

From Florida to Flood Maps: Dr. Christian Guzman’s Journey to Advancing Environmental Justice in Massachusetts



“Engineering isn’t just about the technical stuff, it’s about working with people to make a real difference in their lives.”

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For many, the path to a career in academia begins in the lab or lecture hall. For [Dr. Christian Guzman](#), it began in a reclaimed industrial site.

Brought there by a guest speaker in an undergraduate engineering seminar, what the future Dr. Guzman saw inspired him profoundly: what was once dilapidated, rotting metal, had been, through the efforts of civil engineers, transformed into a beautiful, green, walkable space for people to enjoy.

“That’s when I really lit up and thought, ‘Wow, this is what I want to do,’” Guzman recalls.

Born to Ecuadorian immigrants, Guzman grew up in Florida instilled with appreciation for the transformative power of education. “My parents understood the importance of education,” and from the start, his path was going to be heavily focused on it, he jokes, “at their insistence.”

But while his undergraduate experiences had pushed him towards engineering, it wasn’t until graduate school that Dr. Guzman’s career truly began to take shape. At Cornell, he was drawn to research projects in underserved communities, including a life-changing opportunity to work in Ethiopia studying soil erosion and water degradation.

He prepared for his trip abroad as many dedicated and bright young students would: by researching everything he could about the subjects at hand, hoping to hit the ground running with great ideas and start helping people the moment he got there. It was only when he arrived that he realized he would have a lot more to learn than to teach.

“When I arrived there, it was life-changing,” he recalls. “Everything was upside down from the perspective of what I thought I could help with. The engineering solutions that I thought could change people’s lives had already been tested out. There was more of a need to better integrate researchers and engineers into the community, better work with social scientists, and see how solutions could be a long-term thing rather than a short-term fix.”

In short, he learned that the best engineering comes not from offering people one-way answers but listening to their needs and engaging in collaborative problem-solving.

This understanding of community-engaged engineering defines Dr. Guzman’s work today. As an assistant professor at UMass Amherst, he leads innovative research that addresses environmental and social inequities – work that has been funded by the [Institute of Diversity Sciences](#) (IDS). In [Dr. Guzman’s research project](#), he and his team are using geospatial mapping techniques to identify communities in Massachusetts that are most vulnerable to flooding.

For Guzman, the urgency of the research is clear. “What we’re finding is that in some cities – [places like] Lawrence, Springfield, Holyoke – a lot of these characteristics of minority status, low income, low English-speaking ability, [seem] to overlap with high flood risk,” he explains. “But in areas like Worcester and Boston, these stories don’t tend to be the same. It’s really been interesting to see how more of these vulnerability indices tend to overlap within these flood zones.”

The research team, which includes collaborators from civil engineering and geosciences as well as [Cielo Sharkus](#), a recently graduated PhD student, aims to provide policymakers with tools to ensure that flood mitigation efforts prioritize the communities that need them most. Vulnerability mapping, a cornerstone of the project, combines US census data with flood risk models to highlight where social and geographic factors intersect to create heightened risk.

“As is the driving ambition behind all of the research IDS supports, my team’s work demonstrates how STEM can be a force for environmental and social justice,” Guzman says. “By showing policymakers where the greatest needs are, we can help reduce suffering and economic loss during floods.”

Dr. Guzman’s journey hasn’t been without its challenges. After defending his doctoral dissertation, he faced a string of rejections – academic papers, job applications – which left him questioning his path. “I was completely deflated,” he says. “I had come to the culmination of these experiences and been told in one way or another, ‘You’re nothing.’” Returning home to Florida gave him the space to reflect. “I re-understood why I was doing my PhD. Success will come along the way, but what you should draw meaning from is what really matters to you.” After regrouping, Dr. Guzman was much more successful the next time around, publishing several research papers and receiving a job offer.

For Dr. Guzman, what matters is clear: using his expertise to empower communities and prepare them for the challenges of climate change. And as he looks to the future, his work serves as a reminder that the best solutions are built not just on data and models, but on collaboration and engagement with communities to ensure social impact.

“Engineering isn’t just about the technical stuff,” he says. “It’s about working with people to make a real difference in their lives.”



Faculty Voices: Christian Guzman

Hear Dr. Guzman speak about what drew him to academia and describe the work he is doing to mitigate flood risk for vulnerable communities.

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