

Department of Biological Regulation and Dwek Institute for Cancer Therapy Research

 ZOOM ON CANCER

HYBRID LECTURE



Prof. Yonina Eldar

Department of Computer Science and Applied Mathematics
Faculty of Mathematics and Computer Science



Keren
Peri-Hanania, MD

**At the crossroads of
science, engineering,
& medicine:
Improving cancer
diagnosis**

23rd December 2021
Thursday

14:00 Candiotty Auditorium

Light refreshments will be served from 13:45

We live in a digital world where data processing and storage is performed using computers. The digital revolution affects all aspects of our life from communications, through radar and medical imaging systems. This revolution is based on sensing the physical signals around us, and representing the acquired signals by digital bits that can be processed by a computer. However, clearly information is lost in this process: digitization rates are limited by the mathematical bounds of Nyquist and Shannon, and acquisition devices are limited by physical bounds such as the diffraction limit. Therefore, we cannot obtain infinite precision in time, space and frequency. In the first part of this talk we consider how the interplay between science, physics and algorithms can pave the way to enhanced technology that is not limited by the bounds above. This coupling of physics and algorithms paves the way to devices that can transmit, sample and process at rates and resolutions exceeding known bounds. We will illustrate applications of these ideas to a variety of problems in ultrasound, optical imaging, radar systems and more, and show several demos of real-time prototypes overcoming standard bounds including a wireless ultrasound probe, super resolution ultrasound, and sub-Nyquist automotive radar.

In the second part of this talk we focus specifically on applications in the cancer domain. We describe various clinical studies in which we try to employ these methods for the benefit of earlier detection and classification of lesions and better monitoring of response to treatment. By combining science, engineering and medicine, we strive to bring the bench to the bedside and make a positive impact on cancer diagnosis and treatment.

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Host

Prof. Yosef Yarden

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