

# Biological Sciences Division

## Open-source software tool for protein microarray analysis available from PNNL

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Pacific Northwest National Laboratory (PNNL) researchers have developed the first open-source software tool that enables biologists to analyze large amounts of data from protein microarrays. The Protein Microarray Analysis Tool (ProMAT) was developed for use with enzyme-linked immunosorbent assay (ELISA) microarray experimental data. ProMAT was featured in the June 9 issue of *Science*.

ELISAs are widely used to detect the presence of an antigen—also called a biomarker—in biological samples. The advent of high-throughput proteomic technologies has increased the rate at which protein biomarker candidates are being discovered. Using ELISA in a microarray format is a highly efficient way to analyze multiple proteins in the large numbers of samples necessary to determine the clinical relevance of a biomarker profile and to characterize factors other than disease that can alter biomarker levels. However, high-throughput analysis of ELISA microarray data requires statistical software specifically designed for estimating standard curves, predicting protein concentrations, and estimating their uncertainties.

Until ProMAT was developed, researchers typically did these calculations with inefficient spreadsheet programs. The statistically based ProMAT significantly decreases ELISA microarray data analysis time while increasing the information content of the results. ProMAT estimates standard curves, sample protein concentrations and their uncertainties, and it provides insightful diagnostic figures. It can be downloaded free of charge at <http://www.pnl.gov/statistics/ProMAT/>.

Funding for this work was provided by PNNL's Biomolecular Systems Initiative, the National Cancer Institute, and the Early Detection Research Network. The development team includes Rick Zanger, Don Daly, Amanda White, Susan Varnum, Kevin Anderson, and Nikki Bollinger.

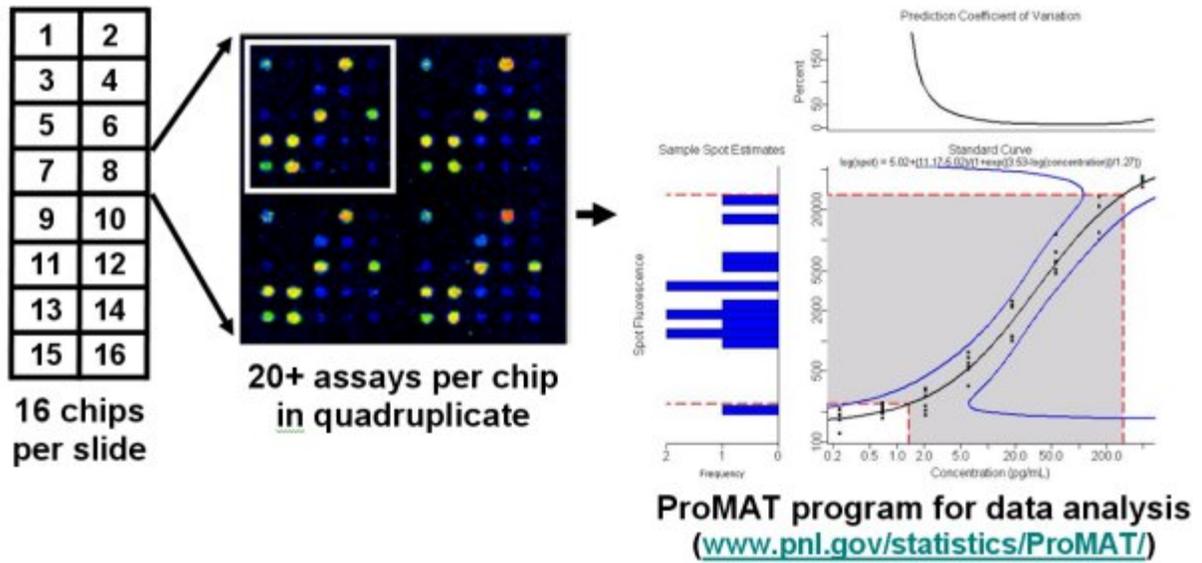
### Reference

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Prototype of high-throughput system for ELISA microarray analysis. Left: a total of 16 identical chips or microarrays are printed on a glass slide. Center: each chip can contain 20 or more assays printed in quadruplicate, once in each quadrant. The spot intensity is shown in false color, with increasing intensity from blue to red. Once the intensities are quantified, the data can be analyzed rapidly using ProMAT. Right: a visual diagnostic from ProMAT contains a histogram of the sample data indicating how well these data are characterized by the standard curve (far right). [Full Image](#)