

Data-driven computational method created

A U.S. statistician has created a data-driven computational approach that's revealing secrets about the inner Earth, as well as gene expression.

"Using mathematical concepts from inverse scattering and modern statistics, we let the data 'speak,' and automatically generate an appropriate model," said Ping Ma, a University of Illinois professor of statistics.

To study features deep within Earth, for example, Ma and colleagues process seismic data with a numeric technique called inverse scattering. Instead of beginning with a geophysical structure and calculating the scattering, the researchers use the scattered seismic waves to reconstruct the scattering structures.

But the data-driven statistical methodology isn't limited to analyzing seismic data. In computational biology, for example, Ma and colleagues have used the technique to discover unique patterns of gene expression in fruit flies and roundworms. They've also used it to study differential gene expression of the retinal development in zebra fish and to explore the effect of histone modifications on gene transcription rates in yeast.

A paper describing the technique has been accepted for publication in the Journal of Geophysical Research.

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