

An Interview with Columbia University Professor Nickolas J. Themelis

By Catherina Ploumidaki

Professor Nickolas J. Themelis finished high school in Athens, and then went on to obtain his BS in Engineering and PhD degrees from McGill University in Montreal, Canada. In the first part of his career he developed metallurgical processes for the extraction and refining of copper and other metals, including the Noranda Process which did away with the emission of millions of tons of sulfur into the atmosphere.

After 20 years in the metallurgical industry, he joined Columbia University's School of Mines, which was first such in the United States. In 1997, the School of Mines was transformed into a school for the new discipline of Earth and Environmental Engineering.

At Columbia University, he was the first Chair of the Department of Earth and Environmental Engineering and founder of Columbia's Earth Engineering Center. He is Chair of the Global WTER Council (GWCouncil.org), which has sister organizations in several countries, including the United States, China and India.

Themelis has been honored with several awards, including those received from the Canadian Chemical Engineering and Metallurgical Societies, the British Institute of Metallurgy, the American Institute of Mining, the U.S. Metallurgical Society, the Japan Institute of Metals, the Confederation of European WTE Plants (CEWEP), and the Materials and Energy Recovery Division of the American Society of Mechanical Engineers. He is a member of the U.S. National Academy of Engineering.

Catherina Ploumidaki: What was your most important achievement during your years of industrial research?

Professor Nickolas J. Themelis: Inventing a process for extracting copper from copper ore that reduced sulfur emissions into the atmosphere by millions of tons (Noranda Process). This process is also used today for recovering metals from used electronics, [reducing electronic waste.]

CP: Tell us about your current field of research.

NT: Waste management is a major environmental problem and I am applying my knowledge of materials science and process engineering to sustainable waste management, that is, with least possible environmental impacts. Since the beginning of history, humans have generated solid wastes and disposed them in makeshift dumps or set them on fire. After the industrial revolution in the 18th century, the amount of goods used and then discarded by people increased so much that it was necessary for cities to build



'Ladder' of sustainable waste management of nations

essary for cities to build landfills and incinerators for disposing waste. The management of municipal solid waste (MSW) has become a major problem of cities since the middle of the 20th century, when the consumption of goods, and the corresponding generation of MSW, increased by as much as six times!

CP: What was the response of scientists and engineers?

NT: In response, the most advanced countries developed various means and technologies for dealing with solid waste. They

Waste Management?

NT: The order of priority and the applicability of waste management methods is represented graphically by the Hierarchy of Waste Management

In this Hierarchy, sanitary landfilling is given a lower priority than waste-to-energy, although it is less costly to implement. One reason for this is that sanitary landfilling requires a lot of land and also has much higher environmental impacts than WTE including the transformation of greenfields to landfills. For example, we have esti-

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range from reducing waste by better designing products and packaging, to recycling of usable materials, composting of green wastes, combustion with energy recovery – commonly called "waste to energy" (WTE) – and sanitary landfilling that prevents aqueous and gaseous emissions to the environment.

CP: How big is the problem of managing waste?

NT: It has been estimated that the urban solid waste even after recycling (post-recycling MSW) exceeds 1.5 billion tons, of which over one billion tons are landfilled and the rest are treated in waste-to-energy (WTE) power plants which generate electricity and also recover metals and building materials.

CP: Is there a difference between regulated landfills and waste dumps?

NT: Yes, a lot. However, of the MSW landfilled globally, less than 20% are disposed in regulated ("sanitary") landfills that reduce aqueous and gaseous emissions to the environment.

CP: What is the Hierarchy of

mated that the nearly eight billion tons landfilled in the United States in the last forty years have covered an area of four billion square feet of land, or 91,000 acres.

What is the Ladder of Sustainable Waste

CP: Management Hierarchy of Waste Management?

NT: The environmental performance of waste management of a city or country can be rated by comparing the tonnage of materials recovery (i.e., recycling and composting) and of energy (i.e., WTE) to the tonnage of MSW landfilled. The "ladder of sustainable waste management" rates nations according to how little they landfill and how much they recycle and combust with energy recovery.

This figure shows that several nations have already reached the goal of very little or no landfilling. The United States, one of the wealthiest nations, is behind many developed countries, such as Austria, Germany, Japan, and the Netherlands. Europe as a whole is do-

ing a good job: It has gone from 60% landfilling in 1995 to 25% in 2015 by a combination of recycling and WTE. The United States is stuck at about 63% landfilling and only 7% WTE, most of it on the east coast. China is moving fast and becoming a leader in WTE, from 40 plants in 2000 to over 350 by 2018.

CP: What about Greece?

NT: As for Greece, regrettably the "cradle of western civilization" in the last two decades hasn't moved much from 80% landfilling (vs 65% for the United States and 28% average for the EU). This is despite the fact that the per capita GDP in Greece is higher than other countries who are progressing in sustainable waste management. Also, the price of electricity in Greece is relatively high so that WTE plants would be both environmentally and economically much preferable to landfilling.

CP: What other problems is Greece facing now with respect to waste management?

NT: The worst thing is the practice of setting fires to waste dumps, to create more landfill space, which is prevalent at several Greek islands. Columbia's sister organization in Greece (WtERT-Greece) is headed by Professor Kostas Aravossis of the Athens Polytechnion and is trying hard to reverse the existing situation in Greece.

CP: Is there a climate change advantage of WTE, over regulated landfilling?

NT: WTE eliminates landfill methane emissions and, therefore, one ton of MSW going to WTE, instead of a sanitary landfill, reduces carbon emissions by one ton.

CP: What are your future goals and ambitions?

NT: To reduce and eventually eliminate the use of landfilling of urban wastes.

CP: What do you consider to be your most important achievement during your academic career at Columbia?

NT: Educating young people from all over the world as to the need for sustainable waste management. By now, Columbia is one of the foremost academic groups in this field of study, with sister organizations in other countries, including China, India, and Greece; also, being elected as member of the U.S. National Academy of Engineering.

CP: Which are the wisest words you were taught and from whom?

NT: "Enjoy today but plan for tomorrow" Epicurus and Plato!
CP: If you could turn time back what would you change?

NT: Really, nothing!
For more information, visit: www.GWCouncil.org.

Negroponte Returns to MIT Media Lab to Inspire

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rina Hatsopoulos.

The youngsters included, Bill Gianoukos, Pineapple; Michalis Vlastarakis, Eurobank/EGG program; Marianthi Fragkopoulou, Herado; George Chaliotis, Medline USA; Apostolos Atsalakis, PNOE; and Dr. Evangelos Pappas, RTsafe.

The Greek crisis, while causing tremendous hardship, pushed Greece to reboot and create a new engine of growth by fostering a startup economy. Highly educated graduates, unable to find work, started creating their own jobs by founding innovation-based startups in agriculture, food, tourism, energy, logistics, and technology. "These globally-focused Greeks have been setting the country on a new course to recovery through technology entrepreneurship," said Michalis Bletsas, a leading Research Scientist at the MIT Media Lab who has been involved with Greek startups for two decades and who, together with Nicholas Negroponte, founded the One Laptop Per Child non-profit organization.

Greek startups have come through incubators and accelerators like MIT Enterprise Forum Greece, Eurobank's The EGG in Athens, and OK!Thess in Thessaloniki, as well as research centers such as Demokritos, Coralina, the South-East European Research Centre, and programs of The Hellenic Initiative (THI).

Entrepreneur Marina Hatsopoulos said, "Greeks are strong, independent thinkers who are hungry to control their own destiny. Greece has a tremendous opportunity to follow Israel's lead in employing developers in the homeland while growing global businesses based in the United States. We



Nicholas Negroponte, founder of the MIT Media Lab, with Consul General of Greece Stratos Efthimiou and members of the panel discussion.

hope to empower Greek entrepreneurs by connecting them to the rich network of mentors, advisors, partners, customers, and investors here in Boston."

According to Marathon Ventures, in 2010-2018, 301 Greek startups raised \$2.4 billion in 500 investment rounds from 268 venture capital funds. During that period, a total of 47 acquisitions and 5 IPOs took place. The total invested amount in Greek startups grew 11 times, from \$48 million in 2010 to \$539 million in 2018. Some U.S.-based investment firms that have invested are Kleiner Perkins, Andreessen Horowitz, Bain Capital, and Sequoia. About one third are founded by Greeks but are not based in Greece.

Entrepreneurial activity was boosted last Spring, when Equi-

Fund, an EU-based fund-of-funds supporting entrepreneurship and innovation, committed to investing €320 million in Greek venture, private equity, and tech transfer funds, such as Marathon Ventures, Venturefriends and Big Pi.

Addressing young entrepreneurs at the event, Nicholas Negroponte recommended creating a startup only if you have passion and a deep belief in your idea, not just to make money.

Stratos Efthimiou, Consul General of Greece in Boston, said "The Consulate of Greece in Boston is critically positioned to bring the Greek tech community together from both sides of the Atlantic." He added that "we are working toward the establishment of a non-stop flight that will connect Boston to

Athens. We want to help Greek entrepreneurs take advantage of the opportunities of the Boston ecosystem and we encourage American investors to seize opportunities in Greece."

The Hellenic Innovation Network (formerly known as the MIT Enterprise Forum Greece Diaspora Group) was started by MIT Enterprise Forum Greece, with the support of the Consulate General of Greece in Boston. The group, composed of entrepreneurs, academics, executives and other professionals based in the United States, organizes semi-annual events to educate the community and provide the opportunity for Greek startups to pitch and network, with the goal of creating a bridge to the United States technology entrepreneurial ecosystem.

GOINGS ON...

■ JUNE 4-28
MANHATTAN – The Consulate General of Greece in New York and Timarete Hellenic Art Festival are pleased to announce "Inside, Outside and Beyond" a group exhibition at the Consulate General's premises, 69 East 79th Street in Manhattan, June 4-28. Participating artists include Eozen Agopian, Maria Anasazi, Elaine Angelopoulos, Laura Dodson, Angie Drakopoulos, Peter Gerakaris, Cris Gianakos, Morfy Gikas, Mark Hadjipateras, Maria Karametou, Zoe Keramea, Georgia Lale, Eirini Linardaki, Aristides Logothetis, Despo Magoni, Demetrius Manouselis, Jenny Marketou, Eleni Mylonas, Antonia Papatzanaki, Costas Picadas, Panayiotis Terzis, Lydia Venieri, and Adonis Volanakis. Monday-Friday, 9 AM-2:30 PM.

■ JUNE 20-23
BRAINTREE, MA – St. Catherine Greek Orthodox Church, 119 Common Street, holds its annual Greek Festival June 20-23. Enjoy the Grecian Food Festival with Specialty Boutiques, Children's Corner, Greek Food and Pastry, YiaYia's Attic, live Greek music and dancing. Free admission and plenty of free parking. Hours: Thur., Jun. 20, 11 AM-9 PM; Fri., Jun. 21 and Sat., Jun. 22, 11 AM-11 PM; and Sunday, Jun. 23, Noon-9 PM. More info available by phone: 781-843-0047 and online: <https://stcatherinebraintree.org>.

■ JUNE 21-23
WEST ALLIS, WI – Annunciation Greek Orthodox Church holds its annual Greek Festival at Wisconsin State Fair Park, 640 S 84th Street. Experience traditional Greek culture and indulge in the famous Greek chicken, along with other popular Greek dishes such as souvlakia, gyros, baklava, koulouria, YiaYia's spanakopita, a cultural exhibit, merchandise boutique, raffle, traditional Hellenic dancers and live band, traditional Greek dance lessons also available. Admission is Free. Paid parking at Wisconsin State Fair parking lot. Hours: Friday, Jun. 21, and Saturday, Jun. 22, 11 AM-11 PM; and Sunday, Jun. 23, 11 AM-8 PM. More information is available by phone: 414-461-9400 and online: annunciationwi.org.

DENVER, CO – Assumption of the Theotokos Greek Orthodox Cathedral, 4610 E. Alameda Avenue in Denver, holds its 54th Annual Greek Festival June 21-23. Enjoy saganaki, Greek fries, Greek wings, mezethes, souvlakia, gyros, lamb, Greek chicken, spanakopita, tiropites, keftedes, dolmades, Greek salad, pastitsio, galaktobouriko, koulourakia, loukoumades, kourambiedes, baklava, and more! Church tours, raffle, cooking demonstrations, and boutique. Live Greek music and dancing. More information is available by phone: 303-388-9314 and online: www.thegreekfestival.com.

CAMARILLO, CA – St. Demetrios Greek Orthodox Church holds its annual Greek Festival June 21-23 at Freedom Park at Camarillo Airport, 515 Eubanks Street. The Ventura County Greek Festival is one of the county's longest-running cultural festivals. Featuring homemade Greek food, live music, Greek dancing, shopping, and rides for the kids! Proceeds go to the Building Fund to pay off the mortgage for the new location. \$5 admission, includes a Free Raffle Ticket for a chance to win \$3,000. Free parking. Hours: Friday, Jun. 21, 5-9 PM; Saturday, Jun. 22, 11 AM-9 PM; and Sunday, Jun. 23, 11 AM-7 PM. More info available by phone: 805-482-1273 and online: <http://vcgreekfestival.org>.

■ JUNE 22-23
DEKALB, IL – St. George Greek Orthodox Church holds its annual Greek Festival at Hopkins Park Shelter House, 1403 Sycamore Road in DeKalb, June 22-23. Family style picnic at the local park with Greek food and pastries. No alcohol allowed in the park. Enjoy Greek music and dancing. Hours: Saturday, Jun. 22, 11 AM-8 PM and Sunday, Jun. 23, 11 AM-7 PM. More information is available by phone: 815-758-5731.

■ JUNE 27-29
PORTLAND, ME – Holy Trinity Greek Orthodox Church, 133 Pleasant Street in Portland, holds its annual Greek Festival June 27-29, noon-9 PM all days. This wonderful family event draws more than 10,000 visitors from around the greater Portland area each year. Enjoy exquisite Greek cuisine, live Greek music and traditional dancing. More information is available by phone: 207-774-0281 and online: <http://www.htrinityportland.org/greek-festival/>.

■ JUNE 27-30
FORT WAYNE, IN – Holy Trinity Greek Orthodox Church holds its 39th Annual Greek Festival in Headwaters Park, 333 S Clinton Street in Fort Wayne, June 27-30. Enjoy Greek cuisine, daily raffles, live Greek music and dancing. Greek Fest Olympic 5K on Saturday at 10 AM beginning at Headwaters Park. Admission: Thursday, Friday, and Saturday 11 AM-4 PM, Free; All Day Sunday, Free; Thursday, Friday, and Saturday 4-10 PM, \$5; under 16 years old, Free. More information is available by phone: 260-489-0774 and online: www.fortwaynegreekfestival.org.

■ JUNE 28
MANHATTAN – The Manhattan AHEPA Family, Delphi Chapter #25, Daughters of Penelope-Evryklea Chapter #36, and The Sons of Pericles-New Renaissance Chapter #5, invite all to attend their 3rd Annual Greek Wine, Food & Music Cruise (21+ to enter) on Friday, Jun. 28, 7:30-10:30 PM. Proceeds to benefit scholarship programs of World Hellenic Biomedical Association. Please visit www.eventbrite.com/e/3rd-annual-ahepa-greek-wine-food-music-cruise-around-manchattan-tickets-61380955089 for details.

■ NOTE TO OUR READERS
This calendar of events section is a complimentary service to the Greek American community. All parishes, organizations and institutions are encouraged to e-mail their information regarding the event 3-4 weeks ahead of time, and no later than Monday of the week before the event, to english.edition@thenationalherald.com

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