

For Immediate Release



## First PhD in civil engineering at AUB goes to Lilian Malaeb

Beirut, Lebanon- 08/07/2011 - Lilian Malaeb, who graduated with a bachelor's in civil and environmental engineering in 2002, has received the first PhD from the Department of Civil Engineering at AUB.

"My childhood dream of holding a PhD in water engineering from the American University of Beirut, even before the creation of a PhD program, has come true," said Malaeb, who is also the second person to receive a PhD from the Faculty of Engineering and Architecture.

"She is an ideal student and outstanding scholar that one gets to meet every decade or so," said George Ayoub, professor of environmental engineering and Malaeb's advisor on her PhD thesis. "It was a real pleasure working with her and makes one wish to have more students like her."

Malaeb, who graduated with high distinction, ranking first in her undergraduate degree, says she feels a deep sense of gratitude towards her parents, whose great sacrifices impelled her to give her best when getting such an opportunity in life. "AUB is an institution where dreams can come true."

Malaeb's thesis focused on developing a novel solar still with enhanced productivity. Solar powered desalination units, contrary to conventional heavy energy consumer ones, make use of a sustainable and pollution-free source, the sun, to produce high quality water, the only limitation being their relatively low productivity compared to the other methods currently in use.

"My dissertation presents a complete analysis of a sustainable and environmental friendly development that significantly enhances the productivity of a solar still without forsaking its basic advantages such as ease of handling, material availability, efficacy, low cost, safe water quality and space conservation," explained Malaeb. "Prof. Ayoub's guidance and support throughout my work was crucial to the accomplishment of this study."

"She was always ready to tackle and absorb knowledge no matter how difficult and always achieved the highest possible levels," said Ayoub. "Her loveable personality, honesty, sincerity, hard work and appreciation by peers make her an excellent asset."

The novel improvement introduced by Malaeb is a slowly rotating drum that encourages thin films of water to form in the system which increases the surface area exposed to sunlight and enhances the evaporation process resulting in a considerably higher yield with minimal cost increase. It produces an average percent improvement of 200-300 percent and higher if sunshine hours are considered. The new system allows a constant renewal of the evaporating film layer with each drum rotation thereby solving the stagnation problem occurring in conventional basin stills, and it is also less sensitive to higher salinity levels in the brine.

Factors that can have significant impacts on performance, including the effect of materials/heat absorbers, cover cooling, brine depth, initial water conditions, and still geometry are studied and correlated to productivity. Modeling of flow circulation within the still and different methods to estimate internal heat transfer coefficients are employed to allow for a better prediction of the still performance and for system optimization. The cost of the proposed system showed its feasibility compared to other renewable-based desalination methods and even to conventional desalination especially if pollutant trading schemes are applied and environmental degradation costs are considered.

“The courses I took in water and environmental engineering rekindled my old dreams of green lands, clean environments, abundant water and sufficient supplies for everyone,” said Malaeb. “Fresh water scarcity and environmental degradation continue to challenge today's world and until recently, fossil fuel availability and tolerated levels of greenhouse gases have slowed down the search for sustainable environmental practices.”

“The need for novel approaches has become more intense with the advent of climate change, growing urbanism, diminishing natural resources and aggravating environmental problems,” she concluded. “My message in this field is not to conquer nature but to protect and respect it, learning from its lessons of harmony, abundance and creativity.”

Asked whether she would be teaching at AUB, Malaeb replied that she was going overseas for a couple of years for her post doctoral work. “Hopefully we will have her here after that if we have any vacancies,” added Ayoub. “Or maybe we will create one for her.”

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Note to Editors

## **About AUB**

Founded in 1866, the American University of Beirut bases its educational philosophy, standards, and practices on the American liberal arts model of higher education. A teaching-centered research university, AUB has more than 600 full-time faculty members and a student body of about 8,000 students. AUB currently offers more than 100 programs leading to the bachelor's, master's, MD, and PhD degrees. It provides medical education and training to students from throughout the region at its Medical Center that includes a full service 420-bed hospital.

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