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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.

University of Southern California

USC

Sonny Astani

Department of Civil and Environmental Engineering

USC Viterbi School of Engineering

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.

jocelyn.stewart@latimes.com

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

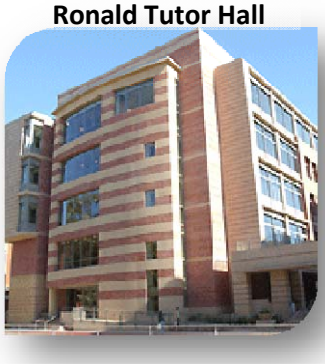
8:30 **Opening Remarks:**

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?

Ronald Tutor Hall



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

EPA Gerontology Center

11:59 Lunch Served in the Gerontology Courtyard
► Across the street, west of Ronald Tutor Hall

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

University of Southern California

Sonny Astani
Department of Civil and Environmental Engineering

USC Viterbi School of Engineering

Symposium Presentations

Advances in Structural Dynamics and Earthquake Engineering

University of Southern California
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Richard Miller **(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
Hongnan Li **(Dalian University of Technology, China)** **Some Advances on FBG Monitoring in Civil Engineering**
Hamid Ghasemi **(Federal Highway Administration)**

Long Term Bridge Performance Program

Amr Elnashai

(University of Illinois at Urbana Champaign)

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Yozo Fujino

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