

# DataSpeaks Interactions® - Breakthrough Software for Systems Biology, Drug Discovery, and Drug Development

## PROBLEM ▶

**P**atients are waiting for better drugs and services that we can create with help from breakthrough software for systems biology, drug discovery and drug development. Conventional software that implements the statistical method and works best for analyzing cross-sectional data about groups (data snapshots) is not sufficient. The problem is that the statistical method is based on assumptions and works under conditions that do not characterize real biological systems.

Furthermore, software that implements established alternative methods such as neural networks and genetic algorithms may be helpful but often yields results that are almost as mysterious as the biological systems that they imitate.

Leroy Hood, Director of the Institute for Systems Biology, is one person who anticipated the DataSpeaks' solution when he was quoted in a Science article about where to go now that the human genome is almost finished: "We don't know how to make measurements [of function and interactions] that are really critical in a high-throughput manner." I do.

In short, we need breakthrough software to help enable systems biology and improve the productivity of pharmaceutical R&D.

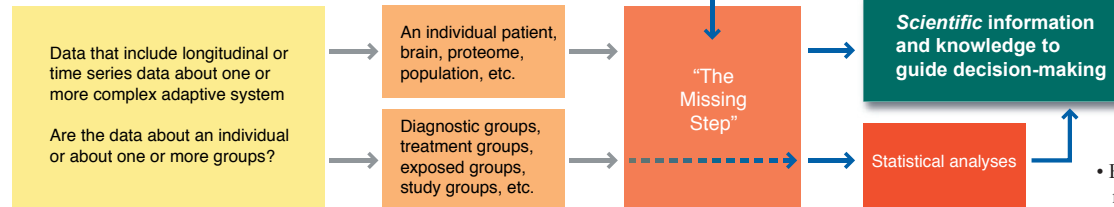
## SOLUTION

DataSpeaks Interactions® is the first representative of a new category of pattern recognition software. It implements a fundamentally new method to account for measurement error and noise while measuring dynamic interactions between and among variables that describe how individual biological systems function, respond and act as agents. Individuals matter when there is genetic diversity and individuals have different histories.

DataSpeaks Interactions® applies to multivariate longitudinal, preferably time series, data (data movies). Time matters when there is need to understand how complex adaptive systems function dynamically and change.

The figure illustrates DataSpeaks' unique solution. DataSpeaks Interactions® enables users to take a crucial missing step that often should come between data collection and statistical analyses for investigations of groups and populations. DataSpeaks Interactions® allows investigators to surmount many limitations of the statistical method before conducting statistical analyses. In general, statistical analyses would be greatly simplified.

DataSpeaks Interactions® also helps enable scientific investigations of individuals such as patients, brains and proteomes with little recourse to the statistical method. As such, DataSpeaks Interactions® can help enable diagnoses of disordered functions as well as health care that is both scientific and personalized.



DataSpeaks Interactions® can help users do science better. It promises to become as important to the conduct of scientific inquiry as the statistical method has been already – a difference like that between snapshots and movies in revealing action and change.

## DataSpeaks seeks collaborations that will lead to:

- Team development including selection of a company president
- Advanced proof-of-concept demonstrations
- Licensing agreements
- Partnerships
- Customers
- Investment

DataSpeaks Interactions® can improve the productivity of pharmaceutical R&D by:

- Targeting drug discovery more effectively by revealing and visualizing mechanisms, pathways, circuits, networks and cascades of biological activity that can become disordered and respond to treatment
- Using high throughput technologies such as microarrays and functional imaging to determine how drugs and drug candidates may affect thousands or millions of interactions simultaneously in a more holistic manner
- Informing the development of mathematical models (theories) of how biological systems function and drugs work
- Avoiding drug attrition by targeting drug development to patients most apt to benefit and least apt to be harmed
- Speeding drug development by measuring the benefit/harm of treatments – interactions between measures of treatment and health – over time and across health variables for individual patients with chronic disorders before statistical analyses that would be conducted on benefit/harm scores rather than health variables
- Improving drug labels by providing detailed information about how apparent benefit/harm varies as functions of dose, delay and persistence of response, as well as analysis parameters used to define episodes of care
- Improving marketing by evaluating how effects on laboratory measures translate into effects on patient symptoms, human performance, and quality of life
- Avoiding safety problems by evaluating interactions that involve multiple drugs and other exposures
- Attracting more patients to clinical trials by making the trials more ethical, more helpful to individual subjects and more responsive to individual patient preferences

- Saving money by increasing statistical power, decreasing sample size requirements, and extracting more value from available data
- Making treatment evaluations and regulatory decisions faster, less adversarial, and more scientific
- Enabling a new class of profitable disease management and health information services crucial to the optimal use of marketed products.

## DataSpeaks has:

- An inspired founder
- A specific and discrete but extensive and largely unanticipated solution to a broad nexus of seemingly intractable problems
- Broad foundational patents (U. S. 6,317,700 and 6,516,288) for platform software
- Pending foreign patents
- Registered marks:
  - DataSpeaks®**
  - DataSpeaks Interactions®**
  - We make data speak.®**
- Advanced prototype software that works and has a good user interface
- Preliminary proof-of-concept demonstrations

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