



# News Release

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## WESTERN RESEARCH TEAM ENTERS INTERNATIONAL COMPETITION

**St. Joseph, Mo.**—June 27, 2006—Using genetic engineering to solve a mathematics problem, an international competition, two professors and seven students, and pancakes are all part of a Summer Research Institute team at Missouri Western State University. The team, which includes a Central High School senior, is conducting a research project for an international competition sponsored by the Massachusetts Institute of Technology (MIT).

The team from Western is only one of 39 entered in the international Genetically Engineered Machine (iGEM) competition, and in November, they will travel to MIT to present their research.

“We’re competing with the big guys,” said Dr. Jeff Poet, assistant professor of mathematics, who is leading the team with Dr. Todd Eckdahl, professor of biology. He noted that Western is the only Midwestern institution in the United States in the competition. The majority of the U.S. college and universities are east- and west-coast schools, including Berkeley, Caltech, Duke and Harvard. International participants include teams from England, Japan, Slovenia, South Africa, and Mexico, among others. Western is one of only two teams in the competition from a primarily undergraduate institution.

The group is seeking to use the bacterium *E. Coli* to solve “The Pancake Problem.” Given an arrangement of different sized pancakes in a stack, the goal is to determine the least number of flips needed to order the pancakes from smallest to largest. “It’s a classic mathematics problem,” said Dr. Poet. “We’re just trying to play the game with *E. Coli* instead.”

Eric Jessen, a senior biology major from Brookfield, Mo., explained the research project using a pancake analogy. Within an *E. Coli* cell, pieces of DNA are the “pancakes,” and enzymes are the “spatula.” The team will construct DNA with some of the pieces in an incorrect order and allow the enzymes to flip pieces of DNA until the correct order is obtained, at which time the bacteria will glow red.

Mathematics is involved in both the framing of the problem and also in the modeling of the solution. So one student on the team, Marian Broderick of Wichita, Kan., is a mathematics major. Along with Dr. Eckdahl, Dr. Poet, Jessen and Broderick, the team includes Western students Adam Douglas Brown, St. Joseph; Trevor Butner, Savannah, Mo., Brad Ogden, St. Joseph; Kelly Malloy, Brookfield, Mo. and Central High School student Lane Heard.

“We are a part of something really big, exciting and new,” said Dr. Eckdahl. “This is the most suited project for undergraduate research I have ever seen. It’s exciting, it’s creative, and it’s pushing the envelope to the point you make mistakes. And it’s all about teamwork.”

Dr. Eckdahl and Dr. Poet noted that besides the outstanding learning opportunity for students, two more factors make this project exceptional: It is multidisciplinary and multi-institutional. Western’s biology and mathematics departments are working together on this project, and the team is also collaborating with Davidson College in Davidson, N.C. on the research.

“That may be our biggest contribution,” said Dr. Poet. “To figure out how people 1,000 miles apart can collaborate.”

An ambassador for MIT’s iGEM program, Andrew Hessel, visited Western in June to meet with the team. “They’ve got a really interesting fundamental idea,” Hessel said of Western’s project. “The downstream application for this problem is very interesting. On a competitive level I think they are doing well.”

He noted that the purpose of the iGEM competition, which began in 2004, is to “use the tools of synthetic biology to make the coolest things you can. It’s really looking for creative application.”

Western’s Summer Research Institute, which began in 2001, consists of several teams from departments across campus that conduct research throughout June and July. Each team includes Western students, area high school students and professors. This year, along with Dr. Eckdahl’s and Dr. Poet’s team, some of the research projects are Learning Economics by Designing a Video Game, Preliminary Research on Design and Construction of Lunar and Martian Space Bases, Design and Simulation of Nanostructure Devices, and Domestic Violence and Order Protection: What Will the Courts Provide? Students will make a presentation of their research at a public forum at the end of the Institute.

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