NEXT LEVEL

Greatest tennis player of all time? The answer will rock your world.

IF YOU WANT TO KNOW THE BEST ATHLETE OR TEAM in any sport, there's a straightforward way to figure it out: Have everyone play everyone else a significant number of times and see who earns the best record. Of course, in most sports, that's impossible to do, which often leads to the mother of all sports riddles: If Team A beats Team B, and Team B beats Team C, and Team C beats Team A, how do you rank the three teams?

Well, thanks to scientists in a field called complex network analysis, there's a novel way to solve this conundrum—and settle a whole lot of bar arguments.

A network is simply any system of points connected by paths that carry information. Networks are everywhere. Groups of proteins that interact within cells are networks. A large set of tennis pros who routinely play each other is a network. So is your set of Facebook friends. So is the Internet itself, for that matter.

Over the past dozen years or so, researchers have discovered various rules that networks tend to follow as they grow, and they've developed ways to explore them, such as search engines. Funny thing: It turns out that measuring which pages on the Internet are most relevant to a search is a lot like measuring which athlete in a group is the best. See, when you search for something in Google, it doesn't simply return a list of the web pages that contain the most hyperlinks. Instead, Google asks how likely it is that a web user who wants information about, say, the Golden Gate Bridge will land at any one of the thousands of pages containing data on it. Google then creates a ranking based on how many connections each page has to other well-traveled pages. In other words, Google answers this question: Given how sites and links are distributed around the web, how relevant is any site to your search?

Now suppose you're looking at the ATP—a network of men's tennis players. Each competitor is a point; the record of any competitor against another is the connection between those two points. You can then ask a question similar to what Google poses: Given how wins and losses are distributed within the group, how good is each player? It doesn't matter whether a player has faced some more often than others or hasn't faced particular opponents at all. Network analysis allows us to rank the importance of every point on a network—the quality of the players—based on the number and the value of the connections they have.

Filippo Radicchi, a physicist at Northwestern, has applied precisely this idea to—ta-da!—men's tennis, creating a giant network from the results of every player who participated in a Grand Slam or ATP Tour event from 1968 to 2010, a total of 133,261 matches.

His conclusion, recently published in the journal PLoS ONE: Jimmy Connors is the best player ever. You may remember John McEnroe as the better competitor or consider Roger Federer more dominant. But Connors holds the record for men's singles titles (109), so he has a high number of connections. And many of those wins came against other great players, so his connections carry great value too. Radicchi also can narrow his network to tell you that Guillermo Vilas was better than anyone on clay or that Ivan Lendl was the top player of the 1980s or that Rafael Nadal emerged as the world's best in 2007, a year before the ATP ranked him No. 1.

Now, network analysts are just beginning to apply their concepts to sports. But Radicchi's work could lead fans down all sorts of interesting paths. "We could apply this method to ranking the best chess players or boxers in history," Radicchi says. Or golfers or Olympians. It might even one day be applied to college football, where there aren't always only two teams worthy of playing for a national title. Network analysis could, say, look at Auburn, TCU, Oregon and Stanford and tell us which two most deserve invites to the championship bowl game. Afterward, it could rank how each played throughout the entire season.

Hmm. Forget about settling bar bets. This could end up bringing down the BCS.