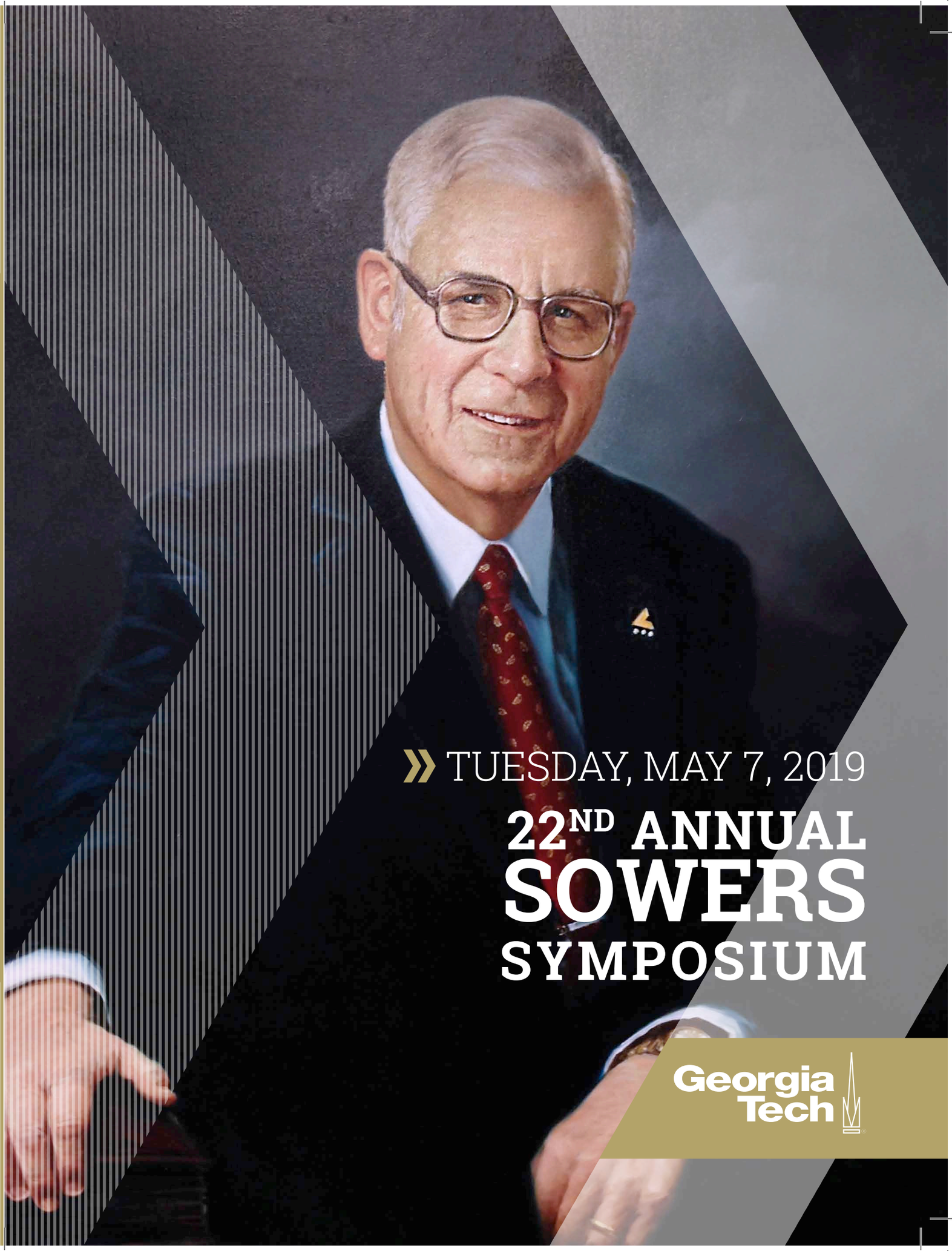

» TUESDAY, MAY 7, 2019

22ND ANNUAL SOWERS SYMPOSIUM

Georgia Tech

A CONTINUING TRIBUTE

For 50 years, Professor Emeritus George F. Sowers served a unique and dual role as a faculty member at the Georgia Institute of Technology and a senior consultant at Law Engineering, Inc. (the predecessor to MACTEC, Inc. and Amec Foster Wheeler). A civil engineer and geologist, he consulted worldwide on substantial civil projects in the United States and Europe, large earth- and rock-fill dam construction in Asia, and deep permafrost conditions in northern Greenland. Truly, he was "world class." A master of anecdotes, his vivid recollection of case studies and his elegant approach to engineering captivated students and professionals alike. His Terzaghi Lecture at the 1979 annual convention of the American Society of Civil Engineers (ASCE) was "There Were Giants on the Earth in Those Days," and it brought to life stories of ancient earthwork and massive construction projects completed several thousand years ago by Native Americans.

Professor Sowers was active in numerous professional societies at the local, national and international level. He held offices in several of these groups, including ASCE, the International Society for Soil Mechanics and Foundation Engineering (ISSMFE), the American Society for Testing and Materials (ASTM), the U.S. Committee on Large Dams, the Seismological Society of America, and the Association of Engineering Geologists.

He was the author and co-author of eight books, including the classic textbook *Introductory Soil Mechanics and Foundations: Geotechnical Engineering*, which enjoyed four English editions as well as versions in Spanish and Mandarin Chinese. His last book, *Building on Sinkholes: Design and Construction of Foundations in Karst Terrain*, was published in 1996 by ASCE. Professor Sowers authored more than 140 technical papers and received many prestigious awards, including the Georgia Tech Teacher of the Year award (1971), the Georgia Society of Professional Engineers Engineer of the Year award (1973), the Herschel Prize from the Boston Society of Civil Engineers (1976), the Middlebrooks Award (1977 and 1994), the ASCE Martin Kapp Lecture (1985), the ASCE Brooks Award (1990), the ASCE Forensic Engineer of the Year award (1994), and the Terzaghi Award (1995). In 1994, Professor Sowers was elected to the National Academy of Engineering.

SOWERS IN INDONESIA, 1986. PHOTOS COURTESY MRS. GEORGE F. SOWERS AND LAW ENGINEERING AND ENVIRONMENTAL SERVICES, INC.

AGENDA

2:45 PM
Arrival and Registration

3:30 PM
State of the Art
A Geospatial Approach for Liquefaction Hazard Mapping
Laurie Baise, Ph.D.
Professor and Chair of Civil and Environmental Engineering
Tufts University
Medford, Massachusetts

4:15 PM
State of the Practice
The Stabilization of Major Landslides Using Drilled and Grouted Elements
John R. Wolosick, P.E., D.GE, F.ASCE
Director of Engineering
Hayward Baker
Atlanta, Georgia

5:00 PM
Reception and Exhibits

6:00 PM
Dinner

7:20 PM
Acknowledgments and Awards

7:40 PM
Remembering George F. Sowers
Joel Galt
Southern Company, Retired
Kennesaw, Georgia

8:00 PM
Sowers Lecture
Smart Geotechnical Infrastructure and Construction
Kenichi Soga, Ph.D., FREng, FICE
Chancellor's Professor
University of California, Berkeley
Berkeley, California

9:00 PM
Adjourn

GEORGE F. SOWERS, PORT OF SAVANNAH FIELD TRIP

GEO-INSTITUTE
Georgia Chapter

Georgia Tech School of Civil and Environmental Engineering
College of Engineering

STATE OF THE ART

A Geospatial Approach for Liquefaction Hazard Mapping Liquefaction is an important secondary hazard that can lead to significant damage after an earthquake. Regional liquefaction hazard maps are often developed as a way to assess liquefaction hazard for regional planning and scenario loss estimation. Traditionally, regional liquefaction hazard maps are developed through interpretation of surficial geology and use of geotechnical data. As an alternative to this data-heavy approach, we have developed a geospatial liquefaction assessment model that relies on geospatial proxies for soil saturation, soil density, and earthquake shaking derived from available global datasets as inputs and provides an estimate of spatial extent of liquefaction for use in regional seismic hazard assessments, such as the United States Geological Survey's ShakeMAP and PAGER. Through prior work, we have tested numerous globally available proxies, many derived from digital elevation models, but also including climate and hydrologic data, such as a global dataset on water table depth. The geospatial liquefaction model has been tested across numerous geographic, geologic, and earthquake scenarios with reliable performance when compared qualitatively to reconnaissance reports and quantitatively to mapped liquefaction occurrence when available. In this presentation, we will detail the generation of the geospatial approach to liquefaction assessment, present case studies as validation examples, and provide examples of successful implementation.

Laurie Baise teaches at Tufts University where she was promoted to professor in 2015 and became chair of the Department of Civil and Environmental Engineering in 2017. Baise received her B.S.E. from Princeton University from the Department of Civil Engineering and Operations Research with a certificate in geological engineering in 1995. She completed her graduate work at the University of California, Berkeley, including a M.S. in both Civil and environmental engineering and geology and geophysics and a Ph.D. in civil and environmental engineering in 2000. Baise's research spans the field of geotechnical earthquake engineering, including liquefaction, site response, regional wave propagation, and ground motion prediction equations. In site response, her focus has been on understanding the origin of complexity in site response through the study of observational data and using weak ground motion and microtremor data for site characterization. In the area of regional mapping of seismic hazards, Baise's work has focused on developing regional seismic hazard maps that optimally use multiple sources of geo-data. This work has spanned both site amplification maps and liquefaction maps. She also uses remotely sensed data for damage classification after earthquakes. Her group recently developed a geospatial approach to liquefaction hazard assessment for use in rapid response and loss estimation, which has been adopted by the USGS PAGER system.

Baise's research has been funded by the U.S. Geological Survey, the National Science Foundation, and the Defense Threat Reduction Agency. She served as a member of the board of directors of the Seismological Society of America from 2011 to 2017 and as the president of the New England Chapter of the Earthquake Engineering Research Institute in 2015. Baise has been honored with numerous awards, including the ASCE Casagrande Award in 2008 and the NSF CAREER Award in 2006.

LAURIE BAISE, PH.D.

PROFESSOR AND CHAIR OF CIVIL AND ENVIRONMENTAL ENGINEERING

TUFTS UNIVERSITY

MEDFORD, MASSACHUSETTS

STATE OF THE PRACTICE

The Stabilization of Major Landslides Using Drilled and Grouted Elements Many major landslides that have occurred throughout the U.S. in the last 20 years have been repaired using drilled and grouted elements. The projects include public and private facilities for many types of owners, such as State DOTs, railroads, casinos, shopping malls, and apartment complexes. The use of drilled and grouted elements, such as tieback anchors and micropiles, has enabled these owners to repair their problems for reasonable costs and within tight schedules.

Details of several different landslides are presented in this lecture. They are located in a wide range of geological conditions and terrains. These areas include Southern California, the Rocky Mountains, the Appalachian Mountains, Middle Tennessee, and the Southern Mississippi River Region. Massive stabilization forces have been imparted to the ground by the drilled and grouted elements to provide adequate factors of safety to stabilize the slide masses.

John R. Wolosick is director of Engineering for Hayward Baker Inc. in Atlanta, Georgia. From this home base, he works on projects all across the United States. He holds B.S. and M.S. degrees in Civil Engineering from the University of Illinois at Urbana-Champaign. He has 40 years of experience in geotechnical engineering and Contracting. Wolosick is the author of more than 35 technical papers and the recipient of the 2008 ASCE Geo-Institute Martin S. Kapp Foundation Engineering Award. He was the president of the Deep Foundations Institute (DFI) from 2014 to 2016. Wolosick is the former co-chair of the ADSC/DFI Micropile committee (2004-2007). He is also a member of the ASCE Earth Retaining Structures committee and chaired the ASCE Georgia Section Geotechnical Committee from 2003 to 2005. Wolosick was named the Georgia Society of Professional Engineers Engineer of the Year – Industry in 2017.

JOHN R. WOLOSICK, P.E., D.GE, F.ASCE

DIRECTOR OF ENGINEERING

HAYWARD BAKER

ATLANTA, GEORGIA

SOWERS LECTURE

Smart Geotechnical Infrastructure and Construction Design, construction, maintenance and upgrading of geotechnical infrastructure requires fresh thinking to minimize use of materials, energy and labor but to keep its resiliency against natural hazards. This can only be achieved by understanding the actual performance of the infrastructure, both during its construction and throughout its design life, through innovative monitoring. Advances in sensor systems offer intriguing possibilities to radically alter methods of condition assessment and monitoring of infrastructure. In this talk, it is hypothesized that the future of infrastructure relies on smarter information; the rich information obtained from embedded sensors within infrastructure will act as a catalyst for new design, construction, operation and maintenance processes for integrated infrastructure systems linked directly with user behavior patterns and city-scale modeling. Some examples of emerging sensor technologies for infrastructure sensing are given. They include distributed fiber-optics sensors, computer vision, wireless sensor networks, low-power micro electromechanical systems, energy harvesting, and citizens as sensors.

Kenichi Soga is a Chancellor's Professor at the University of California, Berkeley. He obtained his BEng and MEng from Kyoto University in Japan and Ph.D. from the University of California, Berkeley. He was professor of civil engineering at the University of Cambridge before joining UC Berkeley in 2016. He has published more than 400 journal and conference papers and is the co-author of "Fundamentals of Soil Behavior, 3rd edition" with Professor James K Mitchell. His current research activities include infrastructure sensing, performance-based design and maintenance of underground structures, energy geotechnics, and geotechnics from micro to macro. He is a fellow of the UK Royal Academy of Engineering and a fellow of the Institution of Civil Engineers. He received the George Stephenson Medal and Telford Gold Medal from the Institution of Civil Engineers and Walter L. Huber Civil Engineering Research Prize from the American Society of Civil Engineers.

KENICHI SOGA, PH.D., FRENG, FICE
CHANCELLOR'S PROFESSOR
UNIVERSITY OF CALIFORNIA
BERKELEY, CA

OUR HISTORY

The Georgia Geo-Institute Chapter of the American Society of Civil Engineers owes its very existence to George Sowers. Beginning in the mid 1950s, a small group of local geotechnical engineers met to have dinner and talk about current geotechnical engineering activities. The group was chaired by then-professor George Sowers and would meet two or three times a year. Some notables of the six to 10 engineers who typically attended these fledgling geotechnical committee meetings were Clyde Kennedy from Law Engineering, Bob Crisp of the Army Corps of Engineers, and various engineers from the Georgia Highway Department. During the mid to late 1960s, the meetings became less frequent and eventually faded away.

In 1978, Professor Sowers encouraged two former students — Robert J. Stephenson, then director of the Corps of Engineers Materials Lab in Marietta, Georgia, and Tom Billings, also a Corps employee — to work with him in reactivating the group. The following month, the first meeting of the newly reorganized Geotechnical Committee, with Billings as chairman, met at Oga's Barbeque on Northside Drive, thus creating what has become an avid attachment to barbecue meals for our meetings. George Sowers gave the initial presentation to those in attendance. Meetings continued at Oga's until it went out of business. Then meetings were moved to the Dunphy Hotel until it also went out of business. During the early 1980s, the group struggled to find a suitable meeting place and tried several venues with varying success. In 1986, presentations were taking place in a basement meeting room at the Royal Coach Hotel. In November of that year, Joel Galt, who later served a term as committee chairman, arranged for the Geotechnical Committee to meet at the Georgia Power Company building. This new location had many advantages over our previous meeting places. Fittingly, the first speaker in this new venue was George Sowers. With a recurring meeting place at the Georgia Power building, our programs began to stabilize and grow. Each year since the early 1990s, the committee has strived to have a program at an outdoor venue. These meetings have been catered by various barbecue restaurants, and accompanied by cold liquid refreshments. They are a good time of fellowship for all of our colleagues.

Now in its 22nd year, our George F. Sowers Symposium is appropriately built on a partnership between practice and academia that emulates Sowers' career. In 1993, Geotechnical Committee Chairman Mike Turner met with Dr. Jean-Lou Chameau, chair of Georgia Tech's School of Civil Engineering, and members of the School's geotechnical engineering program to initiate an annual event (at that time unnamed) with well recognized individuals to deliver an academic lecture at the School in the afternoon and an applied lecture to practicing geotechnical engineers in the evening. The success of this early joint-lecture series, and the inspiration George Sowers was to all of us, led to the formal establishment of the Sowers Lecture in 1998. The first Sowers Lecture was delivered by its namesake's former student, Dr. G. Wayne Clough, BCE 1964, MSCE 1965, who was the first alumnus to become president of Georgia Tech.

PREVIOUS LECTURES

YEAR	SOWERS LECTURE	STATE OF THE PRACTICE	STATE OF THE ART
1998	G. Wayne Clough		
1999	J. Michael Duncan		
2000	Richard E. Goodman		
2001	Robert M. Koerner		
2002	Harry G. Poulos	William F. Brumund	Richard Finno
2003	John B. Burland	Allen Marr	Stephen G. Wright
2004	Kenneth H. Stokoe, II	Edward Cording	Andrew Whittle
2005	Fred H. Kulhawy	Mike Lewis	Chuck Dowding
2006	R. Kerry Rowe	Raymond Seed	Don J. DeGroot
2007	Eduardo Alonso	Ed Kavazangian	Ross Boulanger
2008	Michele Jamiolkowski	Steven Kramer	George Filz
2009	Thomas D. O'Rourke	Robert Bachus	Craig H. Benson
2010	David E. Daniel	John T. Germaine	David O. Potyondy
2011	Keith Kelson	Dan Brown	Cino Viggiani
2012	Bengt H. Fellenius	Jeffrey R. Keaton	Jorge B. Zornberg
2013	Paul W. Mayne	Ken Been	C. Guney Olgun
2014	Richard J. Jardine	Kyle M. Rollins	Ellen M. Rathje
2015	Jonathan Bray	Scott Anderson	Youssef Hashash
2016	Rudy Bonaparte	Roger Chandler	Roman Hryciw
2017	Richard Bathurst	Bruce Kutter	Rick Deschamps
2018	Malcolm Bolton	Jie Han	Marika Santagata

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