preliminary marking of special features or landmarks by the user. This is an ongoing project by a collaboration of mathematicians, computer scientists, biologists and statisticians.

About the speaker:

Ingrid earned her Ph.D. in theoretical physics from Vrije Universiteit Brussel. In addition to seminal advances in time-frequency analysis, she is best known for her breakthroughs in wavelet research and contributions to digital signal processing. Some of the wavelet bases and other computational techniques she developed were incorporated into the JPEG2000 standard for image compression.

Ingrid's career has seen many impressive firsts: the first female full professor of mathematics at Princeton; the first woman to receive the National Academy of Sciences Award in Mathematics in 2000; the first woman president of the International Mathematical Union in 2010; and she is very likely the first and only mathematician to have been granted the title of Baroness by Belgium's King Albert II.

Ingrid continues to break new ground in mathematics research, focusing on signal analysis and inverse problems, with applications ranging from fMRI and geophysics to paleontology and fine art painting.

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