

Creating smarter, healthier transportation systems

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NC State assistant civil engineering professor Eleni Bardaka grew up in Athens, Greece, watching her mom take public transportation to work every day and eventually finding her own personal independence using

multiple options to get around the modern version of the ancient city.

Throughout her educational career—Bardaka earned a civil engineering degree from the National Technical University of Athens, a master's degree in economics from Purdue and a Ph.D. in [civil engineering](#) from Purdue—she has devoted her time to developing alternative [transportation systems](#) that don't necessarily rely on the modes of transportation that evolved in the United States following World War II.

For three-quarters of a century, U.S. residents have been untethered on the road with their personal vehicles. How, though, do you unclog the traffic those vehicles create, sometimes like a cholesterol-filled artery? How do you get people around town and from place to place, not only to relieve traffic but also to get people moving on their own?

Bardaka came to NC State from Purdue in 2017 to tackle those issues, particularly in her undergraduate/graduate class Transportation Systems Analysis (Civil Engineering 401/501), where she includes alternatives to just widening a road or putting in an additional lane. Along with her undergraduate class, Introduction to Sustainable Infrastructure (CE 297), Bardaka is cognizant that transportation planning has a huge impact on a community's physical, mental and sustainable well-being.

In a country where even most large and midsize cities, like those in North Carolina, rely on personal vehicles, transportation systems are built more with suburban development in mind, not public transportation.

"It wastes a lot of resources and creates a lot of traffic," Bardaka says. "So we have to get smarter with how we build our systems."

The stigma of public transportation

One of the biggest ways to tackle the issue is to remove the stigma of public transportation, something that was not part of her Greek background. In the U.S., however, public mass transportation planning is often devoted to large interstate projects, loops and bypasses instead of light rail or other systems that move larger numbers of people at one time.

And those roadways can create division, even while they offer solutions.

"We talk a lot about how interconnected the transportation system and societal systems are," Bardaka says. "How do we make decisions about how we get somewhere? In terms of building something, investing in something, these decisions affect communities, sometimes in a positive way. But we also have a lot of examples where these decisions are also segregating, dividing and harming communities."

One of her recent students, Adam Schmidt, spent the better part of the spring working on a project that looked at how the gentrification of uptown Charlotte followed the city's installation of its Lynx light rail system, a 19-mile, 26-stop line that opened in 2007.

"What I liked from the beginning is that this is the only transportation class I had ever taken that wasn't specifically focused on cars," Schmidt says. "This class is about how people decide how they get to work or go shopping or things like that."

It was foreign territory to Schmidt, who grew up outside of Greenville, North Carolina, where public transportation was about as scarce as authentic baklava.

"It does start with the stigma that gets ingrained early," Schmidt says. "What makes people want to ride the bus and take public transportation? For me, the class provided a window into how people make those

decisions."

New ways to travel

And there is a specific wellness aspect that comes with that, as people learn new ways to travel and commute. Bardaka concedes that hers is not at all a design course, but a vehicle for thought about new ways to move.

"I mostly educate the students about how to get a broader perspective on the impacts of everything we do in transportation," she says. "I think there are a lot of connections on the different perspectives of wellness, like physical wellness, social and community wellness. So there is a behavioral component in which we consider how to design infrastructure, how to design municipal and state policies and how we place infrastructure components.

"As we do those things, it will lead to healthier communities. Future engineers have the responsibility to consider the wellness of individuals and communities."

Provided by North Carolina State University

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