2025 Forensics Engineering Conference Presenters

In Order of Appearance

Robert “Bob” Gilbert, Ph.D.
Department Chair & Professor
Maseeh Department of Civil, Architectural and Environmental Engineering
Cockrell School of Engineering

An internationally recognized expert in geotechnical engineering, Dr. Robert Gilbert is the Brunswick-Abernathy Professor of Civil Engineering at The University of Texas at Austin. He teaches a variety of undergraduate and graduate courses including the senior design capstone course and is a member of the university's Academy of Distinguished Teachers. He conducts research to advance the management of risk in civil engineering. He has received the Norman Medal from the American Society of Civil Engineers (ASCE) and the E.B. Burwell Award from the American Society of Geologists for authoring the top papers in those professions. Gilbert was elected to the National Academy of Engineering in 2020.

In engineering practice, Gilbert has established himself as an expert in assessing and managing risk. He has consulted on a wide-range of high profile projects, including flood protection in New Orleans, the Bay Bridge in San Francisco, the nuclear waste repository in Nevada, and offshore oil and gas facilities around the world. He is a member of the committee responsible for design guidelines for offshore facilities published by the American Petroleum Institute (API) and the International Organization for Standardization. He was awarded the Outstanding Civilian Service Award from the United States Army Corps of Engineers for his service on the ASCE External Review Panel in the forensic analysis of the levee failures in Hurricane Katrina. He is currently a member of the Board of Governors for the Geo-Institute of ASCE.

Gilbert earned a Ph.D. in Geotechnical Engineering in 1993, a MS in Geotechnical Engineering in 1988, and a BS. in Civil Engineering with the Highest University Honor (Bronze Tablet) in 1987, all from the University of Illinois at Urbana-Champaign. He received the top award for Ph.D. research in engineering (the Ross J. Martin Award) and was honored as a Distinguished Alumnus in 1997. Prior to joining the faculty at The University of Texas at Austin, he worked for five years as a geotechnical consultant with Golder Associates Inc. in their Chicago office.

Failure Analysis of the Arecibo Observatory Telescope Collapse

Building and operating cutting-edge, custom-designed research facilities presents unique challenges, where prior designs and experience may not be a reliable guide and unprecedented modes of failure can never be fully anticipated. In 2020, the National Science Foundation's telescope at the Arecibo Observatory in Puerto Rico collapsed, impacting the work of the National Astronomy and Ionosphere Center. Failure Analysis of the Arecibo Observatory 305-Meter Telescope Collapse analyzes the causes of the collapse through extensive review of prior forensic investigations, information gathering from employees at Arecibo Observatory, study of relevant research, consultations with other experts, and examination of structural analyses, engineering plans, inspection reports, photographs, and repair proposals. This report presents lessons learned and makes recommendations to help ensure the safe operation of other unique, critical science facilities.

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Juan Carlos "JC" Araiza, Ph.D., PE, M.ASCE
Senior Vice President
EFI Global, Inc.

Dr. Juan Carlos Araiza has over twenty years of design, construction, research, and technical leadership experience related to the evaluation of existing structures, forensic engineering, and expert witness services. Araiza has extensive experience with structural dynamics and advanced finite element modeling applied to failure analysis. He has led the forensic investigation of some of the most significant structural collapses in the US for the last few years, including the 2018 collapse of the FIU Bridge in Miami and the 2019 collapse of the Hard Rock Hotel in New Orleans. Araiza holds a Ph.D. in structural engineering from Universitat Politècnica de Catalunya. He is an active member of the ASCE Forensic Engineering Division and ACI Committee 444 on Structural Health Monitoring.

The Collapse of the Baltimore Bridge. How Did it Happen?

ABSTRACT
On March 26, 2024, the Francis Scott Key Bridge in Baltimore collapsed after the container ship MV Dali lost power and collided with a supporting pier. This incident resulted in the tragic loss of six construction workers and significant disruptions to the Port of Baltimore. Initial findings from the National Transportation Safety Board (NTSB) indicate that the Dali experienced multiple electrical failures prior to the collision, including two blackouts the day before departure and additional outages minutes before the allision. During this session, Dr Araiza will discuss the status of the NTSB investigation and a detailed timeline that ultimately resulted in the catastrophic collapse of the bridge.

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Michael "Mike" Hoffman, MSc, IAAI-CFI
Vice President, Fire Sciences
EFI Global, Inc.

Mr. Michael Hoffman has over 20 years of experience specializing in fire investigations. Hoffman has extensive experience assisting clients with complex subrogation claims and liability defense claims to establish the origin and causes of fires in structures, vehicles, and watercraft. He is an IAAI Certified Fire Investigator, NAFI Certified Fire and Explosion Investigator, and NAFI Certified Vehicle Fire Investigator. He is a Principal Member on the NFPA 1033 Technical Committee.

Hoffman holds a MS in Forensic Science, from Marshall University and a BS in Biological Sciences from Clemson University. He is a Certified Fire Investigator through IAAI-CFI, a Certified Fire & Explosion Investigator and Certified Vehicle Fire Investigator through NAFI and holds a private investigator license in Florida and Georgia.

Fire Investigation and the Forensic Engineer

ABSTRACT
The role of a forensic engineer is often a critical element in support of a fire investigation and successful subrogation or liability defense work. This topic will provide an introductory discussion of fire investigation, when, and why forensic engineers should be engaged to support a fire investigator, and common pitfalls associated with engineers working on, and opining on, fire causation.

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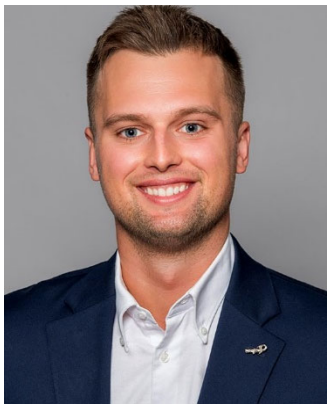

Alex Meucci, PE
Project Engineer
Pivot Engineers

Alex Meucci's start in structural engineering focused on design work related to marine structures and bridges. After being exposed to the detective work that accompanies forensic engineering, he was hooked. Meucci embraces the interesting challenges this specialty involves and enjoys the nuances every unique structure provides his forensic experience includes the evaluation and repair of concrete, steel, timber, and hybrid systems. Meucci has performed investigations of structural failures, evaluated existing structures, performed design reviews, and designed innovative structural repairs. He loves to get his hands on a structure and has extensively used non-destructive testing to aid in the analyses and rehabilitation of existing structures. p

Meucci earned both his MS in Structural Engineering and BS. in Civil Engineering from the University of Florida. He is currently the president of the Structural Engineers Association of Texas (SEAoT) Austin Chapter. He is also involved in the American Concrete Institute (ACI) and is a voting member of Committee 132: Responsibility in Concrete Construction.

Boom! A Case Study in the Evaluation and Repair of Fire and Blast Damaged Reinforced Concrete

ABSTRACT
On June 21, 2021, the Philadelphia Energy Solutions Refinery in Philadelphia, Pennsylvania experienced a fire and three explosions. The fire and subsequent explosions created concern that there could be damage to the reinforced concrete support elements and the reinforced concrete slab on grade in the vicinity of the event.
Pivot was retained to determine the extent of the damage to the concrete elements and develop repair recommendations and quantities for the various existing conditions. This presentation will describe multiple facets of the project, including:

- The challenges associated with site access conditions and how the investigation accounted for these conditions;
- The industry-standard investigation methods used to identify and categorize the fire and blast damage to concrete elements, including visual assessment, ultrasonic pulse velocity, rebound hammer, compressive strength testing, and petrographic testing;
- The efficacy of the applied investigation methods for assessing the existing conditions; and
- The outcomes of the evaluation and the repair recommendations for the various existing conditions that were discovered.

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Michael Lee, PE
Senior Principal
Wiss, Janney, Elstner Associates, Inc.

Michael Lee has investigated hundreds of distressed buildings, parking garages, and other structures. These distressed conditions have involved concrete deterioration, water leakage, collapse, construction deviations, and facade deterioration. Lee uses structural analyses, load tests, nondestructive testing, and laboratory studies to determine the cause and significance of the distress. He also develops drawings and specifications to repair the affected structures.

Prior to joining WJE, Lee worked at HDR (formerly W.E. Simpson) and Campbell & Associates, where he acquired fourteen years of structural design experience. At these firms, he was responsible for the analysis, design, or construction administration of over five million square feet of office, medical, parking, and educational facilities. His experience encompasses precast, post-tensioned, two-way, composite, and long-span structural systems. He has also investigated existing structures and designed modifications, as required, by changes in occupancy and loading.

Lee earned both his MS in Structural Engineering and BS in Architectural Engineering from The University of Texas at Austin. He is a past board member and president of the Structural Engineers Association of Texas (SEAoT) Austin Chapter. He is also involved in the American Concrete Institute (ACI), American Society of Engineers (ASCE) and the Precast/Prestressed Concrete Institute (PCI).

Common and Uncommon Failures Caused by Concrete Materials

ABSTRACT
This presentation will describe damage in concrete structures that has been caused by material behavior as opposed to external loads. Formal engineering training focuses on the analysis and design of structures to resist dead, live, and other loads specified in building codes. However, damage in concrete structures often has very little to do with stresses arising from external loading. In this presentation, case studies will be discussed that explain how cracking, debonding, volume change, and other distress in structural concrete elements has been caused solely by the materials.

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Al Schweickhardt, PE, SE, CDT
President
Applied Building Sciences, Inc.

Al Schweickhardt has over 37 years of engineering experience, including 30 years of work in the field of structural engineering. As a structural engineer, he has designed for industrial, commercial, residential, and municipal facilities, as well as marine equipment. Schweickhardt has assessed and designed repairs to coastal condominiums, residential structures, coastal and offshore structures, concrete waterways, timber docks, piers, pedestrian bridges, and historic trusses. He also has 27 years of experience in the assessment, analysis and design of commercial and residential building envelopes including wall cladding and roofs.

The Vulnerability of Tilt-up Buildings

ABSTRACT
When the tornado sirens went off, a man with his two young daughters thought that they would find shelter in a building with tall concrete walls. The tornado ripped off the roof. When the roof became detached, the roof joists became unstable. Their connection to the tilt-up walls became disconnected, and the tilt-up walls collapsed killing the man and his two daughters. This highlights the vulnerability of tilt-up buildings to sudden collapse once the roof becomes compromised.

In this presentation, we will discuss four case studies regarding the collapse of tilt-up wall panels that resulted in fatalities or could have resulted in fatalities. Three of these were during tornados and one resulted from the deficient design of secondary roof drainage. Some of the questions to be addressed include: Are tilt-up buildings any more vulnerable than other kinds of building construction? Are tilt-up walls sufficiently redundant with respect to structural stability? Can anything be done during design and construction to mitigate the risk of collapse during a roof-damaging event? As Tilt-up construction is commonly used for distribution warehouses with multiple loading dock doors that may be exposed during a storm, should it be required for such warehouses to be designed as partially enclosed so that larger internal pressure coefficients are used to design wind loads?

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Christine Standohar-Alfano, Ph.D., PE, CCM
Principal Engineer and Forensic Meteorologist
ICC Forensics, LLC

Dr. Christine Alfano has been performing forensic evaluations for over ten years starting with her doctoral research when she analyzed damage and researched mitigation techniques for wood-frame construction subjected to tornado loading. Upon graduation, she researched full-scale building performance under wind loads and wildfire/ember exposure in a large-scale wind tunnel. She also worked at Haag Global for seven years and has inspected and assessed damage to hundreds of properties including residential and commercial structures. Alfano remains involved in research and code committees and is an associate member and secretary of the SEI/ASCE/AMS Wind Speed Estimation Standards Committee. This standard is in development as a joint collaboration between engineering and meteorology communities and will provide a consensus document on the estimation of wind speeds in tornadoes and other windstorms by direct measurements (in situ and radar) or by indirect techniques (the Enhanced Fujita Scale, tree fall, etc.). She has written and published many articles on tornadoes and resultant damage in peer-reviewed literature and she has presented her results at numerous national and international conferences. Additionally, she has participated in several large-scale post-disaster surveys for tornadoes and hurricanes.

Alfano joined ICC Forensics in 2024 and is based in Minneapolis, Minnesota. However, she performs work across the country and is currently a licensed Professional Engineer (PE) in ten states including North Carolina, South Carolina, Florida, Georgia, Virginia, Tennessee, Iowa, Wisconsin, Minnesota, and South Dakota. She also received the Certified Consulting Meteorologist (CCM) designation in 2021, making her the only person in the country who is a PE and CCM. Dr. Alfano's primary areas of consulting are structural evaluations, general damage assessment, and forensic meteorology.

Meteorology for Forensic Engineering Applications

ABSTRACT
In many forensic engineering evaluations, weather is a contributing factor related to the observed structural performance and/or failure. As part of a complete evaluation, engineers will review or rely on meteorological data, sometimes without a full understanding of the source, applicability, and limitations of this data. One such product that has been increasingly utilized in the industry is proprietary, algorithm-based weather verification reports. These products provide site-specific estimates of wind speeds, hail size, rainfall, etc., and heavily utilize information obtained from the network of weather radars across the United States. While radar technology has been instrumental in improving weather forecasting over the last few decades, it has significant limitations, especially when trying to determine exact conditions closer to ground level. In light of these limitations, weather verification reports have proven to be unreliable in several recent court rulings. In these cases where the expert witness relied on these reports, their testimony was either struck entirely or severely limited per the Daubert standard. Given these rulings, this presentation will provide a brief introduction into weather radar operations for forensic engineering applications, including the limitations of this technology. Utilizing the knowledge of radar operations, a comparison between various weather verification reports will be presented. Finally, there will be a brief discussion of the Daubert standard specific to these weather verification reports.

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Matthew "Matt" Rechtien
Senior Principal and General Counsel
Walter P Moore

Matthew Rechtien is the General Counsel, and a Senior Principal, of Walter P Moore, where he began his professional career as a Graduate Engineer in 1999. After working in the firm's Houston and Austin offices through 2004, Rechtien earned 12 years of law firm and in-house legal experience, focusing on construction law, commercial and insurance litigation, and municipal law. He counsels and represents Walter P Moore and its affiliates and their employees on a broad range of legal and other issues and participates in leadership of the firm's risk management functions.

A licensed Professional Engineer in Texas, Michigan, and Washington, Rechtien earned his BS in Civil Engineering from the University of Michigan, MS in Civil Engineering from The University of Texas at Austin, and his JD with high honors in law from the University of Washington.

Rechtien is admitted to practice law in Michigan and Texas, is a past president of the Structural Engineers Association of Michigan and has published a number of articles and is a frequent speaker on topics related to construction and engineering law.

Engineering Ethics and Forensic Investigations

ABSTRACT
This presentation will discuss engineering ethics in the context of forensic investigations common to construction defect litigation. Common ethical considerations will be discussed and case studies relating to forensic engineering work and testimony will be included.