THE UNIVERSITY OF CHICAGO

COMPUTATIONAL AND APPLIED MATHEMATICS COLLOQUIUM

ORLY ALTER

Departments of Bioengineering and Human Genetics and the Scientific Computing and Imaging Institute and the Huntsman Cancer Institute

University of Utah

Multi-Tensor Decompositions for Personalized Cancer Diagnostics, Prognostics, and Therapeutics in the Clinic

THURSDAY,February 11, 2021,at 4:15 PM

Via ZOOM

ABSTRACT

I will describe the development of novel, multi-tensor generalizations of the singular value decomposition. I will illustrate their use in discovering accurate, precise, and clinically actionable genome-wide patterns in tumors from small cohorts of adult and pediatric brain, lung, ovarian, and uterine cancer patients. I will also describe a recent experimental validation, in a retrospective clinical trial, of the adult brain cancer pattern as a predictor of life expectancy better than age, which has been the best indicator for the last 70 years. This is a proof of principle that the decompositions underlie a mathematically universal description of the genotype-phenotype relationships in cancer that other artificial intelligence and machine learning methods miss.

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