



Dr. Sissy Nikolaou, P.E., D.GE: Ambassador and Role Model for the Industry

Seeds of an engineer were planted in Dr. Sissy Nikolaou's brain at a very young age. Growing up in Greece, Nikolaou's grandfather, a construction manager, had a big influence on her decision to pursue an engineering career. She loved travelling with him to construction sites every summer, and the payoff for early wake-up calls was seeing a dam or stadium come to life from the ground up. These experiences fascinated this young girl, who was encouraged by both grandparents to ask questions and dream of creating a skyscraper one day, just like the ones in New York City they would see in movies. Greek ancient art, mythology and mathematics played a big role in her upbringing, enhancing her imagination and cultivating her approach to engineering *“as an art form (that) can be carved using proper tools to create future cities and safely sustain existing communities”*—an idea she shared during a recent TEDx talk.

Her journey began at the prestigious National Technical University in Athens (NTUA), earning a five-year diploma in structural engineering. The late Professor Dimitri Papastamatiou's engineering seismology course had a profound influence on her career path, connecting ancient history to seismology, and eventually to seismic hazard predictions and design. It ignited her curiosity, satisfied her problem-solving interests, and sparked her fascination with human evolution, history and art.

Nikolaou soon arrived in America, earning a master's degree and doctorate in geotechnical and earthquake engineering from the University at Buffalo (UB). At UB she worked with Professor George Gazetas in his pioneering research on soil-pile interaction, which has been incorporated into design codes. Gazetas recalled Nikolaou as an “excellent, outstanding, very well-organized student and selfless individual.” Nikolaou described the presence of Gazetas in her professional life as “catalytic,” leading to her recent recognition as a distinguished alumna of NTUA during the school's 130-year anniversary.

She serves on the UB Advisory Board of the Dean of Engineering & Applied Sciences, Dr. Liesl Folk. Nikolaou's passion for the next generation of engineers impresses Folks finds her to be “a role model who never fails to give a hand to those around her to help them step up to the next level,” as she does by connecting UB graduates to large firms. Folks regards Nikolaou as the “epitome of enthusiasm for doing good in the world and using her skills and talent to improve the lives of others.” Folks invited her to deliver the Distinguished Alumna Commencement Speech for the 2017 UB School of Engineering Class.

Work and Teaching

An adopted New Yorker, Nikolaou started working in the City more than 20 years ago as a geotechnical engineer. At a time when New York had just started enforcing a seismic code, Nikolaou paved the way to the regional geotechnical earthquake engineering practice by transferring West Coast knowledge to the unique geologic and seismic challenges of the East.

Addressing growing demands to incorporate resilience into engineering designs, she took the leading role of the

multi-hazard practice of WSP USA in the firm's Geotechnical and Tunneling Technical Excellence Center (GT TEC), where she is the WSP Technical Fellow of Earthquake Engineering. She works with WSP's buildings and infrastructure sectors to create innovative solutions for complex projects and to provide decision support to clients through the WSP global platform, SPEED. Two WSP colleagues, Frank Pepe, director; and Dale Moeller, east manager of the GT TEC describe her as a technically exceptional person and a big picture thinker who impresses clients and understands both the business and engineering sides of WSP, with an enthusiasm that is contagious to her colleagues and the rising engineers she mentors.

Christopher LaTuso, transportation program manager at HDR, fellow engineer, client and collaborator, calls Nikolaou an “industry expert, valuable friend and true leader. I have never met a person more passionate about their work than Sissy. Her support of earthquake engineering and research on resiliency are not just for the good of her organization and her client, but really benefit people.”

Education and Outreach

Nikolaou strongly believes in outreach and enjoys teaching geotechnical earthquake engineering at Manhattan College. She feels when she interacts with her students she learns almost as much from them as she teaches. She has also created interactive programs on NYC geology and underground infrastructure for K-5 students, her “toughest crowd.”

Nikolaou was able to establish the NY-Northeast (NYNE) Regional Chapter of the Earthquake Engineering Research Institute (EERI), the go-to organization for earthquake awareness and risk mitigation advocacy. NYNE has grown into an

exemplary chapter, bringing seismic risk awareness to engineers and the public. She currently serves as a national director of EERI and a mentor to many student chapters globally.

She is involved in the NYC Building Code, chairing its seismic subcommittee since 2011, and represents the Structural Engineers Association of NY as its appointed director to the Applied Technology Council (ATC).

Front Line

Nikolaou is characterized as a leader in geotechnical, resilience and earthquake engineering by UB Professor Andrew Whittaker, who first crossed paths with Nikolaou in late 2000, and says, “with civil engineering being a male-dominated industry, she has worked thoroughly, carefully and respectfully to broaden the talent pool. She is a fan of diversity and inclusion and promotes enhanced visibility of LGBTQ+ individuals in the civil engineering profession.” Whittaker tips his hat because she saw this need in the industry, and says, “she is someone who likes to lead from the front.”

Internationally, she is renowned for her approach to geoseismic challenges of large, unique projects in earthquake-prone areas in Canada, Mexico, Panama, Dominican Republic, Germany, Middle East, Japan, New Zealand and her native Greece. This experience supports her contributions to the Geotechnical Extreme Event Reconnaissance (GEER) Association, where she serves on its Advisory Panel. She has been called to the front lines of GEER missions when natural disasters strike, finding reconnaissance work to be rewarding from technical, humanitarian and impact aspects.

When GEER reached out to University of Illinois Professor Youssef Hashash, the 2017-18 ASCE Geo-Institute (GI) president, to build a team and lead the Hurricane Sandy Mission, he chose Nikolaou as his partner, recognizing her skills at bringing together engineers from firms and agencies. Hashash says Nikolaou is extremely active in advancing research for extreme events, a valuable addition to the ASCE-GI Board of Governors, and a role model for women in the industry.



Nikolaou on site

Following Hurricane Sandy, her home country was hit in 2014 by two major earthquakes (M6.0 and M6.1). Professor Jonathan Bray from the University of California, Berkeley, and founding leader of GEER, believed Nikolaou was the only person who could face the challenge of local politics and unify the involved parties to complete the GEER reconnaissance report. She led and coordinated a team of 70 engineers and scientists from Greek universities and U.S. volunteers from GEER, EERI and ATC, living up to the challenge and producing a unified report.

White House Experiences

Nikolaou was invited to the White House by President Barack Obama to participate in the 2016 Earthquake Resilience Summit, where she interacted with the U.S. Secretary of the Interior Department, the Director of Science and Technology and the senior members of the Resilience Policy at the National Security Council.

Shortly afterward, an M7.8 earthquake struck off the West Coast of Ecuador. Nikolaou and her local counterpart, Dr. Xavier Vera, led the GEER team to Ecuador with geotechnical volunteers and structural participants from ATC. She worked with Lt. Col. Enrique Morales, professor and chair of Earth Sciences and Construction at the Armed Forces University, who characterizes her as an “honest, wonderful human being and a perfectionist who can apply advanced engineering to projects while making it understandable and non-intimidating to others.”

Witnessing destruction caused by massive liquefaction and infrastructure failures and deaths caused by simple non-

structural malfunctions inside hospitals, is one of the most devastating experiences of her career. In areas where embankments failed to support fishing farms — a major resource for the country's economy — Nikolaou recommended to government officials that local fishermen should be part of the rebuild, since they use their hands for their livelihood and can learn building techniques. Her vision connected people to technology that would

provide income in the short term, while making communities more appreciative of engineering in the long term.

Nikolaou was invited back to the White House to debrief the President's senior staff on this experience and share how she found the “missing link” between politics and technology. She, with members of her team, shared lessons from the 2016 earthquake that could be applied to national security strategies when responding to extreme events and trying to “bounce forward” after them. Nikolaou learned that engineers are rarely consulted on disasters at such a high government level, and strongly believes that it is “our responsibility as geotechnical and civil engineers to elevate our profession where it belongs — a seat at the table where decisions are being made.”

DFI Benefits

Nikolaou joined DFI a few years ago, finding it a welcoming and upbeat organization that brings together designers and contractors of deep foundations on a productive platform. She is a member and inaugural speaker of its Women in Deep Foundations Committee that embraces differences with a broad statue of diversity that goes beyond gender, where she appreciates gaining perspective from different minds and backgrounds and viewing engineering problems from fresh angles.

“Don't be afraid — always reach out to others without hesitation. Progress is made by going against fear and insecurities,” Nikolaou says to young engineers. She lives by the quote of pioneer theater practitioner, Uta Hagen: “We must overcome the notion that we must be regular... it robs you of the chance to be extraordinary!”