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Yo Soy Información

MU's soybean database is a resource for scientists around the world.

Story by Erik Potter

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Piece by piece, data set by data set, Dong Xu is making the University of Missouri the world's headquarters for soybean information.

Dong Xu. Photo by Gene Royer.

If you want data about soy's genetic makeup and expression, protein activation, or which metabolites are associated with higher oil or protein content, Xu has it. A lot of it.

Hundreds of gigabytes of data make up the Soybean Knowledge Base (SoyKB). Xu, the James C. Dowell Professor and chair of the computer science department, continues to grow the database to make studying soybeans easier, faster and more efficient.

Xu doesn't generate the data himself. He's been gathering it for three years from collaborators at MU and around the country, as well as collecting it from journal articles.

"We mine the data and integrate the data — that is, we combine all the things to make a biological hypothesis," Xu says. "It's a very user-friendly … analysis tool online."

One tool Xu is working on would identify genotype-phenotype relationships: finding the genetic basis (genotype) for an outward characteristic (phenotype). Narrowing the search for genetic causes of desirable traits (such as drought resistance) speeds the process of breeding for that trait.

One of Xu's main collaborators is Gary Stacey, Missouri Soybean Merchandising Council Endowed

Professor of Soybean Biotechnology at MU. Stacey says SoyKB is tackling one of the biggest challenges facing science in the 21st century: understanding complexity.

It's one thing to know all the amino acids that make up an organism's genome. The challenge now is to understand what those genes do, how they interact, how changes in one can affect another and how environment influences all of that.

"SoyKB is a Web–based tool to address those issues," Stacey says. "After we have a place to store, analyze and integrate [data], we hope to take the knowledge there and get a better understanding" of soybeans.

Stacey says Xu is continuing to improve the integration of dissimilar data sets to allow scientists to see connections and relationships that haven't been discovered before.

Scientists around the globe use the online database, and Xu hopes to expand beyond soybeans. His next project is to build a similar database for grapes, which are becoming an economically important crop in Missouri.

Xu wants universities elsewhere in the world to use his template to create organism–specific databases on locally important animals and crops.

"There is a big need," Xu says. "We hope to provide a generic platform people can use."

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