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Research Innovation Fund (RIF) Report

by

Sami F. Masri

on

***International Symposium on Advances in
Structural Dynamics and Earthquake Engineering***

The University of Southern California Viterbi School of Engineering and the Sonny Astani Department of Civil and Environmental Engineering hosted an international symposium in honor of Professor Ahmed M. Abdel-Ghaffar, a USC faculty member.

The Symposium was held on Friday, 19 September 2008, from 8:00 A.M. to 5:00 P.M. in Ronald Tutor Hall on the USC Campus. The main focus of the symposium was on "Advances in Structural Dynamics and Earthquake Engineering". Ahmed M. Abdel-Ghaffar's work on the design and monitoring of bridges led to the development of more efficient and reliable ways to build them. He died on April 17, 2008 at Torrance Memorial Medical Center from complications of liver disease at the age of 60.

All the IRF funds were used for partial support of the travel expenses incurred by the invited speakers who were leading international researchers in the research field that Prof. Abdel-Ghaffar was active in.

Supplementary information about the symposium is provided in the attachments.

A Special Issue of the American Society of Civil Engineers (ASCE) *Journal of Engineering Mechanics* has been approved by ASCE to be dedicated in honor of Prof. Abdel-Ghaffar. Selected participants from the Symposium and other leading researchers in the field of structural dynamics of dispersed systems, have been invited to contribute technical papers, and their manuscripts are due in the Fall of 2009.

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Ahmed Abdel-Ghaffar Symposium

International Symposium on Advances in Structural Dynamics and Earthquake Engineering

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Ahmed M. Abdel-Ghaffar's work on the design and monitoring of bridges led to the development of more efficient and reliable ways to build them. He died on April 17, 2008 at Torrance Memorial Medical Center from complications of liver disease at the age of 60. [More on Abdel Ghaffar](#)

[Symposium Program](#)

[Symposium Presentations](#)



Ahmed M. Abdel-Ghaffar

(1947-2008)

Los Angeles Times

http://www.latimes.com/news/obituaries/la-me-abdelghaffar4-2008may04_0,2936609.story
From the Los Angeles Times

Ahmed M. Abdel-Ghaffar, 60; USC engineering professor advanced bridge design and monitoring

By Jocelyn Y. Stewart
Los Angeles Times Staff Writer

May 4, 2008

Ahmed M. Abdel-Ghaffar, a USC professor of engineering whose pioneering work in the design and monitoring of bridges led to the development of more efficient and reliable ways to build them, has died. He was 60.

Abdel-Ghaffar died April 17 at Torrance Memorial Medical Center from complications of liver disease, said his son Samy of San Francisco.

As a graduate student at Caltech in the early 1970s, Abdel-Ghaffar conducted seminal research on the Vincent Thomas Bridge, which links San Pedro to Terminal Island.

Through a state program, sensors had been placed on the bridge specifically to monitor the effects of a major earthquake. But Abdel-Ghaffar argued that streaming data from the sensors could be useful, even when there was no earthquake.

The sensors continuously measure lower-level vibrations -- such as those generated by wind and traffic -- that can cause subtle changes in the bridge. Abdel-Ghaffar collected the data and used them to create a mathematical model that represented the structural characteristics of the bridge, developing a picture of its overall health.

Such diagnostic information could then be used to design bridges that were better able to withstand earthquakes.

"At that time, 34 years ago, these ideas and this methodology were all very groundbreaking developments," said Sami F. Masri, professor of civil and environmental engineering at USC. "This was not the conventional thing."

Today, the use of sensors on bridges and other structures such as dams is widespread. The methodology that Abdel-Ghaffar pioneered applies to other structures as well, Masri said.

Abdel-Ghaffar's work made him prominent in his field. Over the years, he consulted in the building of structures internationally, including the long-span bridge across the Gulf of Suez, an arm of the Red Sea between the bulk of Egypt and the Sinai Peninsula. He spent long periods in Japan, where he collaborated with bridge researchers at major universities.

The California Department of Transportation used a computer program Abdel-Ghaffar developed to retrofit the Vincent Thomas Bridge, Masri said.

In addition to his work with long-span bridges, Abdel-Ghaffar examined the interaction between soil and structures affected by earthquakes. He also conducted vibration experiments on Santa Felicia Dam, which forms Lake Piru in eastern Ventura County.

But bridges were his passion. Along with his students, he climbed the Golden Gate Bridge and collected data for a study on vibrations.

"He really loved bridges; he thought they were beautiful structures," his son said.

Abdel-Ghaffar was born April 30, 1947, in Egypt, one of eight children. He received a bachelor's degree in civil engineering from Cairo University.

At Caltech, he earned a master's in civil engineering in 1973 and three years later a doctorate in civil engineering, with an emphasis on structural dynamics and earthquake engineering.

Abdel-Ghaffar began his academic career in 1978 with a brief stint at the University of Illinois. A year later, he joined the faculty of Princeton University, where he remained until moving in 1987 to the USC Sonny Astani Department of Civil and Environmental Engineering.

His journey from Cairo blazed a trail that others followed, his son said.

"He left a legacy at Cairo University," Samy Abdel-Ghaffar said. "People found out that he was in America. He helped a lot of Egyptians come to the United States, and he was their PhD director, their mentor."

In addition to Samy, Abdel-Ghaffar, who was divorced, is survived by another son, Tarek Abdel-Ghaffar of Torrance; a daughter, Sarah Abdel-Ghaffar of Los Angeles; and a brother and two sisters, who live in Egypt.

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AHMED ABDEL-GHAFFAR INTERNATIONAL SYMPOSIUM



Advances in Structural Dynamics and Earthquake Engineering

University of Southern California

Ronald Tutor Hall | Room 526

Friday, 19 September 2008

8:00 a.m. – 5:00 p.m.

Hosted by:

Viterbi School of Engineering &

Sonny Astani Department of

Civil and Environmental Engineering

Friday, 19 September 2008



8 a.m. Continental Breakfast

A.M. Prof. Mihran Agbabian, USC, Morning Chair
Morning Session #1

Ronald Tutor Hall | Room 526

8:30 **Opening Remarks:**

Yannis Yortsos, Dean

Viterbi School of Engineering, USC

Jean-Pierre Bardet, Chair and Professor

Sonny Astani Department of Civil and Environmental Engineering, USC

8:45 **President Richard Miller**

Olin College

*BEYOND RESEARCH: Are Our Universities Doing
the Best Job of Producing Real Engineering Innovators?*

Dr. Shigeki Unjoh

Japan Public Works Research Institute (PWRI)

Damage of Bridge Structures During Recent Earthquakes

Dr. Jochen Kurz

Fraunhofer Institute for Nondestructive Testing, Germany

Monitoring Civil Infrastructure in Europe - The Last Twenty Years and What Might be Ahead

Prof. Hongnan Li

Dalian University of Technology, China

Some Advances on FBG Monitoring in Civil Engineering

Dr. Hamid Ghasemi

Federal Highway Administration

Long-Term Bridge Performance Program

10:15 Break



10:45 Morning Session #2

Ronald Tutor Hall | Room 526

Prof. Amr Elnashai

University of Illinois

Integrity Assessment of the Pharos of Alexandria During the AD 1303 Earthquake

Prof. Kazuhiko Kawashima

Tokyo Institute of Technology, Japan

E-Defense Experiment on the Seismic Performance of Bridge Columns

Prof. Limin Sun

Tongji University, China

Long-Term Monitoring of Donghai Bridge in China

Prof. Hiroki Yamaguchi

Saitama University, Japan

*Modal Analysis of Bridge Structures: An Application
to Noise Generation From Modular Expansion Joint*

11:59

Lunch Served in the Gerontology Courtyard

▶ Across the street, west of Ronald Tutor Hall

Ronald Tutor Hall



EPA Gerontology
Center



P.M.

Prof. L. Carter Wellford, Afternoon Chair, USC

Afternoon Session #1

Ronald Tutor Hall | Room 526

1:30 Dr. Zifa Wang

Institute of Engineering Mechanics, China

Damage and Lessons of the Great Wenchuan Earthquake

Prof. Toshiro Hayashikawa

Hokaido University, Japan

Seismic Performance of Cable-stayed Bridge Tower

Prof. Manos Maragakis

University of Nevada, Reno

Seismic Response of Ceiling-Piping-Partition

Prof. Kenji Kawano

Kagoshima University, Japan

Dynamic Response Evaluations of Offshore Structure Due to Wave and Seismic Forces

Prof. Mourad Zeghal

Rensselaer Polytechnic Institute

*A Micro-Mechanical Study of the Interaction of
Liquefiable Granular Soils with Pile Foundation*



3:00

Break

3:15

Afternoon Session #2

Ronald Tutor Hall | Room 526

Prof. Yozo Fujino

University of Tokyo

*Dynamics and Monitoring of Long-Span Bridges;
Impact of Prof. Ahmed M. Abdel-Ghaffar' Work and Recent Progress*

Prof. Ahmed Elgamal

University of California San Diego

From Seismic Data to Discovery in Geotechnical Earthquake Engineering

Prof. Hirokazu Iemura

Kyoto University, Japan

Earthquake Response Control of Long-Span Bridges With Innovative Devices

Prof. James Beck

California Institute of Technology

System Identification: Don't Estimate, Update and Predict Robustly!

Prof. Raimondo Betti

Columbia University

Monitoring the Structural Health of Main Cables of Suspension Bridges

Prof. Robert Nigbor

University of California, Los Angeles

The 1982 Ambient Vibration Survey of the Golden Gate Bridge

5:00

Closing Remarks

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Symposium Presentations

Advances in Structural Dynamics and Earthquake Engineering

University of Southern California
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Morning Session

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(Olin College)

[BEYOND RESEARCH: Are Our Universities Doing the Best Job of Producing Real Engineering Innovators?](#)

Shigeki Unjoh

(Japan Public Works Research Institute (PWRI))

[Damage of Bridge Structures During Recent Earthquakes](#)

Jochen Kurz

(Fraunhofer Institute for Nondestructive Testing, Germany)

[Monitoring Civil Infrastructure in Europe: The Last Twenty Years and What Might be Ahead](#)

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