

Doing good with operations research

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For Northwestern University's Karen Smilowitz, the term "industrial engineering" is a bit of a misnomer. It evokes the image of the engineer in a factory with a stopwatch in hand, making sure production is as efficient as possible.

Surely some industrial engineers still do that. But these days, industrial engineering has grown beyond the factory and into the world of business. Others have taken it one step further -- into nonprofits.

Smilowitz has co-organized a symposium, "Doing Good with Good OR: Applying Operations Research for Societal Impact," to highlight such work. It will be held at the American Association for the Advancement of Science (AAAS) annual meeting in Washington, D.C., Friday, Feb. 18.

Smilowitz, associate professor of industrial engineering and management sciences and the William A. Patterson Junior Professor in Transportation at Northwestern's McCormick School of Engineering and Applied Science, has studied ways to optimize how freight is moved: how to reduce the distance of trucking routes, for example, or how to get companies to pool their resources and lower costs. More recently, she has taken that work and applied it to nonprofits both at a global and a local level, including finding equitable and efficient distribution of relief supplies in humanitarian logistics and improving operations for mobile delivery of asthma care.

Nonprofit and humanitarian organizations often have operations

problems they don't have the budget or technology to solve, and their needs are different from those of for-profit companies. "When you have a nonprofit, the goals change," Smilowitz says. "You can't just take a commercial model and apply it, since maximizing profit and minimizing cost aren't necessarily the goals."

Smilowitz and her Northwestern colleague Seyed Iravani, professor of industrial engineering and management sciences, have worked with a food bank in Chicago to find the best way to match donors and recipients and design collection and delivery routes. Along with Sarang Deo, assistant professor of managerial economics and decision sciences at the Kellogg School of Management, they are working with the Mobile C.A.R.E. Foundation (MCF), a nonprofit organization that provides free asthma treatment to children in Chicago's underserved communities via mobile medical units. This multi-year project has given Northwestern students an opportunity to see how they can use their engineering skills to address pressing issues in their community.

Paul Detjen, M.D., co-founder of MCF, will discuss the Northwestern/MCF collaboration at the "Doing Good with Good OR" symposium.

"You need to have a model that shows how asthma progresses over time," Smilowitz says. "And you need a capacity-allocation model that says how to best use a scarce resource when your objective function is to bring in the entire population. It's a difficult problem."

Recently, Smilowitz and Irina Dolinskaya, assistant professor of industrial engineering and management sciences at McCormick, have launched a Humanitarian Logistics initiative at Northwestern, bringing together researchers across the University and practitioners in the field to study the application of operations research techniques to nonprofit and humanitarian settings. The goal of the initiative is to develop and

apply modeling and solution technology to promote welfare and equity through the efficient delivery of goods and services.

More information: More information about the initiative can be found at <http://hl.mccormick.northwestern.edu/>.

Provided by Northwestern University

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