

SCIENCE for Social Change

After several months (and emails), here I am sitting across Prof. Ana Beatriz Acevedo of EAFIT University for an interview to get to know her insights, perspectives and her work in Colombia around earthquake risk awareness, understanding and resilience. We will also be touching on how and why she got involved with GEM.

Jeph: Hi Prof. Ana, thanks for agreeing to do this interview. If you're ready, I will go straight to my questions.

Ana: Hi Jeph. Thanks for this opportunity, too. Yes, I'm ready.

Jeph: Ok, let's break the ice and start with an easy one.

Jeph: *Can you still recall the first time you experienced an earthquake, and what did it feel like?*

Ana: I think I was about four years old when I first experienced an earthquake. If I'm not mistaken, it was the 1979 Mistrató earthquake. We lived in a residential building at the time, so we really felt it, a strong swaying motion. It was a very frightening experience for my family. I can still remember the big crack it created on our wall.

Jeph: I can imagine the feeling. I experienced the same swaying motion from a strong 7.7 magnitude earthquake 30 years ago in the Philippines. I think the Mistrató earthquake was an 7.9 magnitude that struck Colombia that year. *Did that experience influence you in any way to take up engineering?*

Ana: No, not at all (laughter).

Jeph: (laughter) Ah, good we're having this interview. I can get to know you better. *So, what actually got you into engineering?*

Ana: I was very good in Math...that was the main reason. But I guess, the Mistrató earthquake plus a cracked wall in our apartment left behind a mark in my subconscious.

Jeph: I think that's plausible. Our childhood experiences can sometimes influence our decisions later in life. Thanks for sharing that experience.

Jeph: The next questions will be a little bit more complicated to answer, so please take your time.



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I have made a commitment to help increase Colombia's resilience to earthquakes. I do not want to be just an academic that publishes articles but does not contribute to the society's wellbeing.

Ana: Ok, no problem.

Jeph: Fast forward to the present. You are now a Civil Engineer with Master and PhD degrees on Earthquake Engineering, and currently a Professor of Civil Engineering at EAFIT University in Medellin handling a course on earthquake engineering.

Ana: That's correct.

Jeph: Obviously, at some point in your career, you got involved with GEM. **But before GEM, what was your 'world like' so to speak?**

Ana: Before joining GEM through the SARA project, I was a young professor, just five years into teaching. I was focused mainly on my classes. I had done some research activities related to structural behavior, but I was not very successful in communicating the results to the public, to the end beneficiaries.

Ana: At the time I worried a lot about academics more than anything else, and I did not know how to apply the knowledge, the research I've done for improving the wellbeing of our society. I didn't feel satisfied with just doing research.

Jeph: I agree, it's always difficult to communicate research results to your intended beneficiaries, especially in your field where socio-political and socio-economic factors are also at play.

Jeph: **What changed or what incident changed your situation?**

Ana: When I was contacted by the GEM Foundation to be part of the SARA project in 2013, I accepted the invitation because I saw an opportunity to learn about seismic risk assessment. The project was perfect for me since I did my graduate studies on that subject. It was an opportunity to apply what I have studied. But I must confess that when I accepted the GEM invitation, I had no experience on seismic risk assessment.

Jeph: Well, things definitely turned for the better. And we are happy that the lack of experience did not stop you from joining. **At the SARA project, what were the tasks that were assigned to you?**

Ana: There were three of us in the team – a colleague from EAFIT, a Master student and myself. We were tasked to develop exposure models, vulnerability and fragility functions. Our team developed an exposure model for the Antioquia Department, Bogotá and Metropolitan area of Cali, and fragility functions for Colombian unreinforced masonry structures.

Jeph: That's quite a lot. **How did you find that experience? Anything in particular that stood out?**

Ana: I have to say that the development of the exposure model and the fragility functions was a learning experience for our team. The interaction with GEM and support from your staff was vital to that experience, as it made it easier to transfer state-of-the-art knowledge to us.

Ana: The training workshops in Medellín, Colombia in 2014, and Lima, Peru in 2015 also marked the start of a change in my knowledge and perspective of risk. During the training in 2014, we learned about the GEM building taxonomy and general concepts about seismic risk assessment. In the Peru training, we were introduced to OpenQuake.

Jeph: Thanks for sharing that information. I am starting to have a clearer picture of how the GEM SARA project played a key role in changing the course of your professional career. **Are there any other inciting incidents that helped you change your situation?**

Ana: (Thinking...) I believe that another 'inciting incident' took place in Ecuador in 2015 when I was presenting the work I did for the SARA project.

Jeph: **What transpired during that event?**

Ana: I had the opportunity to meet Carlos Villacis, who was the GEM Regional Program Manager and Strategy Coordinator at the time. Carlos stressed the need to involve policy makers as much as possible in research projects related to seismic risk assessment. This was something that I had not considered before – my mindset has always been “I am an academic, not a politician”.

Jeph: I remember Carlos. I worked with him briefly. Yes, academics and politicians usually don't mix well. **So, did you follow Carlos' advice?**

Ana: Yes, I did. In 2017, I helped organize an EAFIT-GEM seminar and workshop on seismic risk assessment that involved guest speakers from organizations such as the Colombian Geological Survey, Metropolitan Area of Medellín, and National Entity for Disaster Risk Management. The event was free, and was attended by more than 100 people from public and private institutions. Right now, my closest partners in the city are two public institutions: SIATA and AMVA and one non-profit organization called Build Change.

Jeph: That's impressive. **Given these changes in your perspective brought about by your involvement with GEM, what goal did you set for yourself?**

Ana: After my positive experiences with GEM, I have made a commitment to help increase Colombia's resilience to earthquakes. As I have mentioned earlier, I do not want to be just an academic that publishes articles but does not contribute to the society's wellbeing.

Ana: I want to transfer the knowledge I have gained about seismic risk assessment to my students both graduate and undergraduate, to the society, to policy makers.

Ana: I want to participate in research that has real life applications, and where results can be used by policy makers to improve building codes and risk mitigation strategies.

Jeph: That's very noble and selfless. **What do you think are the barriers in achieving those goals?**

Ana: I think that the number one barrier is being in a society that does not believe that earthquakes can happen

anytime, sometimes without warning. In Colombia, we had a devastating M6.1 earthquake in 1999 in Armenia Earthquake where hundreds perished and thousands injured. But it seems that most people have forgotten about it.

Ana: This is evident in the high number of informal and non-engineering buildings in Colombia, where construction quality is very poor. This is becoming a big concern because rapid population growth and urban development can increase disaster risk.

Ana: My opinion is that this can be attributed to the general lack of disaster risk awareness, earthquakes in particular.

Ana: Another barrier in my opinion is that earthquakes are also not a top priority for policy makers, making it difficult to communicate earthquake risk information that could be vital for the improvement of public safety and protection of critical infrastructure.

Ana: I believe that there is a lot of work to be done in bringing the information of seismic risk to the society, in such a way that any person can take actions that can increase our resilience to earthquakes.

Jeph: I share your concerns because those are also true in most countries prone to earthquakes.

Jeph: You mentioned earlier that you are now working closely with two government institutions and an NGO. **How did that come about? And was that part of your plan to address the low awareness of policy makers on earthquake risk?**

Ana: A couple of months after the seismic risk seminar held at EAFIT in 2017, we had a meeting in Medellín with GEM and different institutions related to seismic risk in the city. It was the first time that we all sat together.

Ana: The meeting was a turning point because it helped strengthen the ties between EAFIT University and public institutions such as SIATA (early warning system of the metropolitan area of Medellín), and AMVA (Metropolitan area for Medellín).



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The people at GEM are always open to answer your questions, to give you advice, and for me, that has more value than funding.



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I think change can happen anytime, but it has to start with one's self. Since 2016, we have been improving the exposure models of Medellín, Bogotá and Cali. We have also collaborated with GEM for the development of the Colombian exposure model that was used for the Global Earthquake Risk Map of 2018.

Ana: In fact, since 2017 SIATA has been using OpenQuake for the assessment of seismic risk for Medellín and its metropolitan area. That was how my collaboration with SIATA and AMVA started.

Jeph: Good to know that GEM's OpenQuake software is being used in Medellín. Thanks for sharing that information.

Jeph: *How do you intend to change the prevailing attitude towards earthquake risk? Or if you have already started or done anything to address it, could you kindly share your experience with us?*

Ana: I think change can start anytime, but it has to start with oneself.

Ana: The SARA project was completed in 2015 but my collaboration with GEM did not stop there. On the second semester of 2015, I attended the GEM Annual Risk Training Workshop in Pavia and after the training I was able to use OpenQuake. The knowledge and skills I gained there helped me to move forward.

Ana: Then in October of the same year, I was invited by GEM to present my work at the SARA project in Ecuador in a session about risk in the Habitat III conference. It was there that I met John Schneider and he kindly accepted my invitation to visit EAFIT University in Medellín two days after the conference. After that meeting, EAFIT and GEM signed a collaboration agreement.

Ana: The collaboration agreement allowed the GEM Risk Team, Catalina and Vitor, and myself to continue working on earthquake scenarios for unreinforced masonry buildings in the three main cities of Colombia. The results were presented in a journal in 2016 and in the 16th World Conference of Earthquake Engineering in 2017.

Ana: From the year 2016 until now and with the help of a graduate student we have been improving the exposure models of Medellín, Bogotá and Cali. We have also

collaborated with Catalina for the development of the Colombian exposure model that was used for the GEM Global Earthquake Risk Map of 2018.

Jeph: Your commitment and passion are truly admirable. *Earlier, you also mentioned that you'd like to transfer your knowledge to your students. Can you share your experience on how you achieved that?*

Ana: Yes. From the second semester of 2017, I have been teaching seismic risk assessment at the Seismic Engineering course at EAFIT. The students use OpenQuake to understand ground motion prediction equations and to perform both seismic hazard and seismic risk assessments.

Ana: I have also tutored several students that have been using OpenQuake in thesis such as 'Seismic risk assessment of electric substations', 'Assessment of earthquake-induced landslides in Quito, Ecuador', and 'Seismic risk assessment of water services in Medellín'.

Jeph: Again, that's impressive. Now you're not just teaching earthquake engineering but seismic risk assessment as well. That's quite a leap. Congratulations!

Ana: Thank you.

Jeph: *With a number of positive experiences you have shared with us, do you think that the barriers to earthquake resilience in Colombia have been resolved?*

Ana: Personally, with the SARA project, I believe that I have achieved my goal to update my knowledge on seismic risk assessment. I have also been able to transmit that knowledge to my students, the engineering community, and the public at large.

Ana: But... I also realized that this is not a race that has a finish line. On the contrary, each time I move forward, so does the finish line.

Ana: What is certain is that working at the SARA project was a

tipping point in my professional life because it made me aware that there is a lot to be done to increase earthquake resilience in Colombia.

Ana: I also gained better appreciation of my interaction with GEM because it showed me the importance of networking and sharing of information, especially in the field of seismic risk assessment.

Jeph: Very well said. **What would you want our readers to take away from your story?**

Ana: Thanks. Well, I always look at the world as a place full of opportunities, you just need to keep your eyes open and recognize such opportunities. Working at the SARA project was a unique opportunity for me. The fact the project finished did not mean that I had to stop interacting with GEM.

Ana: Many professors and researchers only get involved in projects if there is funding, but there is a lot that can be done without the need of funding.

Ana: The people at GEM are always open to answer your questions, to give you advice, and for me, that has more value than funding.

Jeph: I absolutely agree. Without commitment, no amount of funds would be enough to achieve organizational or personal goals. **Any parting words?**

Ana: I would like to thank you again for the opportunity to share my experiences with you and the GEM readers and followers. I hope that my learning experiences with GEM would inspire students, researchers, engineers and others to advocate for better seismic risk awareness and education to make Colombia and the world more resilient to earthquakes.

Jeph: On behalf of GEM, I would like to extend our gratitude for your continued support to GEM and our projects. Again, thank you very much for your time, Prof. Ana.

About the GEM Impact Stories

Earthquake risk remains abstract and highly technical, and there are significant risks due to poor or limited understanding of it. Because of this prevailing condition, policymakers and the public at large may not be able to fully take advantage of existing and future information that can either help create better or enhance existing earthquake risk reduction and management strategies, especially at the local and national level.

Specifically, the GEM Impact Stories project aims to:

- Collect and document stories where GEM or its partners have contributed to positive change
- Encourage policy and decision makers to use science- and evidence- based information to formulate earthquake DRR strategy at the national level through positive stories of change
- Increase awareness of the public at large on earthquake risk and preparedness

Acknowledgement

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