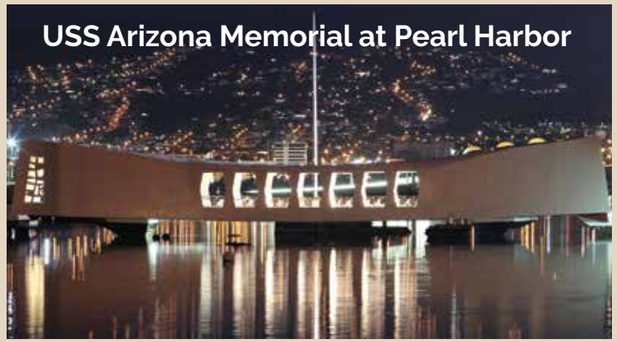
CELEBRATING ALUMNI CONTRIBUTIONS

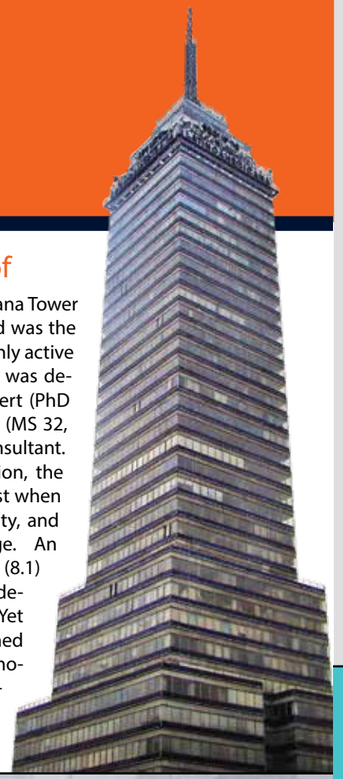
USS Arizona Memorial at Pearl Harbor



In addition to shaping history, CEE alumni have helped memorialize it. Thomas Lum (MS 59) was the sole structural engineer for the *USS Arizona* Memorial, an historical monument located at Pearl Harbor in Hawaii. Dedicated in 1962, the Memorial is built over the sunken wreckage of the *USS Arizona*, the final resting place for many of the 1,177 crewmen killed on December 7, 1941, during the bombing of Pearl Harbor.

Earthquake proof

Mexico City's Latinoamericana Tower was completed in 1956 and was the first skyscraper built on highly active seismic land. The structure was designed by Leonardo Zeevaert (PhD 49), with Nathan Newmark (MS 32, PhD 34) as the main consultant. Only a year after completion, the structure was put to the test when a 7.9 earthquake hit the city, and survived without damage. An even larger earthquake (8.1) hit Mexico City in 1985, destroying many buildings. Yet again, the Tower remained unscathed. Today, the Latinoamericana Tower is still considered one of the safest buildings in the city.



Golden Gate Bridge

For many years, a man named Joseph Strauss received all the credit for designing the Golden Gate Bridge. But in truth it was one of Strauss's employees—Charles A. Ellis (CE 22)—who was responsible for the design and calculations of what was then the longest suspension bridge in the world.

Ellis was a civil engineering professor at Illinois for seven years before accepting a position at Strauss Engineering Corporation in Chicago. Joseph Strauss, who was not an engineer but had experience building bascule bridges, originally lobbied for a hybrid cantilever/suspension bridge across the Golden Gate. When his plans were rejected, he hired Ellis to develop an alternate design.

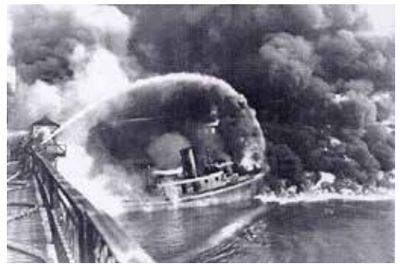
Ellis spent months working on the project and his version was approved by the Bridge District Board of Directors in 1930. Ellis made all the computations for the bridge, including suspension ropes, floor beams and cables. For reasons still unknown, Strauss fired Ellis before construction began and removed all mention of Ellis from his final report on the bridge. It wasn't until the 1980s that Ellis' role as bridge designer became widely known, and it wasn't until the bridge's 75th anniversary in 2012 that a plaque acknowledging Ellis' role was installed at the bridge.

Other areas of the bridge construction in which CEE alumni played a role include cable spinning, pier foundations, and properties of steels and riveted joints.

Burning rivers

Before environmental regulations were enacted, American industry dumped waste into rivers and lakes without much regard for the effects. Burning rivers were not all that uncommon—rivers in Columbus, Detroit, Philadelphia, Cleveland and other cities caught fire from the late 19th century through mid-20th century. But in 1969, a magazine article about a relatively minor fire on the Cuyahoga River in Cleveland engaged the public's interest; the fire became both a symbol of environmental neglect and a rallying cry for change. Many states, including Ohio, were already making efforts to clean up their waterways, but the national attention and support eventually led to the federal Clean Water Act of 1972.

Jim Hanlon (BS 72) spent most of his career with the U.S. Environmental Protection Agency, and served as director of the Office of Wastewater Management for over 10 years. During his tenure, he led a significant cleanup of the nation's waterways and worked with industry, trade and government stakeholders to develop numerous regulatory programs. Hanlon's work has garnered him many awards, including two separate Meritorious Service Awards, granted by Presidents George W. Bush and Barack Obama.



Interesting sidenote: photos—including the one above—that are often used to illustrate the infamous Cuyahoga River fire in 1969 are actually pictures of earlier fires. No photos of the 1969 fire are known to exist. Indeed, the 1969 fire was considered just a "flare-up" and initially barely rated local news coverage. This photo shows a fire from November 1952.

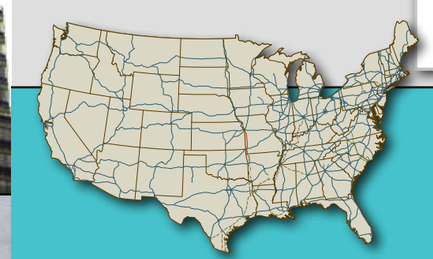
Sesquicentennial libretto

To commemorate the University of Illinois sesquicentennial, the University's School of Music commissioned a new musical work. The libretto sets the words of three Illinois alumni—one of whom is Fazlur Khan (MS 53, PhD 55)—to music. Khan's quotes are used in two male solos:

MALE SOLO:
"I put myself in the place
of a whole building,
feeling every part.
In my mind I visualize
the stresses and twisting
a building undergoes"

MALE SOLO:
"The technical man must not be lost
in his own technology;
he must be able to appreciate life,
and life is art, drama, music,
and most importantly, people."

The work was performed in Chicago, New York City, and the Krannert Center for Performing Arts in Urbana.



Interstate highway system

In December 1918, E.J. Mehren (BS 06), a civil engineer and the editor of Engineering News-Record, presented "A Suggested National Highway Policy and Plan" during a gathering of the State Highway Officials and Highway Industries Association at the Congress Hotel in Chicago. In the plan, Mehren proposed a 50,000-mile (80,000 km) system, consisting of five east-west routes and 10 north–south routes. This formed the basis of plans that eventually became the Interstate Highway System.

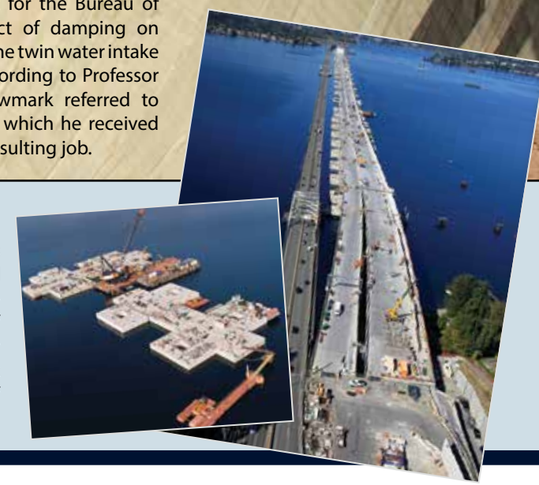
Nathan Newmark's first paid consulting job

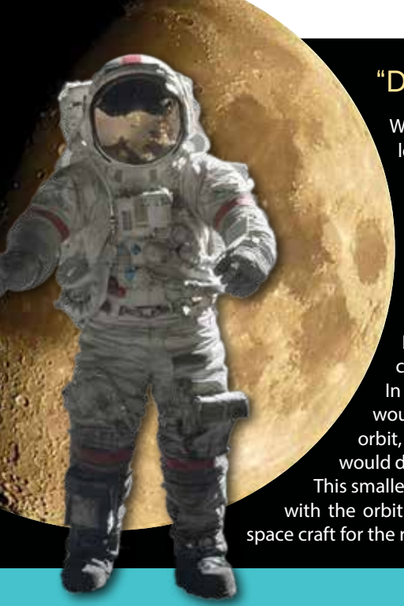
Before he was Department Head, Nathan M. Newmark (MS 32, PhD 34) was a graduate student at Illinois, then postdoc, then research assistant, research assistant professor, and finally research professor.

In 1933, he wrote a report for the Bureau of Reclamation about the "effect of damping on seismic vibration response of the twin water intake towers for Boulder Dam." According to Professor Emeritus William J. Hall, Newmark referred to this—an engineering task for which he received payment—as his first paid consulting job.

World's longest floating bridge

The Evergreen Point Floating Bridge, completed in 2016, measures 2,349.55 meters and connects the cities of Seattle and Bellevue, Wash. It holds the Guinness World Record for longest floating bridge. Sam Yao (MS 84, PhD 89) was extensively involved in the engineering of the bridge. He also served as the leading engineer of the repair of severe damages in the new floating bridge, and the leading engineer of the removal of the old bridge after the new bridge was completed. His work received the Outstanding Projects and Excellence Award from National Council of Structural Engineers Associations as well as several other engineering societies.





"Do we want to go to the moon or not?"

When President John F. Kennedy challenged NASA to land a man on the moon by the end of the 1960s, the prevailing thought was that the goal would have to be accomplished with a single giant rocket traveling directly from the earth to the moon's surface. John Houbolt (BS 40, MS 42) disagreed with this approach. Instead, Houbolt developed the concept of a lunar orbit rendezvous (LOR). In this scenario, two joined components would travel from the earth to the moon's orbit, at which point one of the sections would detach and take the crew to the moon. This smaller component would then rendezvous with the orbiting rocket to return the crew to the space craft for the return trip to Earth.

Even though the LOR would cost less, shave years off the timeline, and be more efficient, there was much resistance to the idea. Houbolt became a fiery advocate for the LOR approach and, according to NASA, took the "bold step of skipping proper channels" to argue the point in a letter to an incoming director:

"Do we want to go to the moon or not?" he asked. "Why is Nova, with its ponderous size simply just accepted, and why is a much less grandiose scheme involving rendezvous ostracized or put on the defensive?"

Houbolt eventually managed to sway opinion and his method was implemented. NASA credits Houbolt as one of the "unsung heroes of the Apollo Program," who made the moon landing possible within the decade named in President Kennedy's directive.

Urban transportation systems

The De Leuw, Cather firm engineered many of the early subway projects in North America, including Toronto, Chicago, Boston, Philadelphia, Seattle, Washington D.C.. Charles De Leuw's (BS 12) firm also pioneered integrated transportation systems, combining various modes of transportation in a single right of way. An example is Chicago's Eisenhower Expressway, which was the first expressway in the United States to incorporate a rapid transit line and an expressway within the same corridor.

Who you gonna call?

When a notorious drug lord escapes prison through a ventilated, well-lit mile-long tunnel (complete with a modified motorcycle mounted on rails), who do newscasters call to help explain to viewers how such a tunnel could have been excavated? They call CEE at Illinois alumnus and tunnel expert Gary Brierley (MS 70, PhD 75). Brierley was interviewed by CNN in July 2015 to provide insight into the escape tunnel Joaquin "El Chapo" Guzman entered via an opening under the shower in his Altiplano Prison cell and exited at a construction site nearly a mile away.

Tallest buildings in the world.

Fazlur Khan's (MS 53, PhD 55) pioneering work in structural design established tubular systems as the "go-to" method for creating skyscrapers. Khan designed the bundled tube system that was used in construction of Willis Tower (known then as Sears Tower), which for many years held the title of the tallest building in the world. It was surpassed in 1998 by the Petronus Towers in Kuala Lumpur, which used Khan's "tube in tube" system. In 2010, the Burj Khalifa (at right) dwarfed every other tall building in the world, with an architectural height of 828 meters – almost twice the height of Willis Tower. The "buttressed core" structural system used in the Burj Khalifa was developed by William F. Baker (MS 80).

Currently under construction, the Jeddah Tower will take on the title of tallest building in the world when completed, being the first building to reach the one kilometer high mark. Geotechnical engineer Alan Poeppel (BS 91, MS 93) worked on the foundation design, which will eventually accommodate a gravity load of 860,000 tonnes—almost twice that of the Burj Khalifa.

Photo: FEMA

Forensic engineering

After catastrophic events, CEE alumni are often the ones contacted to make sense of what happened. W. Gene Corley (BS 58, PhD 61), Mete Sozen (MS 52, PhD 57), James R. Harris (MS 75, PhD 80) and William Baker (BS 75, MS 80) are just some of the experts that have provided analysis for disasters such as the collapse of the World Trade Center (WTC) towers and the crash of Flight 77 into the Pentagon on September 11, 2001, and the 1995 bombing and collapse of the Murrah Federal Building in Oklahoma City.

Robert Smilowitz (MS 73, PhD 77), who was a member of the ASCE/FEMA Building Performance Assessment Team that analyzed the WTC collapse, also contributes to the other side of the equation: designing blast-resistant structures. Among his projects are security upgrades to the United Nations in New York City, protective design of the new World Trade Center towers, and blast investigations and design for the NATO Headquarters in Brussels, Belgium.

Vail, Colorado

Did you know that Vail, Colo., was named for civil engineering alumnus Charles Davis Vail (BS 1891)? Vail was appointed Colorado's state highway engineer in 1930. During his tenure, the state's hard-surfaced road system expanded from 539 miles to more than 4,400 and included all-weather routes through the Rocky Mountains. One of Vail's projects was construction of U.S. Highway 6, which he routed through Gore Valley, about 75 miles west of Denver. The pass became known as Vail Pass, and when the ski resort and town were established at the base of the pass in the 1960s, they also adopted Vail's name.

CEE Alumni Association

The Civil Engineering Alumni Association was established in 1963. The first Annual Meeting was held on May 23, 1964 in the Illini Union Building. The first newsletter was published in 1963, and has since developed into the biannual CEE Magazine.

Photo: Frank Murphy at a 1910 Conference track meet. Courtesy University of Illinois Archives.

The Olympic Games

In 1912, Frank D. Murphy (BS 24) was captain of the Illinois Varsity Track Team. A champion pole vaulter, he was selected to compete in the 1912 Olympic Games in Stockholm, Sweden. In addition to receiving a Bronze Medal at the Games, he met and became a life-long friend of Jim Thorpe. After a ten-year gap, Murphy returned to the university and completed his civil engineering degree.

Another civil engineering alumnus competed at the 1912 Olympic Games: Avery Brundage (BS 09). Brundage competed, but did not medal, in the decathlon and pentathlon. In subsequent years, he won three national track championships. Brundage remained active in sports throughout his life, though as an administrator not a competitor. In 1952, he was named President of the International Olympic Committee (IOC) and served in that position for 20 years (at times, somewhat controversially). Brundage is the only American to have served as IOC President.

Trans-Alaska Pipeline

Construction on the Trans-Alaska Pipeline took place from 1975-1977. The pipeline is 789 miles long, and extends across Alaska from Prudhoe Bay in the north to Valdez in the south. Some of the pipeline is buried, but where permafrost exists the pipeline is above ground. Approximately 1.8 million barrels of oil flow through the pipeline each day.

Among those who worked on the project were Professor Emeritus William J. Hall (MS 51, PhD 53), who was part of the design team, and Nathan M. Newmark (MS 32, PhD 34), who designed sections of the pipeline located near fault lines. Douglas J. Nyman (MS 71, PhD 73) has a long professional association with the pipeline: first, as a member of the engineering staff and later as primary seismic engineering consultant.

America's favorite pastime

Many people know that CEE alumnus George Halas (BS 18) started the Chicago Bears football team and is one of the founders of the NFL. He even designated the team colors as blue and orange in honor of his alma mater. However, did you know that in addition to football, Halas also lettered in basketball and baseball while at Illinois? Halas even went on to play minor league baseball and, in 1919, was called up to the majors where he played as an outfielder for the New York Yankees. His baseball career was cut short due to a hip injury, and he returned to his home state. It was then that he took control of the Decatur Staley's football team and moved them to Chicago to become (in 1922) the Bears. As was common practice for many early football teams, the team name was derived from the city's baseball team – in this case, the "Cubs" led to the "Bears."

Over the years, CEE alumni have had a hand in baseball stadium projects across the nation. Recently, Bill Bennet (BS 91, MS 93) led a renovation of the Chicago Cubs' Wrigley Field. Some of the other baseball stadiums with which our alumni have been involved are Yankee Stadium, Fenway Park, Safeco Field (Seattle), US Cellular Field (Chicago), Chase Field (Phoenix), Target Field (Minneapolis), and SunTrust Park (Atlanta).