

Probability two strangers
will click when they meetDeals with meeting
random strangers

Time

Number of strangers
you meetNumber of friends
you haveDeals with meeting
friends of friendsNumber of people you get
introduced to by others

$$\left\{ P_r \frac{m_r}{t} \right\} + \left(\frac{m_r d_i(t)}{t} \right) \left(\frac{m_n}{m_r (P_r m_r + P_n m_n)} \right)$$



Northwestern University economist Brian W. Rogers helped develop a mathematical formula that determines the randomness of social networks. Tribune photo by Chris Walker

The mathematics of friendship

By Jason George | Tribune staff reporter



NAME: Brian W. Rogers
TITLE: Assistant professor of managerial economics and decision sciences
WHERE: Northwestern University
AGE: 28
PHD FROM: California Institute of Technology
WHY ECONOMICS: "Economic theory provides useful tools for analyzing strategic interactions. Understanding the properties of these interactions allows one to design institutions to improve outcomes, and ultimately benefits many aspects of society."

You're popular. You meet people at weddings, work and bars. Friends — you've got a million. But just how you met those friends can affect your social circle's dynamics, and two economists say they can prove that with a new mathematical formula they've developed. Brian W. Rogers of Northwestern University and Matthew O. Jackson of Stanford University specialize in the study of social networks — the science of how people and organizations meet and connect.

This type of economics examines social butterflies, known as "connectors," and hermits, termed "loners." These economists probe problems trivial — remember the '90s parlor game Six Degrees of Kevin Bacon? — and topical, such as the formation of terrorist cells.

"I think as an economic theorist you've got to keep a close eye to making sure what you do corresponds to being able to answer a real question," said Rogers, an assistant professor at Northwestern's Kellogg School of Management.

Rogers and Jackson created the formula to help other scientists better understand how people go about meeting each other. Consider this example:

Epidemiologists want to know why

two cities have different HIV infection rates, so they plug population data into the new equation. They then discover that one city has a lot of people coming and going from elsewhere, while the second town keeps to itself.

"And then you want to ask yourself, do different kinds of network structures tend to encourage or discourage the spreading of the disease?" said Rogers, who with Jackson will have the formula published in the June edition of *The American Economic Review* as part of a 48-page paper, "Meeting Strangers and Friends of Friends: How Random are Social Networks?"

To prove the equation worked, Rogers and Jackson tested it out on all kinds of data, everything from high school romances to prison friendships to how Web pages link to other pages.

Mostly they found things they expected: Social people tend to have more social friends; popular Web sites become more popular over time; high school really is as insular as you think.

One fact that surprised Rogers, though, was how cliquish prisoners tend to be.

"And I have no idea why that happens, and it's not something I have personal experience with," he said. "Thankfully."

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NAME: Matthew O. Jackson
TITLE: Professor of economics (Jackson grew up in Clarendon Hills)
WHERE: Stanford University
AGE: 45
PHD FROM: Stanford University
WHY ECONOMICS: "I love mathematics, but also wanted to do research that had some direct social relevance. Economics offers the perfect mix."