



➤ TUESDAY, SEPTEMBER 21, 2021

**23RD ANNUAL
SOWERS
SYMPOSIUM**

GT 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.



GEORGE F.
SOWERS

23RD ANNUAL

SOWERS SYMPOSIUM

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

AGENDA

➤ **2:45 PM**

Arrival and Opening Remarks

➤ **3:00 PM**

State of the Art

Research Methods, Needs, and Strategic Approaches for Geohazard Event Reconnaissance

Joseph Wartman, Ph.D., P.E.

H.R. Berg Professor of Civil and Environmental Engineering

University of Washington

Seattle, Washington

➤ **4:00 PM**

State of the Practice

Ground Improvement in the 21st Century

Vernon R. Schaefer, Ph.D., P.E.

James M. Hoover Chair in Geotechnical Engineering

Iowa State University

Ames, Iowa

➤ **5:00 PM**

Acknowledgements and Awards

➤ **5:20 PM**

Remembering George F. Sowers

Robert C. Bachus, Ph.D., P.E.

Senior Principal Engineer

Geosyntec Consultants

Atlanta, Georgia

➤ **5:40 PM**

Video Happy Hour

➤ **6:00 PM**

Sowers Lecture

Urban Green Infrastructure for Stormwater Management: Findings and Lessons Learned from a Multi-Year Research Program

Patricia J. Culligan, Ph.D., C.Eng, F.ASCE, FICE

Matthew H. McCloskey Dean, College of Engineering Professor of Civil

Engineering University of Notre Dame

South Bend, Indiana

➤ **7:05 PM**

Closing Remarks



GEORGE F. SOWERS, PORT OF SAVANNAH FIELD TRIP

STATE OF THE ART

Research Methods, Needs, and Strategic Approaches for Geohazard Event Reconnaissance

For more than a century, researchers have collected perishable field data immediately following major geohazard events such as earthquakes, landslides, eruptions, hurricanes, and floods. State-of-the-art instrumentation and mobile data collection applications have significantly advanced the ability of field reconnaissance teams to rapidly capture data in challenging post-disaster settings. These data and the natural hazards and disaster investigations they have supported have provided many lessons for the research and practice communities and have greatly improved our scientific understanding of extreme events and their consequences. But concurrent with this progress has been a rapidly growing threat from a period of new extreme events, which has led to mounting concerns about the high levels of risk that natural hazard events pose to people, communities, critical infrastructure, buildings, and supply chains, worldwide. This talk will review geohazard extreme event reconnaissance, discuss current state-of-the-art field data collection instrumentation, and present new, strategic approaches to acquire and integrate data over a range of temporal, spatial, and social scales across disciplines.

Joe Wartman directs the Natural Hazard and Disaster Reconnaissance (RAPID) Facility headquartered at the University of Washington (UW), where he is a Professor of Civil and Environmental Engineering. He specializes in disaster risk reduction with a specific interest in geologic hazards and their impacts on communities. Over the past two decades, he has investigated and analyzed major natural hazard events worldwide, including earthquakes, hurricanes, landslides, and public health emergencies. Wartman's research appears in such scientific journals as the ASCE Journal of Geotechnical and Geoenvironmental Engineering, Engineering Geology, Geomorphology, GeoHealth, Scientific Advances, and the International Journal of Disaster Risk Reduction, among others. In addition to his scientific publications, Dr. Wartman's non-technical writing on disasters has appeared in the New York Times, the Seattle Times, and EOS, among other venues.



JOSEPH WARTMAN, PH.D., P.E.

H.R. BERG PROFESSOR OF CIVIL AND ENVIRONMENTAL ENGINEERING

UNIVERSITY OF WASHINGTON

SEATTLE, WASHINGTON

STATE OF THE PRACTICE

Ground Improvement in the 21st Century Ground improvement methods have developed markedly over the past six decades, to the point where they are routinely used in geotechnical design and construction. Their development, evolution and use is discussed and summarized. A large number of ground improvement methods can be employed to overcome poor soil site conditions; and the growth in methods, products, systems and engineering tools has resulted in a very large body of knowledge. Selection of the most appropriate technology is a complex undertaking that depends upon integration of available knowledge and expertise as well as site specific factors. These factors are discussed in relation to the essential elements for success of a ground improvement project. Recent advances in selected methods and the emerging issue of sustainability in ground improvement are discussed. GeoTechTools, a web-based ground improvement information and guidance system, developed to summarize and organize this knowledge to facilitate informed decisions, can be used for engineering and construction practice that incorporates these essential elements. GeoTechTools was conceived as a living system in which regular updates would keep the system current. Recently moved to the Geo-Institute of ASCE, the G-I and its committees are working to update GeoTechTools and add additional technologies and capabilities. Recent updates to the system are highlighted.

Professor Vern Schaefer, Ph.D., P.E. is the James M. Hoover Chair in Geotechnical Engineering in the Civil, Construction and Environmental Engineering Department at Iowa State University. He specializes in foundations, slope stability & landslides, earth retention systems, ground improvement, and geotechnical asset management. He has a B.S. in civil engineering from South Dakota State University, a M.S. in geotechnical engineering from Iowa State University, and a Ph.D. in civil engineering from Virginia Tech. Prof. Schaefer has over 150 publications and numerous research reports from 54 funded research projects between 1987 and 2021, with research expenditures over \$10 million. As the Principal Investigator and Project Manager for the SHRP 2 R02 project Geotechnical Solutions for Soil Improvement, Rapid Embankment Construction, and Stabilization of the Pavement Working Platform, Prof. Schaefer led a team of 12 researchers and over 40 graduate students in the development of the GeoTechTools system, the web-based information and guidance system for more than 50 ground improvement and geoconstruction technologies.



VERNON R. SCHAEFER, PH.D., P.E.

JAMES M. HOOVER CHAIR IN GEOTECHNICAL ENGINEERING

IOWA STATE UNIVERSITY

AMES, IOWA

SOWERS LECTURE

Urban Green Infrastructure for Stormwater Management: Findings and Lessons Learned from a Multi-Year Research Program.

Urban stormwater management in the face of increasingly intense rainfall is a challenge faced by many of today's global cities. To meet this challenge, municipalities are increasingly turning to green infrastructure. Green infrastructure includes networks of green space, encompassing natural areas such as woodlands, built areas such as parks and community gardens, and engineered interventions such as green roofs, rain-gardens, bioswales and other similar designs. Green infrastructure interventions can soak up rainfall where it falls, protecting cities against the devastation and disruption of frequent flooding as well as the harmful environmental impacts of untreated stormwater runoff.

This lecture will present results and lessons learned from a decadal research program that has been investigating the performance of a suite of engineered green infrastructure types located in New York City, including green roofs, urban canopies and right-of-way bioswales. Data collection, modeling protocols and findings from the research program will be discussed, as well as the broader role of green infrastructure in promoting urban sustainability.

Patricia Culligan is the Matthew H. McCloskey Dean of Notre Dame's College of Engineering. She is internationally recognized for her expertise in water resources and geo-environmental engineering, including her work on sustainable urban infrastructure. Prior to joining Notre Dame, Culligan was the Department Chair and Carleton Professor of Civil Engineering and Engineering Mechanics at Columbia University, where she also served as the Founding Associate Director of Columbia's Data Science Institute and on the Executive Committee of the Earth Institute.



PATRICIA J. CULLIGAN, PH.D., C.ENG, F.ASCE, FICE

MATTHEW H. MCCLOSKEY DEAN, COLLEGE OF ENGINEERING PROFESSOR OF CIVIL ENGINEERING

UNIVERSITY OF NOTRE DAME

SOUTH BEND, INDIANA

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 23rd 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
2019	Kenichi Soga	John Wolosick	Laurie Baise

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