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National University Rail Center of Excellence

UI-led National University Rail Center of Excellence to focus on sustainability, passenger use, more

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CHAMPAIGN — A new national rail center could allow University of Illinois engineers to improve railroad infrastructure in a variety of ways that civil and environmental engineering Professor Christopher Barkan says will become increasingly relevant as time goes on.

“We as a nation are trying to reduce our carbon footprint,” Barkan said. “In fact, not just us. Nations all around the world are trying to do that. Railroads are intrinsically more efficient than highway transport, probably by about a factor of three or four.”

Last week, Illinois’ two senators, Dick Durbin and Tammy Duckworth, and U.S. Rep. Nikki Budzinski, D-Springfield, announced that the UI would receive a $5 million grant from the U.S. Department of Transportation to establish the National University Rail Center of Excellence. Barkan is the director of the Rail Transportation and Engineering Center on campus, where researchers are already working on improving railroads’ efficiency, safety and performance.

NURail CoE (that’s the official abbreviation for the new center) will bring in researchers from eight other universities with a focus on those issues as well as sustainability and resilience in anticipation of potential changes in climate conditions.

“We have a world-class engineering faculty on our campus,” Barkan said. “I’ve always felt it was really important to engage all of this specialized expertise amongst the different engineering departments to apply their expertise to solve railroad problems. This is a great opportunity for that.”

Barkan said that while the UI already has the largest railroad-engineering curriculum in the country, this new center will continue to attract students from all over the world.

He also hopes to increase the number of universities around the world that teach railroad engineering; he said many of the UI program’s Ph.D. students go on to start programs at other schools.

In East Central Illinois, trains aren’t always the first thought for transportation — though they’re certainly used by farmers to move tons of material.

“We want to make sure everybody understands that railroad foresight is a tremendous advantage we have in this country, and again, something we tend to take for granted,” Barkan said. “We have the best freight-railroad system in the world in North America.”
Passenger rail is a bit of a different story.

Barkan highlighted metropolitan areas like Chicago for having great rail networks, but said he’d like to see better options for passengers outside of large cities.

“We have three trains a day from Chicago, and they’re not always reliable,” he said, referring to Amtrak’s Illini, Saluki and City of New Orleans services. “That’s something we’d like to see changed.”

In Europe and Asia, passenger trains cover long distances at speeds approaching 200 miles per hour. Barkan said they can do that because of specialized infrastructure; the tracks aren’t shared with freight trains like they are in most of the U.S.

“The Amtrak trains use it, but it’s really designed and operated as a freight railroad — as it should be, because they’re the ones who paid for it and own it,” Barkan said.
He said UI researchers have previously performed a feasibility story for a high-speed railroad connecting Chicago, Champaign-Urbana, Decatur, Spring□eld and St. Louis, but that they’re also researching how to improve shared tracks, since that is the existing infrastructure.

An improved rail system would advance that mission to reduce the country’s carbon footprint as more passengers and freight could be moved by rail with less environmental impact.

Research will also continue for alternative forms of power for locomotives to further improve rail as a sustainable option.

“This is a really complex problem, and it’s not going to be solved overnight,” Barkan said. “We don’t even know what the right approach is, and there are going to be different approaches in different contexts. Some of our partners are quite knowledgeable and expert in this sort of thing, and that’s one of the advantages we bring to the table in the context of this topic. We have a lot of expertise that can help answer some of these questions.”