SPRING 2024

The Bent

Of Tau Beta Pi

THE ENGINEERING HONOR SOCIETY

Engineering the Skeleton

Two International Chapters Installed

Tau Beta Pi NAE Fellows

The Bent
Of
Tau Beta Pi
The Engineering Honor Society

Tau Beta Pi was founded at Lehigh University, South Bethlehem, PA, June 15, 1885, by Edward H. Williams Jr., A.B., A.C., E.M., Sc.D., LL.D. (1849-1933). Key and name registered in U.S. Patent and Trademark Office.

Member, *American Society for Engineering Education*; co-founder, *Association of College Honor Societies*; and Affiliate, *American Association for the Advancement of Science.*

On the COVER: Image of a historical hip joint replacement from the Keggi–Rubin Hip Implant Collection at Yale University. The original photograph was taken by Terry Dagradi (the Cushing Center Coordinator for the Yale Medical Historical Library). Article appears on page 6.

Artist: Dali Polivka

VISIT www.tbp.org

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See back inside cover for listing of Tau Beta Pi chapters.

SPRING 2024

The Bent

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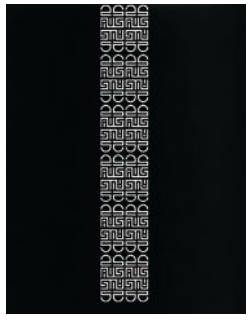
FEATURES:

REPORTS:

DEPARTMENTS:



COUNCIL'S CORNER

Mike J. Hand III, *MI Γ '11,* ΤΒΠ 2024 Treasurer

A CLOSER LOOK: ASSOCIATION FINANCES

When I was a student, there was a (non-ΤΒΠ) campus organization that famously gave its financial updates as "we have money." Starting my second year as Tau Beta Pi Treasurer, I can say that we ***do*** indeed have money. We had a few lean years recently where judicious actions were needed to ensure the financial solvency of the Association — June Association Officials meetings are now only held in person occasionally, rather than every year. Although we still have a ways to go before we are at the level of financial stability that we would like, we are grateful for efforts by Curt and others to bring us to a much firmer financial footing. In-person Conventions remain one of our larger expenditures, so while we are still dealing with the effects of not holding in-person Conventions in 2020 and 2021, especially a notable increase in the number of struggling chapters, those two years did result in additional savings in the short term.

The experiences of the last few years highlighted an important component to the financial well-being of the Association, one that the Executive Council will focus on in the next few years — unrestricted funds. About half of the money donated to ΤΒΠ is considered "restricted," that is, it must be spent for a particular purpose such as a specific program or for scholarships and fellowships. In many cases, these funds can be used to pay for the outputs of a program (e.g. the money given to a student as a scholarship) but not the labor associated with them (e.g. paying a systems administrator to maintain or enhance the website). As such, while ΤΒΠ has, through the generosity of its many donors, grown in activities and impact over the last several decades, the broader Association infrastructure has generally not grown proportionally.

While all donations are appreciated and integral to the mission of promoting excellence and integrity in the engineering profession, unrestricted funds — those which may be spent on anything needed by the Association, including day-to-day operations — provide the flexibility for the Association to adapt to changing environments, pursue new opportunities, and to continue the work we already do. ΤΒΠ can use unrestricted funds to provide resources such as Headquarters staff in support of our program operations; cover travel costs for students to attend District Conferences where they receive training and development; and to help fund extra activities and professional development sessions at Convention.

Typically, unrestricted funds come from initiation fees, merchandise sales, and donations to individual giving campaigns. These donations represent an act of trust on the part of the donor. When a donor designates their gift for scholarships or fellowships, it is known in advance how that money will be spent, and the funds are restricted to the designated use only. However, an unrestricted gift is made with the donor not knowing exactly how the money will be spent, and thus requires the confidence that the Association will use these funds responsibly. Our goal this year is to clearly articulate priorities, goals, and current activities so that the use of unrestricted funds is understood by our members and donors. Critical to building the confidence of our donors is through the ongoing work of the Association's Strategic Plan. Our priorities remain supporting existing members, initiating new members, and adding new chapters, thus making Tau Beta Pi membership accessible to even more of the best and brightest students around the country and the world.

This is an exciting time for the Association. In addition to our efforts to put ΤΒΠ on even firmer footing financially, we also aim to make membership more valuable to current and future members by continually improving and expanding our programming. While I cannot guarantee that we will make changes as fast as some members would want or maintain certain elements as they are, I can guarantee that we will continue to prioritize activities that provide value to our members, that align with our governing documents, our policies, strategic priorities, and the directives of the Convention. Furthermore, we will continue to provide open communication about what the Association is doing so you can have confidence that donations are being used responsibly to advance the interests and mission of the Association.

MIKE HAND is an autonomous vehicle systems engineer at Ford Motor Co. and a graduate of the University of Michigan with B.S. and M.S. degrees in electrical engineering systems. A ΤΒΠ Fellow (2012), Mike helped establish the Ann Arbor Alumni Chapter, has attended every Convention since 2011, and joined the Executive Council in 2023.

2024 EXECUTIVE COUNCIL

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Councillor Joan M. Sciacca, CA M '87
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YOUR LETTERS

Send letters to tbp.media@tbp.org. Text may be edited for length and clarity; not all letters can be published.

Recording the Eclipse

I enjoyed the article on eclipses.

Let me suggest a fun and semi-quantitative way of recording an eclipse, download the output of your home's solar photovoltaic (PV) system or solar panels, if you've got them.

I live in Albuquerque, NM, which was almost exactly the center of the annular eclipse on October, 14, 2023. I created a graph of the output from my PV system. It was interesting that the drop in PV output was nearly 100 percent, yet the decreased light observed by the human eye was relatively minor, perhaps only 10-20 percent.

It shows how remarkable (& non-linear) our eye's response to light is.

Bruce M. Thomson, *CA Λ '71*

Solar Viewers

I saw your article on the total eclipse and would like to share a couple of low cost and safe solar viewers that I've designed.

They make use of the technique common to astronomers called eyepiece projection, but instead of buying and assembling separate lenses, these use good quality but inexpensive monoculars that are available for around $11.

My original design was based on a plastic document storage tube but requires cutting the viewing port as well as the access hole for the monocular mount.

My second and subsequent designs eliminate all cutting by using 3D printed end caps for mailing tubes and would make for a good STEAM project.

I have used the eyepiece projection technique with half of a pair of binoculars for many years and have been lucky to see the 1998 total solar eclipse on a cruise ship (Aruba), the 1990 total solar eclipse on a cruise ship (Black Sea), and the 2017 total solar eclipse near the Great Smoky Mountains in Tennessee.

Here is the link to my first design:

https://www.thingiverse.com/thing:6243278

and my low cost versions using mailing tubes:

https://www.thingiverse.com/thing:6306688

I hope these can be shared with readers of *The Bent*.

Donald K. Knight, *CA K '78*

Thank you to our readers for helping maintain the accuracy of the magazine. If you find an error or inconsistency, please email tbp.media@tbp.org *or call 865/546-4578.*

Correction:

In the Winter 2024 issue, Chapter Project Awards pages (20-21), the Michigan Gamma Chapter was mistakenly omitted. The chapter received a Project Award at the 2023 Convention and will be awarded a $500 Scholarship for earning a Chapter Project Award for at least three consecutive years. Below is a summary of the 2022-23 MI Gamma Chapter projects along with an image submitted by the chapter leaders.

MI Γ University of Michigan
150 Projects focused on a return to in-person events including the TBP/SWE Career Fair with 350 companies in attendance, and MindSET K-12 hands-on activity sessions such as a boat maker module.

Members of the Michigan Gamma Chapter during a K-12 egg-drop activity.

The Bent magazine Letters Policy

The Bent invites letters to the editor addressing topics covered in the magazine. Criticism of Tau Beta Pi and its policies is permitted, but no letters containing potentially libelous statements, profanities, or personal attacks will be printed. All letters must be signed and not exceed 400 words. The editors reserve the right to edit letters for length and clarity and have the final decision to publish any letter. Some letters may appear only online. There is no guarantee that all letters received will be published. Ideas or views expressed in this magazine do not necessarily reflect the policies or opinions of the Association.

We appreciate your cooperation and understanding. If you have questions or concerns, please contact us at tbp.media@tbp.org *or call 865/546-4578.*

WHO'S WHO IN TAU BETA PI

Recognizing Tau Bate accomplishments

John M. Cioffi Ph.D.

Illinois Alpha '78

was a recipient of the National Medal of Technology, the nation's highest honor for technological advancement. John founded Amati Communications Corporation, built the world's first DSL modem, and founded Adaptive Spectrum and Signal Alignment (ASSIA, Inc.) in 2003. He teaches graduate courses in electrical engineering at Stanford as the Hitachi America Professor Emeritus in the School of Engineering.

Rory A. Cooper Ph.D.

California Mu '84

was recognized as a recipient of the National Medal of Technology for "inventing and developing cutting edge wheelchair technologies and mobility devices." He is a distinguished professor and founder of the Human Engineering Research Laboratories at the Univ. of Pittsburgh. In addition, Rory serves as a senior research career scientist and center director for the U.S. Department of Veterans Affairs and has three degrees in electrical engineering.

Aprille J. Ericsson Ph.D.

District of Columbia Alpha '86

was nominated by President Joe Biden to be Assistant Secretary of Defense (Science and Technology), Department of Defense. She is the new business lead, Instrument Systems and Technology Division, for NASA's Goddard Space Flight Center and has served for 30+ years at NASA in a variety of leadership positions. Aprille is a champion for the advancement of women and minorities in STEM fields and a 2018 ΤΒΠ Distinguished Alumna.

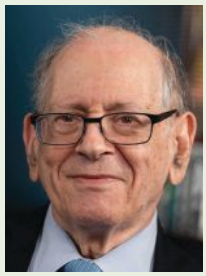
Kimberly L. Jones Ph.D.

District of Columbia '90

was named chair of the Environmental Protection Agency's Science Advisory Board. She is the first African American and representative from an HBCU to chair the group "responsible for advising the nation's top agency committed to protecting human health and the environment." Kimberly serves as associate provost for faculty affairs at Howard University, where she is also an advisor to the DC Alpha Chapter.

Robert E. Kahn Ph.D.

New York Eta '60



received the 2024 IEEE Medal of Honor, the organization's highest award, "for pioneering technical and leadership contributions in packet communication technologies and foundations of the Internet." He is chairman, CEO, and president of the Corporation for National Research Initiatives, worked for 13 years with the U.S. Defense Advanced Research Project Agency (DARPA), and is a 2005 Presidential Medal of Freedom recipient.

Jeong H. Kim Ph.D.

Maryland Alpha '83

was awarded the National Medal of Technology for his work with broadband optical systems, data communications, and wireless technologies, "that transformed how we communicate." A member of the Nuclear Threat Initiative Board of Directors and Kiswe Mobile Chairman, he previously served as the 11th president of Bell Labs and as a nuclear submarine officer in the U.S. Navy. Jeong holds a Ph.D. in reliability eng'g.

Tian J. Ma Ph.D.

Illinois Zeta '03

received the Asian American Engineer of the Year Award from the Chinese Institute of Engineers-USA. He is a Distinguished R&D computer scientist at Sandia National Labs, a recognized expert in detection algorithms, and a pioneer in the field of tracking systems. An inventor with numerous patents, he earned a B.S. degree in computer eng'g and an M.S. in electrical & computer eng'g from the Univ. of Illinois at Chicago.

Subra Suresh Sc.D.

Pennsylvania Gamma '77

was named a recipient of the National Medal of Science. He was honored "for (his) commitment to research, education, and international collaboration that has advanced the study of material science." Subra is Professor Emeritus and former dean of the MIT School of Engineering and joined ΤΒΠ in 2015 as an eminent engineer at Carnegie Mellon University (PA) where he served as president from 2013-17.

Sheldon Weinbaum Ph.D.

New York Gamma '59

was recognized with the National Medal of Science, the highest honor for scientific achievement bestowed by the U.S. government. He was chosen for his "pathbreaking research in biomechanics." A prolific researcher, he is professor emeritus in the City College of New York's SOE, where he was instrumental in establishing the CCNY Department of Biomedical Engineering and the New York Center for Biomedical Engineering.

THE NATIONAL ACADEMY OF ENGINEERING (NAE)

Elects 114 New Members

President John L. Anderson, Ph.D., *DE A '67*, announced the election of **114 new members** and **21 international members, 31 of whom are Tau Bates. The international member is on page 56.** Election to the Academy is among the highest professional distinctions accorded to an engineer. It honors those who have made outstanding contributions to "engineering research, practice, or education" and to "pioneering of new and developing fields of technology and making major advancements... ."

Irene J. Beyerlein, Ph.D., *SC A '93*
Professor, University of California, Santa Barbara. For methodologies predicting the mechanics of complex engineering materials to improve their stability and strength.

Jingguang G. Chen, Ph.D., *DE A '82*
Professor, Columbia University. For discovering new catalysts and synchrotron techniques to connect catalytic and electrocatalytic mechanisms under reaction conditions.

Rory A. Cooper, Ph.D., *CA M '84*
Distinguished professor, University of Pittsburgh. For wheelchair innovations that transformed the health, mobility, and inclusion of people with disabilities and older adults.

Donald O. Dusenberry, *NY Δ '73*
Retired consulting principal, Simpson Gumpertz & Heger Inc. For national structural design load standards, and for standards covering blast, fire, and progressive collapse.

Catherine E. French, Ph.D., *MN A '81*
Distinguished professor, University of Minnesota. For design, safety, and construction of structural concrete buildings and bridges.

James E. Gebhardt, Ph.D., *SD A '77*
Retired senior engineer, FLSmidth & Co. For transforming mineral processing operations with online measurements, electrochemical sulfide flotation, and hydrometallurgical models.

Dario Gil, Ph.D., *NJ A '88*
Sr. VP and Director of Research, IBM Research. For advancement and practical use of artificial intelligence and quantum computing in industry and society.

Kiruba S. Haran, Ph.D., P.E., *NY Γ '00*
Professor and Director, University of Illinois at Urbana-Champaign. For the high-power density electric and superconducting machinery technology and innovations in aircraft electric propulsion.

Peter E. Hart, Ph.D., *NY Γ '62*
Founder and chairman emeritus, Ricoh Innovations Inc. For pattern classification, information theory, computer vision, and robotics.

Mark C. Hersam, Ph.D., *IL A '96*
Professor, Northwestern University. For the synthesis, purification, functionalization, and application of low-dimensional nanoelectronic materials.

Vicki A. Hollub, *AL B '81*
President and CEO, Occidental Petroleum Corp. For leadership in energy company management and advocating for carbon management solutions.

Jen-Hsun Huang, *OR A '84*
Co-founder, president, and CEO, Nvidia Corp. For high-powered graphics processing units, fueling the artificial intelligence revolution.

Charles T. Johnson-Bey, Ph.D., *DE A '93*
Senior vice president, Booz Allen Hamilton. For development of engineering innovations in support of national security.

Eugene F. Kranz, *MO E '54*
Retired Director, Mission Operations, NASA Johnson Space Center. For establishing the principles and mission control procedures for manned spaceflight operations.

Sonia M. Kreidenweis, Ph.D., *NY Ξ '83*
Distinguished professor, Colorado State University. For elucidating the impact of aerosols on climate, linking chemical composition and cloud formation capacity.

Bret J. Lizundia, S.E., *CA Γ '87*
Principal, Rutherford + Chekene. For seismic design through applied research, innovative practice, earthquake reconnaissance, and building code development.

Vice Adm. Michael K. Loose, P.E., *KS A '75*
Retired deputy chief of naval operations, U.S. Navy. For the planning, execution, and operation of worldwide capital asset programs to serve national security.

Duane K. Miller, Sc.D., P.E, *OH E '71*
Manager of engineering services & welding design consultant, Lincoln Electric Co. For design, fabrication, and performance of welded structural steel connections and for contributions to welding education.

Nicholas W. Miller, P.E., *NY Γ '79*
Principal, HickoryLedge LLC. For reliable integration of wind and solar plants into electric power systems.

Paul Milly, *NJ Δ '78*
Research hydrologist, U.S. Geological Survey. For advances in the understanding of global and continental hydrology and their interactions with a changing climate.

George J. Pappas, Ph.D., *NY Γ '91*
Professor and chair (ESE), University of Pennsylvania. For analysis, synthesis, and control of safety-critical cyber-physical systems.

Seth L. Pearlman, *PA Γ '78*
Chief executive officer, Menard USA. For ground improvement technologies, geostructural design, and geotechnical construction techniques.

Peter J. Pupalaikis, *NJ B '88*
Founding member and director of signal integrity, Nubis Communications. For digital signal processing for test and measurement instruments.

Maureen F. Reitman, Sc.D., P.E., *MA B '90*
Group vice president and principal engineer, Exponent Inc. For understanding the selection, performance, and durability of polymeric materials in consumer, medical, and industrial applications.

Christine E. Schmidt, Ph.D., *TX A '88*
Distinguished professor and chair, Univ. of Florida. For biomaterials and tissue engineering for neural regeneration and improved wound healing and for leadership in diversifying bioengineering.

Jill E. Seebergh, Ph.D., *PA A '89*
Principal senior technical fellow, Boeing Co. For materials and coating processes that enable efficient and sustainable aircraft production, performance, and safety.

Jonathan P. Stewart, Ph.D, P.E., *CA A '90*
Professor, Univ. of California, Los Angeles. For improved understanding of soil-structure interaction, earthquake ground motions, site response, and soil liquefaction.

Dawn M. Tilbury, Ph.D., *MN A '89*
Professor and department chair of robotics, University of Michigan. For advances in manufacturing network control and human-robot interaction and for engineering leadership.

Scott P. Willoughby, *PA A '89*
Vice president and aeronautics systems program manager, Northrop Grumman Corp. For engineering leadership enabling the deployment of the James Webb Space Telescope.

Jeannette M. Wing, Ph.D., *MA B '79*
Executive VP for research, Columbia Univ. For formulation and advocacy of computational thinking, and for contributions to formal methods and trustworthy computing.



Engineering the Skeleton

By: ***Trudy E. Bell*** ©2024 Trudy E. Bell

Each year, over a million people worldwide become bionic when major joints of their skeletons are replaced with prosthetic implants. Here's a brief sketch of some engineering backstory.

Above Image Credit: Terry Dagradi (Yale University). See sidebar on page 10 for more information.

When my left hip finally failed in late June 2022, the sustained pain was the worst in my life. Even with a walker, I could hardly journey the length of my apartment without gasping. I was already maxed out on Meloxicam, and extra strength Tylenol offered zero relief. I sent my wonderful daughter out to purchase a wheelchair, and was fortunate that a cancellation let me move an appointment with an orthopedic surgeon from mid-July to the next day. After the agony of X-rays and a consultation, when he informed me that the next available surgery date would be forever away on August 1, I asked: "How am I supposed to survive until then? And after five weeks in a wheelchair, won't it become inoperable?" "You're a long way from that," he replied reassuringly, but demurred prescribing stronger pain meds.

The hip failure—possibly due to the last of the cushioning cartilage being worn away, leaving the joint bone-on-bone—couldn't have come at a worse time: I was in the middle of packing to move and both apartments were a jumble of boxes, many heavy with books.

I had been praying that the hip could last into September when the move would have been complete, but the joint's degradation had accelerated in the final few weeks. (Surgeon: "That happens sometimes.")

The hip had begun to have issues in 2011, when I first noticed an aching limitation in the range of motion when doing a sideways knee-lifting exercise known as the "fire hydrant." Over the years, I obtained periodic relief from several rounds of physical therapy and walking up and down hills. And there was the nonsteroidal anti-inflammatory drug (NSAID) Meloxicam and the analgesic Tylenol. But X-rays and an MRI of my hip and lumbar region revealed "advanced severe degenerative osteoarthritis," the most common form of arthritis, which is inescapably progressive. Slowly, the hip's range of motion became increasingly limited and stiff. Eventually, it even felt as if the hip would almost give way under my weight from one step to the next. The long-term trend line was headed in the wrong direction.

As August 1 approached, I became frankly terrified. First, I realized I had to trust this surgeon, who looked like a boy, to cut out and replace a key part of my skeleton. Second, I feared that post-surgical pain would exceed even the appetite-sapping suffering I was already enduring. But the status quo (daily pain level averaging 8 to 9.5, maybe 7 on a good day, with no end in sight) was a nightmare prospect. I had no choice but to power through the surgery.

IF YOU LIVE THROUGH IT...

Three hours after the surgery, when I woke from the general anesthetic, several hospital aides assisted me to stand with full weight-bearing. My first thought: "These post-operative pain meds are very good." Blessedly, blissfully, I felt no pain. Indeed, after the anesthetic wore off, I realized, "oh, this post-surgical pain is entirely manageable"—bone-on-bone had been 100 times worse. (Surgeon: "A lot of people say that.") Second, I realized "this hip isn't going anywhere!" It was rock solid.

"Don't worry about breaking the implant," explained my gifted surgeon—Dr. Christopher Bechtel (pronounced "BETCH-el"), then of University Hospitals—when he visited my hospital room that afternoon. "It's the strongest thing in your body. Your original hip joint was very severely damaged. The ball had basically disintegrated and the socket was resting directly on the arthritis."

Within days, using a walker, I was walking the length of the corridor of a residential rehab facility. (Daughter Roxana: "This is the first time I've had hope.") By Halloween, I was walking without a cane, without pain, and without restrictions, and by New Year's was back to hiking forest trails.

Although millions of people had previously gone through similar surgery (and worldwide a million more each year receive new hips)[1], from my individual patient's personal viewpoint, it felt nothing short of a medical miracle. Moreover, my curiosity was sparked: joint replacements had to have an underappreciated materials science and structural engineering backstory. My journalist's motto: If you live through it, write about it.

ANATOMY 101

First, some essential medical vocabulary: the femur (thigh bone) is the longest and strongest bone in the body. It (and the body's other long bones) is made up of two kinds of bone: cortical bone (the strong, dense, and compact outer layer that makes up 80 percent of the skeleton) and trabecular or cancellous bone (porous honeycomb-like inner bone found at the ends of the long bones and in the vertebrae). Inside the femur is a long cavity called the medullary canal, which houses the body's stores of bone marrow (which contains stem cells that produce blood cells and other cells essential to the immune system).

At the top of the femur is the nearly spherical femoral head that serves as the "ball" in a hip joint. It is covered with tough, slippery cartilage, and it articulates (moves) within the smooth cartilage surface of the acetabulum (pronounced "ass-say-TAB-u-lum") or "cup" or "socket" of the pelvis [**Fig. 1a**]. In a healthy hip joint, there is a slight space between the two cartilage surfaces, which is filled with synovial fluid—a viscous fluid that lubricates and reduces wear on the joint.[2] The cartilage and synovial fluid together act as a shock absorber that cushions the repeated impacts from walking or running. The hip joint is held together by fibrous ligaments; it is articulated by muscles attached to the bones by tendons.

A functional hip joint, whether natural or prosthetic, must meet demanding engineering requirements. A "standard walking pace causes approximately five times one's body weight to be loaded on the hip…; going up or down stairs is associated with a more than sevenfold increase in effective body weight… ."[3] For athletes—think gymnasts or figure skaters or tennis players—fast leaps, twists, and turns can drive the effective loads far higher. A prosthetic hip joint must robustly resist fatigue for millions of cycles of compressive loading and release from muscles and tendons. It also must mimic articular cartilage in reducing friction under load and distributing stresses at the hip to resist wear from repeated movement of the femoral head within the acetabulum (the body still produces synovial fluid after a hip joint replacement).

In a diseased hip like mine, however, the space between the ball and socket had narrowed, depriving the joint of synovial fluid, the cartilage on both the femoral head and inside the acetabulum had mostly worn away, and osteoarthritic bone spurs had grown, limiting range of movement [**Fig. 1b**].

The idea of surgically replacing a natural hip joint with a prosthesis ("total hip arthroplasty" in medical lingo) is several centuries old, but early materials tried, such as wood, were neither strong enough nor biocompatible (that is, made of a material that the body would not reject)[4].

Figure 1a: Healthy hip joint.
Credit: American Academy of Orthopedic Surgeons.

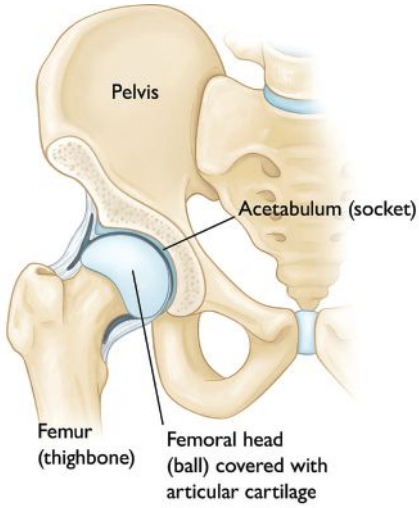
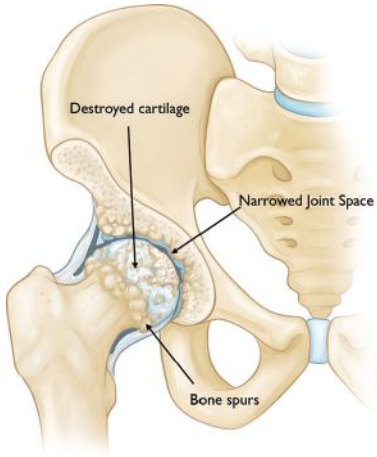


Figure 1b: Diseased hip joint.
Credit: American Academy of Orthopedic Surgeons.



The first ball-and-socket hip prosthetic implant, made of ivory and fixed in place with nickel-plated screws, was by German surgeon Themistocles Glück in 1890; later researchers tried all manner of other materials. But the acknowledged "father of modern arthroplasty" was Sir John Charnley in England, who revolutionized hip implants in the 1960s, producing the first successful low-friction, high-load–bearing, biocompatible implants with decent longevity (a decade or more), having a stem inserted into the top few inches of the femoral (medullary) canal and fixed in place with bone cement.[3,5]

THE SOCKET

In answer to my query for details about the hip joint implant I received, surgeon Bechtel responded through his assistant Lisa Brenot:

> The manufacturer of her components was DePuy [DePuy Synthes, a subsidiary of Johnson & Johnson]. She has a Pinnacle acetabular component that has a porous metal coating on the backside of the shell that is osteoconductive and allows for her bone to grow onto the surface of the shell and provide a biologic fixation. The inner liner is ALTRX highly crosslinked polyethylene.[6]

In 1962, Charnley first used an acetabular cup made of ultrahigh molecular weight polyethylene (UHMWPE) as the bearing surface of his hip prosthesis, introducing the use of high-density polyethylene as a low-friction–bearing material. Conventional polyethylene (PE) is sterilized using gamma radiation in air. That produces crosslinking of chemical bonds between individual long polymer chains to produce a three-dimensional network, giving the PE greater mechanical strength—a good thing. But such irradiation also releases free radicals that oxidize in air, which made the PE more brittle and less resistant to wear—a bad thing, because the resulting UHMWPE wear debris could (and did) cause osteolysis (bone degeneration) and eventual failure of the implant in some early patients.

Over the decades, much research was devoted to improving wear resistance while eliminating the oxidation, resulting in the development of "highly cross-linked UHMWPE," abbreviated XLPE. In outline (regardless of manufacturers' individual variations), cross-linking is achieved by using gamma radiation or electron beam radiation; the polymer is then heated to near its melting temperature (137°C) to eliminate free radicals. Finally, it is sterilized in the absence of air. In clinical use, XLPE has demonstrated a dramatically lower rate of wear and osteolysis.[7] ALTRX is a third-generation material introduced by DePuy in 2007.[8]

THE STEM

Dr. Bechtel continued:

> The femoral stem is a CORAIL (French) stem. It is primarily made of titanium but it is coated in hydroxyapatite that is a known growth factor that stimulates her own bone to grow onto the stem along the length of the stem inside the femoral [medullary] canal.

In the early 1960s, the metal of choice for the femoral stem was stainless steel, but its wear resistance turned out to be poor. Other steel alloys were tried with greater or lesser success, with a cobalt-chromium-molybdenum steel alloy proving to have good wear resistance. But it was also stiff, stiffer than cortical bone. Bone is somewhat flexible, and there was a poor match between the implant's rigidity and the bone's elasticity, resulting in bone resorption from "stress shielding."

Bone requires stress to strengthen or maintain strength (hence the importance of weight-bearing exercise); without stress, it begins to atrophy. The early steel hip implants did not sufficiently transfer stress from the weight of the upper body to the femur. But titanium alloys were more flexible and had a lower mismatch with the elasticity of bone, reducing or eliminating stress shielding.

Hydroxyapatite is a naturally occurring mineral form of calcium that makes up more than half of human bones and teeth; it is often called "bone mineral." Hydroxyapatite in various forms, whether of biologic or synthetic origin, is used in dentistry and in orthopedic applications to encourage bone regeneration around and through metal and/or ceramic implants.[9]

Bone cement for the femoral stem of hip implants, however, turned out to be somewhat problematic. Its success depended greatly on the skill of the individual surgeon: if not properly packed, the cement might not adequately penetrate the bone bed, so an implant was at risk of loosening. Moreover, microscopic particles of the cement were sometimes found in other cells, causing inflammation.

HIGH-TECH BANDAGES

The bandage that covered my direct anterior approach incision after hip joint replacement surgery looked like nothing so much as a foot-long strip of duct tape under a wider and longer piece of Saran Wrap. But both the shiny gray bandage and its waterproof transparent wrap (actually a single unit) were softer and more flexible than either actual duct tape or sandwich wrap would have been.

The materials also adhered amazingly well, not lifting at the corners even in the shower—yet when a nurse removed them seven days after the surgery, both materials came away from my skin easily with no pulling of tender tissues. Moreover, aside from looking purple and a bit lumpy, the newly healed 3-inch incision was completely clean with zero sign of inflammation. It never gave me a moment's trouble.

What kind of waterproof yet breathable dressing could be left in place for a week with no changing, have such a remarkable adhesive, and promote infection-free healing?

According to Dr. Bechtel:

"We use dissolvable sutures to close the different layers of the tissues (muscle/deep, subcutaneous, skin) followed by skin glue over the incision. The bandage is a silver impregnated, waterproof bandage (Mepilex Ag) that elutes very small levels of silver that has known antibacterial properties. It was first used in the military for soldiers that were

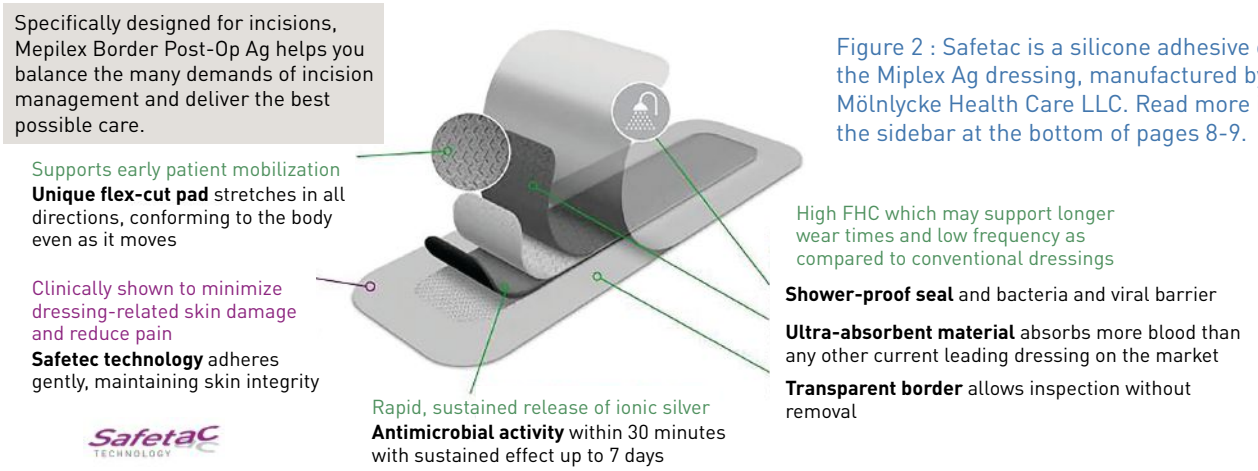


Figure 2 : Safetac is a silicone adhesive of the Miplex Ag dressing, manufactured by Mölnlycke Health Care LLC. Read more in the sidebar at the bottom of pages 8-9.

Thus, in the 1970s, others began trying and using uncemented designs and "intensive broaching of the femoral canal."[5] In plain English, that means drilling out part of the interior of the thigh bone to be slightly smaller than the implant, and then hammering the implant's slightly larger tapered femoral stem into a snug press-fit. (I, pre-surgery: "I hope I'm out cold when all this machining and pounding are going on." Bechtel: "You will be.")

THE BALL

Dr. Bechtel further explained about my implant:

> Lastly, she has a BIOLOX ceramic femoral head. This is a highly polished, hard and durable ceramic that has excellent wear properties when combined with the highly crosslinked polyethylene liner (0.1mm/yr linear wear of the polyethylene liner).

Since the 1970s, alumina ceramics have been used for the femoral head in total hip arthroplasty. Alumina ceramics are biocompatible, have high wear resistance, and are chemically durable. However, early first-generation alumina ceramics were brittle and suffered a dismaying incidence of fracture. Improved manufacturing processes to decrease porosity and grain size and increase toughness reduced fracture rates and made ceramics more feasible. In the late 1980s, European researchers introduced zirconia femoral heads, which had greater bending strength and crack-resistant toughness. But manufacturing issues led to a major recall of zirconia prosthetics.

Since then, the ceramic of choice (which I received) has been zirconia-toughened alumina (ZTA), which combines the hardness of alumina with the tough crack resistance of zirconia. CeramTec first commercialized ZTA around 2000 under the trade name of BIOLOX Delta.[10] Other materials have also been introduced for medical use more recently, such as silicon nitride, a tough and high-strength non-oxide ceramic with half a century of use in bearings and turbine blades.[8]

PROSTHETIC ENGINEERING

What recent engineering developments seem promising for further improving the functionality of prosthetic hip joints? Research continues into biomaterials with better biomechanical properties (including new metals, ceramics, composites, and shape-memory metals or polymers). One tantalizing engineering goal is "infinite" prosthesis life, to minimize the risk of younger and more active patients outliving their replacement hip joints.[10]

One big research area is personalized implants for patients with non-standard anatomy (perhaps resulting from bone defects or from congenital disorders). Such one-of-a-kind prosthetics could be constructed through additive manufacturing (also known as 3D printing).[11] Additive manufacturing could also enable the production of porous femoral stems whose porosity varies along the length of the stem for an even better match with the elasticity of bone.[12] Moreover, surgical robots as surgeons' assistants seem to excel in precise positioning of customized

injured on the battlefield. They would be able to apply the bandage to any combat wounds after bleeding was controlled and it would protect the wounds from infection. It was adapted to be a common surgical wound dressing that is combined with a waterproof adhesive that can stay in place for up to a week."

The remarkable silicone adhesive of the Miplex Ag dressing, manufactured by Mölnlycke Health Care LLC, is called Safetac; it was specifically designed to conform to the skin without sticking to a moist wound or incision, so wounds can heal undisturbed.[17] **See Figure 2**

Silver-impregnated dressings significantly reduce the incidence of infection not only of the superficial incision, but also of more serious deep infection of the joint implant itself. Such deep prosthetic joint infection (PJI) is a potentially catastrophic (even fatal) complication that is a cause of implant failure after surgery, especially if caused by antibiotic-resistant organisms. "Superficial wound infections have been demonstrated to be a risk factor for deep prosthetic infection," one research group stated. Thus, "...minimizing the risk of superficial wound complications is likely a major step toward lessening the risk of subsequent PJI."[18]

–T.E.B.

'HIP' HISTORY

An entire museum exhibition on the innovation and evolution of hip joint replacement surgery? Who knew? Indeed, an extensive collection of historic artificial hip joint implants and other artifacts was assembled and put on display for three months in 2022 in the rotunda at Yale University's Harvey Cushing/John Jay Whitney Medical Library in New Haven, Connecticut.

Moreover, highlights from the artifacts of the new Keggi–Rubin Implant Collection have been beautifully photographed (see page 6) and the images presented in a comprehensive permanent online exhibition recounting their fascinating history (beginning at https://onlineexhibits.library.yale.edu/s/hipreplacement/page/introduction).

The exhibition's scope and purpose are aptly summarized in its introduction:

> The displayed implants trace the trials, innovations, successes, and failures of hip replacement surgery over time, providing insight into the dynamic world of surgical history. By archiving and studying these implants, one can witness the remarkable changes that have resulted from design, engineering, biomaterials, manufacturing, and technological advances over nearly a century. The evolution of total hip replacement has been possible thanks to the timeless contributions and collaborations of many dedicated surgeons, researchers, engineers, industry experts, and manufacturers over the past 70 years.

The YouTube video of the 1-hour dedication ceremony on March 18, 2022, also provides some background on how the remarkable collection and the exhibition came to be. Well worth visiting. –*T.E.B.*

implants within patients. There has even been experimentation with "smart" implants that are electronically instrumented to give early warning of potential loosening and possible failure of the prosthetic hip joint.[13]

The annual number of prosthetic hip replacements is projected only to increase in number through time because of the world's aging human population.[14] And the lifetime of prosthetic hip joints today averages a good 25 to 30 years. The durability of the prosthetic hips plus the development of minimally invasive surgical techniques have expanded the viable range of potential recipients to include younger and more active individuals.[15] (P.S. Some surgical veterinarians even insert hip joint replacements to treat hip dysplasia in larger dogs![16])

Moreover, hips are by no means the only human joints replaced. Knees are even more commonly replaced. Less commonly, patients have had shoulder joints or elbow joints replaced. A growing number of individuals have had two or more joint replacements. I even personally know a woman whose entire lower jaw is of titanium (an arduous travail entailing multiple surgeries over six years, necessitated by a dental implant gone horribly wrong)—but you wouldn't know it to look at her.

Let's hear it for prosthetic engineering.

Figure 3: X-ray of the author's titanium-alloy prosthetic left hip joint as it looked in August 2023, one year after her total hip arthroplasty. (The dim circle at the far right is a calibration marker ball to help with measurements on the X-ray.) Credit: University Hospitals

Gratitude is expressed to the following individuals for their contributions to this article as physicians, museum curators, fellow prosthetic joint recipients, helpful engineering discussants, and/or manuscript readers: Christopher Bechtel, M.D. (NOMS Health Care), Lisa Brenot, Jennifer Doak (Mölnlycke), Terry Dagradi (Yale), Karl Esch, Melissa Grafe, Ph.D. (Yale), Debra Robinson, M.D., Laurie Soc, Philip S. Shoemaker, Ph.D. (The Polymers Center), Dan Sweeny, and Daniel Wiznia, M.D. (Yale).

TRUDY E. BELL, M.A. (t.e.bell@ieee.org), now bionic, is a former editor for *Scientific American* magazine and former senior editor for *IEEE Spectrum* magazine. This is her 34th feature article published in *The Bent* since 2002.

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Most references can be found online by searching the title.

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CHAPTER ENDOWMENT INITIATIVE

The Chapter Endowment Initiative (CEI) program, launched in Spring 2014, allows alumni, companies, and foundations to permanently endow the Association's activities that support any of our 257 collegiate student chapters. Last year we reported 35 gifts/pledges and this year we have an additional 26 for the list as we strive to endow all of our chapters.

$5,830,000 The value of the Chapter Endowment Initiative fund, including growth and interest, at TBP's fiscal year-end (July 31, 2023).

MINIMUM GIFT AMOUNT:
The minimum gift being accepted for this initiative is $5,000. All checks received that are designated for this initiative in an amount less than $5,000 will be paid into Tau Beta Pi's annual fund which supports the same programs as the initiative.

HOW YOU CAN HELP:
There are a number of ways to support this initiative. Checks can be made to: Tau Beta Pi – The Engineering Honor Society Attention: Curtis Gomulinski, Executive Director, P.O. Box 2697, Knoxville, TN 37901-2697. Other options include gifts of highly appreciated stock held for over one year as well as matching gifts, IRA rollover gifts, and including Tau Beta Pi in your estate plans.

TAX-DEDUCTIBLE:
Gifts through this initiative will be reflected in an individual's total giving to TBΠ. As a non-profit organization, we are exempt from federal income taxes under Section 501(c)(3) of the Internal Revenue Code. Your gift is tax-deductible to the full extent allowed by law.

THE CHAPTER ENDOWMENT INITIATIVE:
You can learn more about the progress and developments of the CEI on our website, *www.tbp.org/?CEI* or by contacting Director of Development Sherry Jennings-King, *TN Alpha '93*, by phone at **(612) 226-2922** or by email at tbp.development@tbp.org.

Newly Received Gifts & Pledges

Michigan Gamma Chapter
MICHIGAN GAMMA — $100,000
University of Michigan

Robert R. Bailey, *TX E '70*
TEXAS EPSILON — $20,000
University of Houston

Charles E. Cancilla, *CA Z '59*
CALIFORNIA ZETA — $16,000
Santa Clara University

Richard J. Kisloski, *VT B '67*
VERMONT BETA — $15,000
Norwich University

John Fritz Angle, M.D., *NY Δ '82*
NEBRASKA ALPHA — $10,000
University of Nebraska-Lincoln

Roy Franklin Quick Jr., *MA B '70*
MASSACHUSETTS BETA — $10,000
Massachusetts Institute of Technology

James B. Planeaux, Ph.D., *IN Γ '82*
ALABAMA DELTA — $5,000
University of Alabama in Huntsville
MINNESOTA ALPHA — $5,000
University of Minnesota-Twin Cities

Murray E. Rudin, J.D., *NY K '83*
NEW YORK KAPPA — $7,500
University of Rochester

Thomas A. Clewett, *IL B '88*
ILLINOIS BETA — $5,000
Illinois Institute of Technology

Kathleen L. Colbry, Ph.D., *MI A '99* **& Dirk J. Colbry, Ph.D.,** *MI A '06*
MICHIGAN ALPHA — $5,000
Michigan State University

Robert S. Egerman, M.D., *LA B '83*
LOUISIANA BETA — $5,000
Tulane University

Kevin C. Foye, Ph.D., P.E., *WI E '01*
WISCONSIN EPSILON — $5,000
University of Wisconsin-Platteville

Robert R. Holmen, *CA Γ '85*
CALIFORNIA GAMMA — $5,000
Stanford University

Irwin M. Jacobs, Sc.D., *NY Δ '56*
CALIFORNIA PSI — $5,000
University of California, San Diego

†**Howard E. Jessen,** *CA B '46*
CALIFORNIA BETA — $5,000
California Institute of Technology

Michael & Tina Pierce, *CO A '90* and *'89*
COLORADO ALPHA — $5,000
Colorado School of Mines

Barbara & †**Ralph A. Rockow,** *OH Γ '58*
ANY CHAPTER — $5,000

Jay A. Rushing, Ph.D., *TX Δ '76*
TEXAS DELTA — $5,000
Texas A&M University

Bobby S. Shackouls, *MS A '72*
MISSISSIPPI ALPHA — $5,000
Mississippi State University

Jonathan S. Smalley, Ph.D., *OH I '71*
OHIO IOTA — $5,000
Ohio Northern University

Peter H. Soderberg, *CT A '68*
INDIANA BETA — $5,000
Rose-Hulman Institute of Technology

Frederick "Larry" Stiles, *TN A '71*
TENNESSEE ALPHA — $5,000
University of Tennessee

James C. Williams, Ph.D., P.E., *NM B '76*
TEXAS ETA — $5,000
University of Texas at Arlington

Anonymous, *GA A '78*
GEORGIA ALPHA — $5,000
Georgia Institute of Technology

Anonymous, *MA B '67*
MASSACHUSETTS BETA — $5,000
Massachusetts Institute of Technology

Anonymous, *RI B '81*
RHODE ISLAND BETA — $5,000
University of Rhode Island

The goal of this initiative is to endow all collegiate chapters to provide permanent funding for the activities that benefit the students of those chapters. Chapters with support above $80,000 are eligible to receive grants to support their activities; Headquarters will contact the chapters once funding is available. In addition to the chapters listed on the previous page, as of January 31, 2024, the Association has received cash and pledges totaling less than $100,000 for each of the 87 chapters listed below.

ALABAMA ALPHA
$5,000
ALABAMA GAMMA
$35,000
ALABAMA DELTA
$5,000
ALABAMA EPSILON
$5,000
ARIZONA ALPHA
$5,000
ARIZONA BETA
$10,000
ARKANSAS ALPHA
$5,000
CALIFORNIA ALPHA
$50,000
CALIFORNIA BETA
$40,084
CALIFORNIA GAMMA
$72,000
CALIFORNIA ZETA
$31,000
CALIFORNIA ETA
$35,000
CALIFORNIA LAMBDA
$5,000
CALIFORNIA MU
$5,000
CALIFORNIA NU
$5,000
CALIFORNIA TAU
$5,000
CALIFORNIA PSI
$30,000
COLORADO ALPHA
$50,000
COLORADO BETA
$20,000
DELAWARE ALPHA
$10,000
D.C. ALPHA
$5,000
FLORIDA ALPHA
$5,000
FLORIDA EPSILON
$5,171
GEORGIA ALPHA
$55,886
ILLINOIS BETA
$5,000
ILLINOIS GAMMA
$30,857
INDIANA ALPHA
$45,000
INDIANA BETA
$10,000
INDIANA EPSILON
$30,000
IOWA BETA
$35,000
KANSAS BETA
$5,000
LOUISIANA BETA
$5,000
LOUISIANA EPSILON
$10,000
MARYLAND GAMMA
$10,000
MARYLAND EPSILON
$5,000
MASSACHUSETTS BETA
$85,000
MICHIGAN ALPHA
$50,000
MICHIGAN ETA
$5,075
MICHIGAN IOTA
$8,040
MICHIGAN LAMBDA
$5,000
MINNESOTA ALPHA
$25,000
MONTANA ALPHA
$5,000
NEBRASKA ALPHA
$40,000
NEW HAMPSHIRE BETA
$10,200
NEW MEXICO BETA
$5,000
NEW YORK BETA
$73,707
NEW YORK ETA
$5,000
NEW YORK THETA
$15,000
NEW YORK KAPPA
$27,571
NEW YORK MU
$15,000
NEW YORK NU
$5,000
NEW YORK RHO
$5,725
OHIO DELTA
$35,000
OHIO IOTA
$5,000
OHIO MU
$5,000
OKLAHOMA GAMMA
$5,000
OREGON ALPHA
$10,000
PENNSYLVANIA BETA
$40,000
PENNSYLVANIA GAMMA
$5,000
PENNSYLVANIA DELTA
$5,000
PENNSYLVANIA ZETA
$10,000
PENNSYLVANIA ETA
$10,000
PENNSYLVANIA THETA
$50,000
PENNSYLVANIA LAMBDA
$25,000
PUERTO RICO ALPHA
$10,000
RHODE ISLAND ALPHA
$20,000
RHODE ISLAND BETA
$20,000
TENNESSEE ALPHA
$90,000
TENNESSEE BETA
$10,000
TEXAS ALPHA
$21,240
TEXAS GAMMA
$5,000
TEXAS DELTA
$30,000
TEXAS EPSILON
$25,000
TEXAS ZETA
$10,000
TEXAS ETA
$5,000
TEXAS THETA
$5,000
TEXAS IOTA
$5,000
TEXAS KAPPA
$5,000
TEXAS NU
$40,031
VERMONT ALPHA
$5,000
VERMONT BETA
$15,000
VIRGINIA BETA
$75,069
WASHINGTON ALPHA
$20,000
WISCONSIN ALPHA
$53,120
WISCONSIN BETA
$5,000
WISCONSIN GAMMA
$5,000
WISCONSIN EPSILON
$5,000
ANY CHAPTER
$45,000

Current Endowed Chapters (29) with $100,000 or more in cash and pledges:

CALIFORNIA DELTA
Univ. of Southern California
$100,000
CALIFORNIA EPSILON
Univ. of California, Los Angeles
$100,000
CALIFORNIA UPSILON
Calif. State Univ., Sacramento
$100,000
COLORADO ZETA
U.S. Air Force Academy
$100,000
FLORIDA GAMMA
Univ. of South Florida
$105,000
ILLINOIS ALPHA
Univ. of Illinois at Urbana-Champaign
$187,520
INDIANA GAMMA
Univ. of Notre Dame
$125,000
IOWA ALPHA
Iowa State Univ.
$110,289
LOUISIANA ALPHA
Louisiana State Univ.
$100,000
MARYLAND BETA
Univ. of Maryland
$135,000
MICHIGAN BETA
Michigan Tech. Univ.
$100,000
MICHIGAN GAMMA
Univ. of Michigan
$204,912
MICHIGAN EPSILON
Wayne State Univ.
$250,000
MICHIGAN ZETA
Kettering Univ.
$100,000
MISSISSIPPI ALPHA
Mississippi State Univ.
$115,000
MISSOURI BETA
Missouri Univ. of Science & Technology
$100,000
NEW JERSEY ALPHA
Stevens Institute of Tech.
$100,228
NEW JERSEY DELTA
Princeton Univ.
$100,000
NEW YORK GAMMA
Rensselaer Polytechnic Inst.
$100,000
NEW YORK DELTA
Cornell Univ.
$105,000
OHIO ALPHA
Case Western Reserve Univ.
$100,000
OHIO BETA
Univ. of Cincinnati
$100,000
OHIO GAMMA
Ohio State Univ.
$100,000
OHIO EPSILON
Cleveland State Univ.
$100,000
SOUTH DAKOTA ALPHA
South Dakota School of Mines & Technology
$204,675
TEXAS BETA
Texas Tech Univ.
$100,113
VIRGINIA ALPHA
Univ. of Virginia
$115,000
WEST VIRGINIA BETA
West Virginia University Institute of Tech.
$108,000
WYOMING ALPHA
Univ. of Wyoming
$100,000

Michigan Gamma

established in 1906

Endowment for the Michigan Gamma Chapter at the University of Michigan

In June 2016, the Michigan Gamma Chapter of Tau Beta Pi decided to join alumni across the country and support the effort to endow the Association's activities that support all 255 active student chapters — by endowing *themselves* at the level of $100,000. Encouraged by the support of an anonymous donor who stepped forward in May 2015 with a gift of stock to kick-start support of their chapter through the Chapter Endowment Initiative (CEI), the MI Gamma collegiate officers and advisors stepped forward to meet the challenge. In November 2022, the burgeoning prosperity of the chapter coming out of the COVID-19 pandemic allowed the officer corps to consider the question of how to be the best stewards of their assets. They chose to *re-endow* the chapter's CEI fund with an additional $100,000, making MI G the first and only chapter to endow themselves and thus the first chapter to re-endow with a second $100,000 contribution to their own CEI fund.

While the overwhelming majority of collegiate chapters do not have the financial capacity to do the same, raising funds through initiation fees and small events, MI Gamma is in a different position. Over the last 37 years, the chapter has become known on campus via a career fair hosted in partnership with the local section of the Society of Women Engineers (SWE). By far the chapter's largest event, the SWE/TBΠ Fall Engineering Career Fair functions as a service to the campus, a publicity opportunity, and a bountiful fundraiser.

The fair was first mentioned in the 1983–84 Chapter Survey. The project description indicates that the idea of the career fair evolved from an annual industry banquet that SWE and TBΠ had organized in previous years. Over the next two years, the chapter developed the idea further. The first fair was held on January 20, 1986. It hosted only 19 companies and provided little (if any) income for the chapter. Prior to the pandemic, the event had grown to host nearly 350 companies, and the proceeds grew accordingly.

Now that recruiting is back to having a large in-person component, TBΠ and SWE at the University of Michigan (UM) have rebuilt the career fair, with 289 companies attending in 2023. In large part due to the success of the fair, MI Gamma has found itself to be on exceptionally sound economic footing. Thanks in large part to generous donations made by alumni to celebrate the chapter's centennial anniversary, the chapter created an endowment with the UM that supports chapter service projects and annually funds $20,000 in scholarships to deserving engineering students.

In early 2014, the chapter's Advisory Board focused on reducing the risk of relying on one event for funding, as well as considered the resources consumed from the Association such as Convention travel and chapter support from HQ staff. In October 2015, the chapter officers voted unanimously to authorize the creation of the MI G endowment in the CEI fund, to provide the initial $100,000 contribution, and to make additional contributions as chapter finances allow. The career fair revenue is approaching pre-pandemic levels, so the chapter officers decided to make this second major contribution to convert it from cash to a predictable revenue stream for many years to come.

In 2017, **Michael J. Hand III,** *MI G'11*, now a TBΠ Executive Councillor, noted: "I had the fortune to be involved in the planning and decision making for the MI Gamma endowment from the beginning. While the process was far from straightforward, it was extremely rewarding to know that I was helping to ensure the financial future of the Association, as a whole, and of the chapter in particular, all while also being a part of an unprecedented effort in the organization. While the officers specifically involved in the effort deserve a great deal of credit, it would not have been possible without the work put in by every MI Gamma initiate over the last 30+ years helping pave the way for the current success that the chapter enjoys. I look forward to seeing the Chapter Endowment Initiative continue to grow, both for Michigan Gamma and other chapters across the Association."

Kyle A. Lady, *MI G'10*, MI Gamma Chapter Chief Advisor shares, "The pandemic highlighted the risk of relying on one source of income. The CEI fund enables donors to set their chapters up for a more predictable financial future. I'd like to thank all CEI donors for investing in the Association's future."

Portions of this article were contributed by **Elson Y. Liu, Ph.D.,** *AZ A '02*, MI G Chapter president (Fall 2006), Advisor 2007-14, and current District 15 Director; **Mike Hand** MI G Chapter president (Fall 2012), Advisor 2012-16, District 7 Director 2016-22, and current TBΠ Treasurer; and **Kyle Lady** MI G Advisor 2013-present and Ann Arbor Area Alumni Chapter President.

The STORY BEHIND The PHOTO

Announcing the Spring 2024 "Caption This Photo" Contest!

From the photo archives of the 1997 Convention held in Minneapolis, MN, we found an entertaining picture of two Engineering Futures Facilitators engaged in a friendly arm wrestling match. Matthew W. Ohland, Ph.D., *FL A '96,* is on the left and Gary W. Keylon, *TN Z '92,* is his worthy opponent.

How to Enter: Send us your witty caption(s) for this photo from Convention archives. If the judges vote yours as one of the top three (and you have not been a previous winner), **we'll send you a ΤΒΠ t-shirt of your choice!**

Submit your entry using this form: *www.tbp.org/?CaptionSub* or mail to *The Bent* of Tau Beta Pi, Caption Contest, P.O. Box 2697, Knoxville, TN 37901-2697.

DEADLINE: WEDNESDAY, MAY 1, 2024 5 P.M. [ET]

Questions? Contact *p.mcdaniel@tbp.org*

WINNERS of the Winter 2024 "Caption This Photo" Contest:

We received a whopping 112 entries (which includes 20 of the same caption) from 56 members for this contest. You can read all entries, including captions and results from recent contests, at ***tbp.org/pubs/captionContest.cfm***.

1ST PLACE: TIE

"Can you hear me now?"

Carter I. Allen, *MO B '25*
(the first to submit this caption from a field of 20 identical entries!)

1ST PLACE: TIE

"Well, there goes my 'I'll pretend I can't hear her plan."

Holly Beth Knight, *FL Q '99*

2ND PLACE:

"Menna, whispering through a bullhorn isn't going to get the job done."

Yash Nilesh Shah, *CA Y '23*

3RD PLACE: TIE

"You're gonna need a bigger bullhorn!"

Wayne B. Paugh, *FL G '93*

3RD PLACE: TIE

"I am a Tau Bate, hear me roar!"

Yi-Hsien Doo, *MI Z '81*

THANKS FOR THE GREAT ENTRIES!

▲ The Winter 2024 contest image (above) was taken at the 2023 Convention in Atlanta, GA. Here are Executive Councillor Menna M. Youssef, Ph.D., *VA G '04,* (left) and Director of the District Program, Stacey L. Forkner, *WI A '96*, practicing to herd members into place for the group photo.

Three Letter Acronyms: TLAs in Use These Days

BY ARTHUR T. JOHNSON, Ph.D., P.E.
MARYLAND BETA '64

WHY 3-LETTER ACRONYMS

Three Letter Acronyms (TLAs) are very popular and can be found in almost everything written or spoken these days. Why? Perhaps it is because we are busy, lazy, or maybe there is just a fascination with things that come in threes. Most likely, we write or speak in TLAs because it makes our language more efficient at conveying information with the least possible cost. TLAs transform largely redundant information into a more expeditious form.

ACRONYMS VS ABBREVIATIONS

The dictionary defines an acronym as an abbreviation usually comprising the first letters of the words making up the name to be abbreviated. An acronym is to be distinguished here from an ordinary abbreviation that might contain letters from anywhere in the word to be abbreviated; these letters usually convey the important sounds of the original word. An acronym usually does not abbreviate just one word, nor does it hint to the sounds of the words abbreviated.

An acronym is usually composed of all upper-case letters, whereas an abbreviation may contain both upper-case and lower-case letters. Thus, Cpl (Corporal), Inc (Incorporated), and Sgt (Sergeant), are three letter abbreviations, but LLC (Limited Liability Corporation), MLB (Major League Baseball), NBC (National Broadcasting Corporation), NYC (New York City), and SLC (Salt Lake City), are all TLAs. Some places are known by three-letter abbreviations, not properly acronyms, such as ATL (Atlanta), CLE (Cleveland), and STL (Saint Louis).

There are certainly acronyms of less than three letters or more than three letters, but there seems to be a certain allure of the number three. The preference for three letter acronyms over other combinations is very strong. An example of this is the acronym for age-related macular degeneration, a disease of the eye. Age-related macular degeneration could have been known as ARMD, but instead has been given the acronym of AMD.

THE LURE OF THREES

There is something appealingly special about things that come in threes. A three-legged stool is more stable on uneven ground than a stool with fewer or more legs; the length of a leg of a triangle can always be found from the dimensions of the other two, the Christian Holy Trinity comprises three members; and bad luck events are said by some to come in threes. In music, there is often an evenly-spaced three note modulation when changing keys. The transition between verses and choruses, or from line to line, is often made with a three note run (for example, in Neil Diamond's song, "Sweet Caroline," the words of the first line go, "sweet caroline ..." and then there is an unforgettable three note "bum, bum, bum" before the second line, "good times never seemed so good"). In sports, we have notable happenings in a "hat trick" for three goals made by the same player in a single game, a "trifecta," which is a bet in which the person placing the bet forecasts the first three finishers in a

horse race in the correct order, and a "threepeat" when consecutive championships are won three at a time. In baseball, a batter is entitled to three strikes before being called out. In basketball, an important statistic is the "triple double," or a score in a game of at least ten points, ten rebounds, and ten assists by a single player. In comedy, there is a Rule of Three, where a humorous one-liner is made up of two normal elements with an additional unexpected or exaggerated third element (as with the Amy Schumer 2017 quip, "This past year I've gotten very rich, famous, and humble." The first two elements set up a pattern that is upset by the third, and adds the humor.)[1]

We even have special words for collections of three, such as "trilogy" for three writings and "triptych" for three pieces of art. There are many three-step processes for problem-solving, composed of recognition, diagnosis, and remediation. We have a saying that the "third time is the charm." Most Americans have three names, and some former Presidents were best known by their three-letter initials (FDR, DDE, JFK, etc.).

Three-word names and phrases are also popular. The appeal of three things extends even to political and commercial slogans. These phrases are always words, not TLAs, but comprising three words makes them easy to remember and particularly effective.[2345] Many of these three-word slogans have passed easily into the vernacular without recognizing their original sources. Some of these are: "Black Lives Matter" (also with a TLA – BLM), "Breakfast of Champions" (Wheaties cereal), "E Pluribus Unum" (Latin for "Out of many, one," slogan of the USA), "I'm Lovin' It" (McDonalds), "Imagination at Work" (General Electric), "Just Do It" (Nike athletic apparel), "Just Say No" (1970s anti-drug slogan), "King of Beers" (Budweiser), "Peace with Honor" (Vietnam War slogan), "Read My Lips" (President G.H.W. Bush), "Remember the Alamo" (from the Mexican- American War, 1846), "Yes We Can" (Obama political slogan), and "We Try Harder" (Avis car rental).

THREE SYLLABLES

And, is it just coincidence that commercial (as opposed to chemical) names of drugs and medicines most often contain three syllables? Or, were they purposefully constructed to make them especially easy to remember? Some of these are: Adderall (for ADHD/concentration), Ajovy (migraine headaches), Allegra (allergy), Aspirin (pain), Aveeno (dry skin), Benicar (blood pressure), Biktarvy (HIV treatment), Caplyta (depression), Claritin (allergies), Cosentyx (psoriasis), Demadex (diuretic), Dupixent (asthma, eczema), Eliquis (anticoagulant), Enduron (diuretic), Entresto (heart failure), Farxiga (kidney disease), Fentenyl (pain), Humira (rheumatoid arthritis), Hygroton (diuretic), Keytruda (cancer), Monopril (blood pressure), Mucinex (congestion), Nembutal (sedative), Nexium (acid reflux), Nutrafol (hair health), Prevagen (memory loss), Prilosec (acid reflux), Saxenda (weight loss), Skyrizi (Crohn's disease), Solara (diabetes), Sotyktu (psoriasis), Tylenol (pain), Vabysmo (diabetic macular edema), Valium (anxiety/depression), Warfarin (anticoagulant), and Wegovy (weight loss). And the list goes on. The process that is used to name new medicines and drugs is largely opaque, but all these, and many more, medicines seem to resolve to be easily-remembered three syllable names. Three things seem to be especially easy to verbalize and to remember. So, that might explain why names, phrases, and acronyms of three elements are so popular, at least in American English language.

PERSONAL TLA

This tendency toward three words that lend themselves to become three letter acronyms has special meaning in my career. The Airflow Perturbation Device (APD) is an instrument for noninvasive measurement of respiratory resistance.[6] I invented the APD (**Figure 1**) and have used a good part of my career to develop it further and use it to research respiratory responses to various respiratory challenges. Along the way, a number of graduate students helped immensely toward these goals.

For years after the conception of the APD, we called it a "Perturbation Device," without the "Airflow." That is, there was a graduate student of mine (Chin-Shing Lin) who started calling it an APD,[7] which is much easier to say than "perturbation device." The TLA stuck, and it has been known as an APD ever since.

EXAMPLES OF TLAS

The following lists of TLAs illustrate how much have permeated our speech. TLAs in each paragraph are given alphabetically as much as possible, with the exception of TLAs appearing within parentheses.

TLAs in common use by the general public might include ABS (Anti-lock Braking System for vehicles), APR (Annual Percentage Rate), ATM (Automated Teller Machine), ATV (All Terrain Vehicle), AWD (All Wheel Drive), BAE (Before Anyone Else), BCC (Blind Carbon Copy, secretly sending an email), BLT (Bacon, Lettuce, and Tomato sandwich), CDL (Commercial Driver's License), CEO (Chief Executive Officer), CMA (Country Music Association), CSI (Crime Scene Investigation), DOA (Dead On Arrival), DUI (Driving Under the Influence of an intoxicant), DVD (Digital Video Disk), EDT (Eastern Daylight Time), and its counterparts, FYI (For Your Information), GHG (Green House Gases), GMA (Good Morning America, a television program), GMO (Genetically Modified Organism), HOV (High Occupancy Vehicle highway lane), IRA (Individual Retirement Account, or Inflation Reduction Act), IRS (Internal Revenue Service), KIA (Killed In Action),

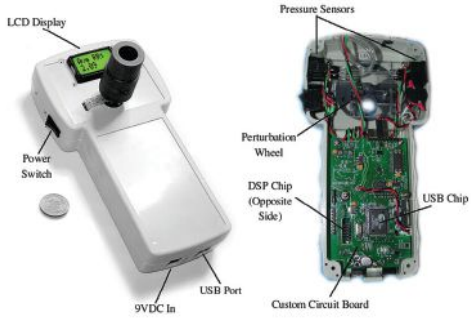


Figure 1. (Left) Picture of the Airflow Perturbation Device (APD); (Right) Picture showing the front cover of the APD removed with some of the internal components exposed.

MIA (Missing In Action), NAE (No Antibiotics, Ever, for poultry raised for human consumption), NCO (Non-Commissioned Officer), NLT (No Later Than), OEM (Original Equipment Manufacturer), OJT (On-the-Job Training), PAC (Political Action Committee), POA (Power Of Attorney), POV (Privately Owned Vehicle, or Point Of View), PYO (Pick Your Own), RDA (Recommended Dietary (or Daily) Allowance), SNL (Saturday Night Live, television program), SOB (Son Of a B****), SOP (Standard Operating Procedure), SOS (Save Our Ship), SSN (Social Security Number), SUV (Sport Utility Vehicle), TBA (To Be Announced), TED (Technology, Entertainment, Design), UFO (Unidentified Flying Object), USB (Universal Serial Bus – a bus is an electrical connection line), and VIP (Very Important Person).

COMMON TLAS

TLAs that might be used under special circumstances include: ADP (Automated Data Processing), ADU (Accessibility Dwelling Unit), APB (All Points Bulletin, a police call), ASL (American Sign Language), BSO (Baltimore Symphony Orchestra), CGI (Computer Generated Image), CIP (Clean In Place), CPU (Central Processing Unit), CRP (Conservation Reserve Program, for farms), CSA (Community Supported Agriculture), DAV (Disabled American Veteran), DSP (Digital Service Provider, supplies Internet service), EDP (Electronic Data Processing), ESL (English as a Second Language), ETO (European Theater of Operations, during World War II), EVA (Extra Vehicular Activity, NASA's term for a space walk), FOB (Freight On Board), GIF (Graphics Interchange Format), GMT (Greenwich Mean Time, where Earth's day begins), IAQ (Indoor Air Quality), IED (Improvised Explosive Device), IPO (Initial Public Offering, of stocks on the stock market), ISO (In Search Of, in personal ads), JIT (Just In Time supply and inventory control), LTE (Long Term Evolution, new cell phone technology giving improved downloading capabilities), NDA (Non-Disclosure Agreement), NFT (Non-Fungible Token, for a digital creation), NYT (*New York Times*), OBO (Or Best Offer) OED (*Oxford English Dictionary*), OFM (Oriental Fruit Moth), OSB (Oriented Strand Board, engineered wood product), PDF (Portable Document Format), PWM (Pulse Width Modulation, means of electromechanical control), RIF (Reduction In Force), RMD (Required Minimum Distribution), SPR (Strategic Petroleum Reserve), SRO (Standing Room Only), SWD (Spotted Wing Drosophila), and URL (Uniform Resource Locator).

NEW TLAS

The tendency for brevity while texting has spawned many new TLAs. Some of these are: BTW (By The Way), IMO (In My Opinion), LOL (Lots of Love, or Laughing Out Loud), OMG (Oh My Gosh), PDA (Public Display of Affection), TBH (To Be Honest), and TMI (Too Much Information). The three-letter extension domain names for web addresses, such as .com, .edu, and .org are not really TLAs; they are more often arbitrary abbreviations that may or may not be based on organizational names.

SPORTS TLAS

In sports, many TLAs are used: EPL (English Premier League, football), ERA (Earned Run Average for pitchers, or Equal Rights Amendment — U.S. Constitution), MMA (Mixed Martial Arts), MLS (Major League Soccer — USA), MVP (Most Valuable Player), NBA (National Basketball Association), NFL (National Football League), NHL (National Hockey League), NIL (Name, Image, and Likeness for college athletes' business opportunities), OTA (Organized Team Activities, football), OTB (Off Track Betting), PGA (Professional Golfers' Association, WWE (World Wrestling Entertainment). The three letter "LIV" in golf is an interesting one; it is not a TLA. Instead, LIV golf is a Saudi Arabian-sponsored professional golf tour, and according to the Internet, the name refers to the Roman numerals for 54, the score if every hole on a standard LIV event par-72 course were birdied.

GOVERNMENT TLAS

Many governmental offices and agencies are known best by their TLAs, including, but not limited to BLM (Bureau of Land Management), CDC (Centers for Disease Control), CIA (Central Intelligence Agency), CPS (Child Protective Services), DMV (Department of Motor Vehicles), DOL (Department of Labor), EEC (European Economic Community), EPA (Environmental Protection Agency), FAO (Food and Agriculture Organization of the United Nations), FBI (Federal Bureau of Investigation), FDA (Food and Drug Administration), FWS (U.S. Fish and Wildlife Service), GAO (Government Accountability Office), HOA (Home Owners Association), HUD (Housing and Urban Development), ICC (International Criminal Court), ILO (International Labor Organization), IMF (International Monetary Fund), IOM (Institute of Medicine), ISA (International Seabed Authority), MTA (Mass Transit Authority or Metropolitan Transit Authority), NAE (National Academy of Engineering), NAM (National Association of Manufacturers), NAS (National Academy of Science), NGO (Non-Governmental Organization), NOP (National Organic Program), OPD (Office of the Public Defender), PSC (Public Service Commission), TSA (Transportation Safety Authority), and WHO (World Health Organization).

Laws and governmental programs often go by their TLAs as a means to avoid having to articulate, or even remember, their full names. ACA (Affordable Care Act, also known as "Obamacare"), ADA (Americans with Disabilities Act), CPI (Consumer Price Index), DEI (Diversity, Equity, and Inclusion), EEO (Equal Employment Opportunity, or the related EOE, Equal Opportunity Employer), GDP (Gross Domestic Product), and its counterpart, GNP (Gross National Product), GPS (Global Positioning Satellite), KGB (Komitet Gosudarstvennoy Bezopasnosti, the security agency for the Union of Soviet Socialist Republics), MOU (Memorandum of Understanding), MPA (Marine Protected Area), PSA (Public Service Announcement), RFS (Renewable Fuel Standard), SDI (Strategic Defense Initiative), SSA (Social Security Administration), TVA (Tennessee Valley Authority), VAT (Value Added Tax), WIC (Women, Infants, and Children supplemental nutrition program) and WPA (Works Progress Administration, New Deal program) are among these.

Figure 2.
GMO (Genetically Modified Organism).

Figure 3.
NHL (National Hockey League).

MEDICAL TLAS

Medical TLAs provide shortcuts for busy healthcare personnel; some have been made popular by television commercials selling medicines for such conditions. Some are ACE (Angiotensin Converting Enzymes), ACL (Anterior Cruciate Ligament), AED (Automated External Defibrillator), ALS (Amyotrophic Lateral Sclerosis, or Lou Gehrig's disease), HIV (Human Immunodeficiency Virus), BMI (Body Mass Index), BSE (Bovine Spongiform Encephalopathy, or mad cow disease), CAT (Computed Axial Tomography), CBD (Cannabidiol, a component of marijuana and hemp). CPR (Cardiopulmonary Resuscitation), CTE (Chronic Traumatic Encephalopathy, a brain condition linked to head injuries), DNA (DeoxyriboNucleic Acid, the basis of the genome), ECG (ElectroCardioGram, and its German counterpart, EKG), EMT (Emergency Medical Technician), EOC (Evidence of Coverage, Medicare), FEV (Forced Expiratory Volume), FSH (Follicle stimulating Hormone), HMO (Health Maintenance Organization), HRT (Hormone Replacement Therapy), IBS (Irritable Bowel Syndrome), ICU (Intensive Care Unit), IIT (Integrated Information Theory), IUD (IntraUterine Device), IVF (InVitro Fertilization), and LSD (Lysergic Acid Diethylamide, also referred to as "acid"). The acronym GAA is an interesting one, because it is backwards, standing for the enzyme Acid Alpha-Glycosidase.

COMPANY TLAS

Companies, corporations, and other organizations are often known by their TLAs. AAA (American Automobile Association), ABC (American Broadcasting Company), ADT (American District Telegraph, home security), AFL (American Federation of Labor), AOL (America OnLine), BET (Black Entertainment Television), BMW (Bavarian Motor Works), CBS (Columbia Broadcasting System), CIO (Congress of Industrial Organizations), ILA (International Longshoremen's Association), IOC (International Olympic Committee), LFO (Lyle Funky Ones, a 90s boy band), KFC (Kentucky Fried Chicken), MTV (Music Television), NJM (New Jersey Mutual insurance company, or, according to their slogan, "No Jingles or Mascots"), NPR (National Public Radio), PBS (Public Broadcasting System), RCA (Radio Corporation of America), TBS (Turner Broadcasting Service), TWA (Trans World Airlines), UPS (United Parcel Service), and USS (United States Steel).

OTHER TLAS

The tourist attraction Disneyland; energy giant Exelon; the furniture manufacturer La-Z-boy; Internet entertainment site Pandora; and the automaker Subaru, do not need TLAs because their names have the preferred three syllables.

Many colleges and universities, especially ones with "State" in their names, are well known by their TLAs: BYU (Brigham Young University), LSU (Louisiana State University), OSU (Ohio State University, or Oklahoma State University), MTU (Michigan Technical University), UMB (University of Maryland at Baltimore), and VMI (Virginia Military Institute).

Some academic degrees are known best by their acronyms: MBA (Master of Business Administration), MFA (Master of Fine Arts), and PhD (Doctor of Philosophy, but not truly an acronym in the same sense).

Not included here are various academic, honorary, fraternal, and sorority organizations that have three letter acronyms, but the three letters are just anglicized versions of the Greek letters that make up their full names. Some examples are TBP (Tau Beta Pi), PBK (Phi Beta Kappa), DDD (Delta Delta Delta), and AGR (Alpha Gamma Rho).

Devices and materials are often known by their TLAs: ABM (Anti-Ballistic Missile), CFC (Chlorinated FluoroCarbon), CRT (Cathode Ray Tube), DVR (Digital Video Recorder), IoT (Internet of Things), LED (Light Emitting Diode), MOS (Metal-Oxide-Semiconductor, or Military Occupational Specialty), NPK (Nitrogen, Phosphorus, and Potassium, chemically identified as K, fertilizer), PFA (Per- & PolyFluoroAlkyl substances, better known as "forever chemicals," or, legally, Protection From Abuse orders), SAM (Surface-to-Air Missile), TNT (TriNitro Toluene), and VOC (Volatile Organic Compound). There is even a double TLA in the electronics field: MOS FET (Metal Oxide Semiconductor Field Effect Transistor), pronounced "moss fet," just like it is spelled.

Some of these TLAs, as with many others, are used so commonly that they are not defined when they appear in written form or when spoken to others; the reader or listener is expected to know what they mean without a definition. Interpretation is context-driven, especially when there are several possible meanings for the TLA used. The exact meaning of a TLA may depend on the audience to which the TLA use is directed. The meaning of TLC is Tender Loving Care in everyday use, but TLC can mean Total Lung Capacity in a

Continues on page 44.

BRAIN TICKLERS

Results From Fall

Perfect Scores

*Couillard, J. Greg	IL	A	'89
*Gibbs, Ken P.	MO	Γ	'76
*Griggs Jr., James L.	OH	A	'56
*Hoffman, Donald E.	IN	B	'78
*Kimsey, David B.	AL	A	'71
*Kuhn, Walter A.	OH	A	'81
*Murray, Alan G.	CA	B	'84
*Norris, Thomas G.	OK	A	'56
*Sisco, Michael D.	WI	A	'91
*Slegel, Timothy J.	PA	A	'80
*Spong, Robert N.	UT	A	'58
*Squire, James C.	VA	Δ	'89
*Strong, Michael D.	PA	A	'84
*Tang, Angela L.	NY	Δ	'18
Voellinger, Edward J.	Non-member		

Other

*Bannister, Kenneth A.	PA	B	'82
Bertrand, Richard M.	WI	B	'73
Braña-Mulero, Francisco	PR	A	'74
*Chatcavage, Edward F.	PA	B	'80
Cross, Harry L.	MI	Γ	'65
*Golemme, Steven S.	IL	A	'20
Goodrich, Robert W.	CA	B	'81
Hesner, Edwin L.	WA	B	'74
Johnson, Roger W.	MN	A	'79
Jordan, R. Jeffrey	OK	Γ	'00
Lalinsky, Mark A.	MI	Γ	'77
Marks, Lawrence B.	NY	I	'81
Marks, Benjamin	Son of member		
Ross, Bradley A.	PA	Δ	'74
Routh, Andre G.	FL	B	'89
Rowland, Ralph W.	MD	B	'51
*Schwam, Susan E.	WA	A	'88
Schwam, Freely	Member Spouse		
Summerfield, Steven L.	MO	Γ	'85
*Sylvester, Noah	Son of member		
Szostek, Reneé	MI	A	'87
Zison, Stanley W.	CA	Θ	'83

*Denotes correct bonus solution

Fall Review

Most problems had 87 percent or better correct answers. However, problem #3 (clock hands) was the most missed, getting only 80 percent correct; we accepted (as correct) answers with just one of the two times where the hands have minimum separation.

Winter Answers

1: The probability of winning is **2/3**. There are three possibilities for the first draw: 1/9 of the time the center square will be drawn, 4/9 of the time a corner square will be drawn, and 4/9 of the time one of four outside squares that is not a corner (referred to as an edge) will be drawn. A little experimentation will show that if the first player draws the center square he will find himself unable to win whenever the second player draws one of the four corners, but will be able to win if the second player draws one of the four edges. Hence, the probability of winning after drawing the center square is 4/8. Similarly, if the first player draws a corner he can win if his opponent draws any of the eight remaining squares except the center; he cannot win if the opponent draws the center square. Hence, the probability of winning after drawing a corner is 7/8. Finally, if the first player draws an edge he will find himself unable to win if the second player draws one of the four squares that block either the row or the column of his initial draw, but will be able to win the game if his opponent draws any of the other four squares. Hence, the probability of winning after drawing an edge is 4/8. Summarizing the possible outcomes, the overall probability of a win is $1/9\times4/8+4/9\times7/8+4/9\times4/8 = 2/3$.

2: **Captain Z of the Bass is #1, Captain T of the Gar is #2, Captain W of the Hammerhead is #3, Captain Y of the Dogfish is #4, Captain X of the Coho is #5, Captain S of the Eel is #6, Captain V of the Flounder is #7, and Captain U of the Albacore is #8**. From rule I, A was not 1, 2, 3, or 7 and was not under Capt. S, who was not 7 or 8. From rule II, H was not first, and T was not last. From rule IV, U was not first and V was not last. From rule V, X was not D, E, first, or last. From rule VII, the captain of ship 2 cannot be S, Y, or Z. From rules VII and VIII, neither F nor the captain of ship 1 can be T or W. Further logic analysis implies W can't be 5 and H can't be 4. S and Y can't be C because they are not 5th. From rule II, since T cannot be 1 or 4, W and H cannot be 2 or 5. From rule IV, since V cannot be 4, U cannot be 5 or C. From rule V, since D is not 5, X cannot be 6 and E cannot be 7. Since E is not 5, X cannot be 4 and D cannot be 3. From rule I, since A is not 5, S is not 3 and must be 6. A is therefore 8. From rule II, since W can't be 8, T, V, X, and Y can't be 4. T is therefore 2, and W and H must be 3. We can deduce F and B are not 2 and T is not C. This implies that U must be 8, and V must be 7, so X is 5 and Z is 1. It follows that U is A, X is C, and V is not E. D is 4 and Y and E is 6. This forces F to be V and 7, B is Z and 1, and T is G and 2.

3: The areas of each region from largest to smallest is **A>C=D>B**. Consider A with a radius A. The right triangle that connects the center of the large circle, the center of A and the point common between the two adjacent large circles shows $(1-r)^2+1^2=(1+r)^2$, and solving for r gives $r=1/4$, and the area of A is $A_A=\pi/16\cong0.196$. Next consider B with side length s such that the origin lies at the midpoint of the left edge of the square depicted in the original figure. The point of intersection of the upper right corner of the square and the attached circle is $(x,y)=(s,s/2)$ where $y = 1-\sqrt{(1-(x-1)^2)}$. Plugging in for x and y and solving for s gives $s=2/5$, so $A_B=0.16$. Square C has

sides of length x which are at a 45° angle from the large square, so $1+x = \sqrt{2}$ and $x = \sqrt{2} - 1$ and $A_B = 3 - 2\sqrt{2} \cong 0.172$. Consider D with a height y and a half-width x. It can be shown using the equation of one of the large circles that $y = 1 - \sqrt{1-(x-1)^2}$. The area is $A_D = 2xy = 2x(1 - \sqrt{2x-x^2})$. Taking the derivative and setting it equal to zero gives the polynomial $4x^4-12x^3+10x^2-2x = 0$. x = 0 and x = 1 are minimum values; the only valid maximum value is $x = 1 - \sqrt{2}/2$, so $3 - 2\sqrt{2} \cong 0.172$, which is identical to the area of region C.

4: The sum of the last progression can never be a square. The first and fourth progressions will allow a sum of 2,305,843,008,139,952,128. With a little searching, we can find $n > 1$ such that the first seven progressions sum to a square. For the first, $n = 8$ gives a sum of $36=6^2$. For the second, $n = 2$ gives a sum of $4=2^2$. For the third, $n = 81$ gives a sum of $9,801 = 99^2$. For the fourth, $n = 25$ gives a sum of $1,225=35^2$. For the fifth, $n = 6$ gives a sum of $81=9^2$. For the sixth, $n = 9$ gives a sum of $225=15^2$. For the seventh, $n = 2$ gives a sum of $9=3^2$. The sum of the m^{th} sequence can be written as $(m/2)n^2+(1-(m/2))n$, so for the 8^{th} sequence we have a sum of $4n^2-3n$. For this to be a square we have $4n^2-3n = k^2$ for integer k, and using the quadratic to solve for a suitable n gives a discriminant term of $9+16k^2=9+(4k)^2$. In order for n to be an integer, this discriminant must itself be a square of an integer, so that $9+(4k)^2=l^2$ for integer l. However, since no two squares other than 16 and 25 (which corresponds to $k = n = 1$) are a distance 9 apart, no solution for $n>1$ exists. As above, we can write the sum of the first seven sequences as $n(n+1)/2$, n^2, $n(3n-1)/2$, $n(2n-1)$, $n(5n-3)/2$, $n(3n-2)$, and $n(7n-5)/2$, respectively. Using the Euclid-Euler theorem, for an even perfect number, it must have the form $2^{p-1}(2^p-1)$. Looking at the seven sums above, it can happen only in the first sequence when $n = 2^{31}-1$, or in the fourth sequence when $n = 2^{30}$.

5: The dice are described by the strings **ROYMZU, DPTIWK, BEGLSV, and ANCXFH**. First note that there are 24 unique letters represented across the 16 words (only J and Q are not present), so each die face will have a unique letter. Examining BUND/FEUD, either BF and NE are grouped, or BE and NF are grouped. Since OPEN is a word, B is on the "E" die and F is on the "N" die. Examining SHUT/HOPS, either UO and TP are grouped, or UP and TO are grouped. Since PAUL is a word, U is on the "O" die and T is on the "P" die. From FEUD/DEFY, Y is grouped with U on the "O" die. Examining OPEN/HOPS, either EH and NS are grouped, or ES and NH are grouped. Since OWNS is a word, S is on the "E" die and H is on the "N" die. Examining XYST/SHUT, either XU and YH are grouped, or XH and YU are grouped. Since we already know YU is grouped, X is with H on the "N" die. Because of DEFY, the D goes on the "P" die, and because of OWNS, the W also goes on the "P" die. Because of GAUD, A has to be with either the E or the N, but it cannot be with the E because of IAMB. So A is on the "N" die. G is on the "E" die because of GAUD, and L is also on the "E" die because of PAUL. Z is on the "O" die because of DAZE, V is on the "E" die because of AVOW, and R is on the "O" die because of TERN. Since RU are together, it follows from RICE/CUKE that I and K are together, and the only die that has two unassigned faces is the "P" die. We conclude by noting that M is on the "O" die because of IAMB, and C is on the "N" die because of CUKE. With the letters on each die now determined, we can trace the paths of each die to identify adjacencies. For example, O is adjacent to U, U to M, M to Y, Y to O, and so on. It is a useful starting point to note that U is connected to O, M, Y, and Z, so R is opposite U; other given connections result in the final string. Continuing in this way, the second die has D adjacent to T, P, W, and I, so K is opposite D. Similarly, in the third die E is adjacent to V, S, G, and B, so L is opposite E. Lastly, in the fourth die A is adjacent to C, N, F, and X, so H is opposite A.

BONUS: Joan's speed was **4.95 mph slower at the tipping point when the lid was replaced by the extension**. In the case when the lid is on, the liquid cannot move in the cup. We can calculate torques about the tipping point at the bottom edge of the cylinder, and find where they offset. The weight of the liquid contributes mgr where r is the cylinder radius, and the fictitious centrifugal force contributes $(mv_1^2/R)(h/2)$ where R is the track radius and h is the cylinder height. Equating and solving for v_1 gives $v_1 = \sqrt{(2Rgr/h)}$. Assume $g = 32.174$ ft/s^2. Taking care with units we can find v_1=121.69mph. With the lid off and the extension in place, the liquid can now shift. A liquid under circular motion will take a parabolic shape with a height $z(r) = \omega^2r^2/(2g)$ relative to a suitable reference. The slope of the water can be found by differentiation, giving $dz/dr = \omega^2r/g$. Since ω is the rotational speed of the liquid, which is just v_2/R, and $r<<R$, we can assume that the slope of the liquid surface is essentially constant and has a value of $v_2^2/(gR)$. It remains to calculate through integration the new center of mass of the liquid since it has changed its shape. This can be done using $x = 1/v \int_{-r}^{r} 2x(h + xv_2^2/(gR)) \sqrt{(r^2 - x^2)}dx$ and $z = 1/v \int_{-r}^{r} (h + xv_2^2/(gR)) \sqrt{(r^2 - x^2)}dx$ where $V = \pi r^2 h = 9\pi$ in^3 is the total volume of liquid. The results are $0.14v_2^2/(gR)$ for the x value, and $2+0.07v_2^4/(gR)^2$ for the z value. Finally, recalculating torques as before with the new lever arm distances gives a sixth order polynomial in v_2 which can be solved to find v_2=116.73 mph, so $v_1-v_2 = 4.95$ mph.

COMPUTER BONUS:

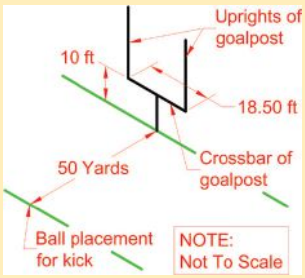
The smallest such prime number is **378,043,979**. Interestingly, a prime gap of 210 is found at 20,831,323. To get exactly 200, one must search integers well over an order of magnitude higher!

BTs continue on page 22

New Spring Problems

1: Field Goal Probability

A football place kicker is attempting to make a 50-yard field goal. The goal post is 50 yards away from the spot of the kick (along the ground), and the horizontal crossbar is 10 ft above the ground, and 18.5 ft wide. The ball must pass over the crossbar of the goal post within the 18.5 ft bounds of the vertical uprights for the field goal to be considered good. The spot of the kick is centered on the goal post. The kicker plans to aim at the center of the goal post with a vertical launch angle of 45° and a speed of 80 ft/sec. Assume the horizontal launch angle has a normal distribution with a standard deviation of 2.5°, the vertical launch angle has a normal distribution with a standard deviation of 2.5°, and the launch speed has a normal distribution with a standard deviation of 10 ft/sec. What is the kicker's probability of making a field goal? Give your answer to three significant figures. Idealize the problem by treating the football as a point, and the goal post as a line. Neglect air resistance and use 32.2 ft/s^2 for the value of g.



—Adapted from **Howard G. McIlvried,** *PA Γ '53* (*deceased*)

2: Bar on Rollers

A bar with length A moves on rollers without slipping from the solid-line to the dotted-line position. What is the value of X in terms of lengths A and B? (See the image below.)

—Allan Gottlieb's Puzzle Corner in *Technology Review*

3: Cryptic Multiplication

What is the largest y in:

$y \times$ WRONG = ARIGHT

that has a valid solution?

The usual rules apply; solve in Base-10, each CAPITAL letter is a different digit, same letters are the same digit, and there are no leading zeros. (Hint: y does not need to be a single digit)

—Adapted from **Don A. Dechman,** *TX A '57* (*deceased*)

4: Rose Bushes

Our local council recently planted some white rose bushes, but they all died. So, they replaced each bush with as many red rose bushes as they had originally planted white bushes. These all died too. Gritting their teeth, they replaced each red bush with as many yellow rose bushes as they had previously planted red bushes. This time they were luckier—only as many yellow bushes died as red bushes had died before. Moved by such dogged devotion to horticulture, a number of leading citizens offered to pay for all the surviving yellow bushes, provided that meant that each could pay for the same number of bushes. What is the largest that this group of citizens can be?

—*Tantalizers* by Martin Hollis

5: Geometric Construction

Using a compass and straight edge, tell us the steps to construct the circle tangent to one side of a triangle and tangent to the other two sides extended. The circle lies on the outside of the triangle.

—*Plane Geometry Problems with Solutions* by Marcu Horblit and Kaj L. Nielsen

BONUS: A class of 23 students are placed in order (no ties) for three different subjects: Math, English, and French, with 1st being the best and 23rd the worst.

The marks for the three subjects are added up and a combined order is produced. Ties are allowed in the combined order. No information is given about the ranges of the marks for the three subjects.

Scenario	Math	English	French	Combined
(i)	1	1	1	?
(ii)	1	?	1	1
(iii)	2	5	6	?
(iv)	17	21	23	?
(v)	17	19	?	1

In hypothetical scenario (i) we suppose that a student is 1st in Math, 1st in English, and 1st in French. What, if anything can be said about his place for the three subjects combined? In hypothetical scenario (ii) we suppose a student is 1st in Math, 1st in French, and 1st for the three subjects combined. What, if anything, can be said about her place for English? Similarly, you are asked to give what information you can about the missing places in scenarios (iii), (iv), and (v). Each of the 5 scenarios is independent from the others.

—*Brain Puzzler's Delight* by E.R. Emmett

COMPUTER BONUS

Find the smallest prime p such that p^2 divides $2^n - 1$ for some integer n which is not a multiple of p.

—Allan Gottlieb's Puzzle Corner in *Technology Review*

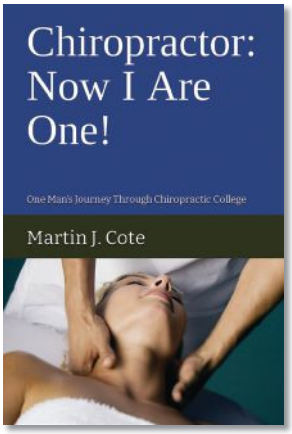
Email your answers to any or all of the Spring Brain Ticklers to *BrainTicklers@tbp.org* or by postal mail to **Dylan Lane, Tau Beta Pi, P.O. Box 2697, Knoxville, TN 37901-2697**. The method of solution is not necessary. The Computer Bonus is not graded. Where possible, exact answers are preferable to approximations. The cutoff date for entries to the Spring column is the appearance of the Summer *Bent* which typically arrives in mid-June (the digital distribution is days earlier). We welcome interesting problems that might be suitable for the column. Dylan will forward your entries to the judges who are **F.J. Tydeman,** *CA Δ '73;* **J.C. Rasbold,** *OH A '83;* **J.R. Stribling,** *CA A '92;* and the columnist for this issue,

— **K.D. Berthold,** *TX B '04*

Figure: Problem #2

Authors

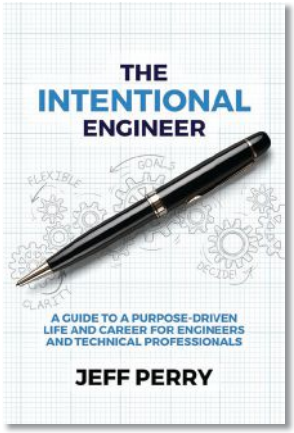
Recently published a book? If so, we would like to recognize you! Send details and a cover image to d.lane@tbp.org. Note: Due to the popularity of this section, submissions are first come, first served, as room allows. Thanks!



Martin J. Cote
Michigan Epsilon '65

Chiropractor: Now I Are One!

This is a self-published memoir of Martin's experiences in chiropractic college in the early 70s. There are descriptions of the profession, teachers, students, course material, strange occurrences, and more. Martin mixes in observations and philosophies with a helping of humor. He has a mechanical eng'g degree from Wayne State Univ. and also attended the General Motors Institute for three years.



Jeff C. Perry
Utah Beta '13

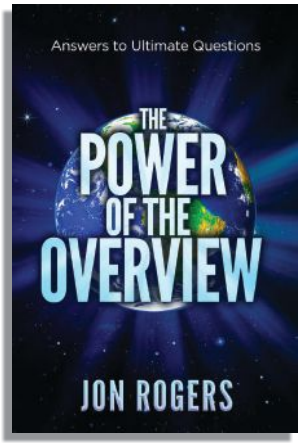
The Intentional Engineer: A Guide to a Purpose-Driven Life and Career for Engineers and Technical Professionals

A leadership and career expert, Jeff's book is your "start to building a life and career that will increase your income, impact, and life satisfaction." Self-employed and sought after as a speaker and teacher, he also hosts "The Engineering Career Coach Podcast." Jeff presented a professional development session at the 2021 ΤΒΠ Convention and has a mechanical eng'g B.S. degree.

Jon C. Rogers, CMfgE
California Eta '00

The Power of the Overview; Answers to Ultimate Questions

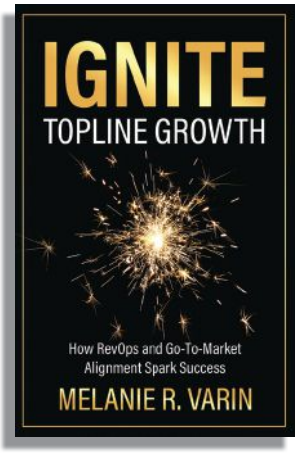
Jon details a new paradigm shift in understanding life on Earth (like when astronauts first see Earth from space), that reveals presently invisible solutions to the personal/social problems facing Americans in pursuit of a purposeful life. The methods are real, moral, and actually work. He's an aero and certified manufacturing engineer.



Melanie R. Varin
Indiana Alpha '83

Ignite Topline Growth: How RevOps and Go-To-Market Alignment Spark Success

Melanie's book is about the superpower businesses can tap into when their revenue-generating teams (sales, marketing, and customer success) are well-aligned. She worked at GE Healthcare for 14 years in roles such as marketing program manager and GM, USA Sales & Marketing, where she experienced the importance of team alignment. She has an EE B.S. degree, MBA, and is owner of TopLine Results Corp.



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NOVEMBER 1, 2023 — JANUARY 31, 2024

Alumni Giving

Donor Recognition Clubs

The Donor Recognition Clubs are part of our effort to recognize a donor's total lifetime cumulative giving to Tau Beta Pi. **THANK YOU** to the 3,229 TAU BETA PI ALUMNI and others who made donations to the Association totaling $787,033 between November 1, 2023, and January 31, 2024. The names of donors whose gifts were received after January 31 do not appear here but will be published in the Summer 2024 issue. These club names and amounts, established by the TBΠ Executive Council, are set at the following levels:

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Edward H. Williams Jr., Sc.D.
PA A 1875, Founder of Tau Beta Pi

$500,000+
Heikes Club

Irving A. Heikes, *PA A 1885*
1st student member

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Marjorie A.H. Franklin, *KS A 1957*
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Edith Clarke, WB #95
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$250+
Forman Club

George W. Forman, *IL A 1941*
Led TBΠ/Sigma Tau merger

NOTES:
1. Names preceded by SPEC denote gifts from non-members.
2. Names marked with a † symbol are of deceased members in whose memory donations were made either by relatives and friends or through bequests.

Clarke Club
Dick J. Kisloski
VT B '67
"Supporting young, talented engineers should be an important priority for everyone."

Clarke Club
James B. Planeaux, Ph.D.
IN Γ '82
"Helping ΤΒΠ inspire engineering excellence in our next generations, as it did for me."

Moore, Forman & Pre-Club Members Listed on website

Due to the number of alumni contributors, the Moore, Forman, and Pre-Club Members will be acknowledged on our website at: *www.tbp.org/?AGP*. All donations are essential to the continued success of the Association, but as print costs rise with each issue, these donors will be listed with all of the other contributors in a protected PDF document. If you have questions or concerns, please contact *tbp.development@tbp.org*. Thank you for your understanding as we strive to produce an enjoyable and cost effective magazine for our readers.

$1 MILLION+ Williams Club

No alumni gifts for this quarter

$500,000+ Heikes Club

No alumni gifts for this quarter

$250,000+ Harelson Club

No alumni gifts for this quarter

$100,000+ Matthews Club

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MA Β Houh, Henry H. '89
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Colbry, Katy Luchini '99
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NY Δ Jacobs, Irwin Mark '56
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CA Η Noble, Gary D. '96
CA Λ Holl, Sue '76
CA Ν Caddock Jr., Richard E. '72
CA Υ Alexander, Joseph William '06
Alexander, Rachel Kristin '15
CO Β Harris, James Robert '68
CT Β Hunziker, Bob Neal '83
DE Α Anonymous '70
FL Α Anonymous '99
Anonymous '00
FL Β Crews, Renard Calvin '70
IL Β Clewett, Tom Alan '88
IL Γ Herzing, Hank George '59
IN Α Davidson, Charles Dean '72
Millstein, Leo '70
IN Γ Planeaux, James Brian '82
IA Α Carlson, Mary Terese '78
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LA Γ Samuels, Katie '86
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MA Δ Coutts, Robert Bruce '72
Fenton, Harvey Albert '58
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MS Α Jerome, Dennis C. '67
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WA Β Moors, Donald Edward '55
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WV Β Payne, Michael E. '81
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Steadman, Sally Jean '69

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CA O Treinen, James Patrick '85
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Lewis, Becky Ann '04
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GA A Driggers, Herbert H. '63
Fawcett, Clint Douglas '92
Mowrey, Dan B. '65
IL A Baits, Paul Gordon '79
Tracy, Mark Alfred '86
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IN B Badger, Jerry Delon '62
IN Γ Buran Jr., Joseph Edward '75
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IA B Carson, David Nethermark '54
KS B Patton, Robert Eugene '70
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MD A Monmonier, Mark '64
MD B Schaefer Jr., William Joseph '70
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PR A Hilerio Sanchez, Josuan '07
RI B Dusablon, Louise Victoria '64
SC Γ Davis III, Emmett Irwin '79
SD B Ufford, Donald A. '87
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Riggs, Donna R.H. '87
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Nobles-Harris, Ellen Marie '69
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Tye III, John M. '67
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TX Θ Barrett, Jerry George '70
UT A Dewey, William Alonzo '67
VA A Brown, Lee Merry '88
VA B Breeser, Jeffrey William '83
VA Γ Richmond, Mark David '98
WA A Pierce, Russ W. '70
WV B Ashman, Michael D. '84
WI A Yee, Paul Yuen-Po '70
WI B Whittington, Laura Lee '88
WI Γ Hanson, Dave L. '86
WI E Foye, Kevin Christopher '01

$2,500+ Eaves Club

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AL Δ Styles, Robert Charles '76
AK A Dombrowski, Roger Alan '69
AZ A Chen, Daniel J. '83
Erickson, Kenneth Lynn '68
Peterson, Marla Ann '83
AR A Hunt, Gary Wayne '84
Newtown Jr., Glenford Andrew '69
CA A Fong, Kirby William '67
Hoe, Albert '92
Wilhoite, W. Clinton '85
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†Lee, Roland Robert '75
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Sansbury, James Douglas '66
CA Δ Moretti Jr., Vincent Carlos '78
Sekimura, Gerald Takashi '73
Zehrbach, Bill Ernest '69
CA E Dobbs, Michael Wayne '66
Gaunt, Arnold John '86
Gritton, Eugene Charles '63
Karagozian, Ann Renee '78
McCandless, Roger James '65
Quan, Alan Chung '00
Simsarian, Greg Garabed '82
Wenck, James Carl '77
CA Θ Lawson, Wayne Alan '69
Anonymous '84
CA I Kuspa, Joe Anthony '93
CA Λ Hafer, Edward Henry '70
Horn, Jeffrey Ben '79
Okpisz, Alexander Edward '91
Pickles, William Raymond '80
Yung-Rubke, Belinda '80
CA N Jordan, Patrick Anthony '87
Smith, Michael P. '84
CA O Campbell, William James '65
CA P Owens, Lawrence Paul '82
CA Y Lindauer, John Arthur '90
CO A Rense, John A. L. '74
Schneider, Randy Paul '71
Van Dinter, Jennifer Ann '97
CO B Aerstin, Franklyn George '64
Blackwelder, Ron F. '64
CO Γ Mead, Dick Wilson '63
Ton, Scott Marshall '74
CO Δ Fisher, James Ebberly '78
CT A Fischer, Edward Michael '89
CT B Devin, Maurice Roger '73
Killingbeck, David R. '77
Mastracchio, Robert '64
Tylaska, Theodore Thomas '85
DC A Abron, Lilia Ann '68
Engram, Robert Louis '69
Gathungu, Peter Maina '93
DC B King, David Alan '68
Ratto, Christopher R. '07
DC Γ Haldeman, Paul Metz '70
FL A Daniher, Peter Michael '66
Evans Jr., Andrew Joseph '75
Iwens, Ralph Peter '62
Layman, Robert William '68
Newlands, David Michael '62
FL B Ault, Richard Harold '64
Jennings IV, Tipton Davis '54
Tilles, Arno William '85
FL Γ Copeland Jr., Edwin '73
Dip, Anthony '86
Jones, William David '74
Lyons Jr., Tom Francis '76
FL Δ Paulley, Jason '93
GA A DeLoach Jr., Thomas Clifton '69
Monk, Robert Franklin '63
Peatman, John Burling '56
Snare, Daniel Marion '80
IL A Barchenger, Kimberly '06
Buboltz, Lisa Ann '01
Jones, Doug Warren '80
Ostrodka, David Leon '70
IL B Carter, David William '68
Gurney Jr., Donald P. '59
Hughes, Joseph L A '79
IL Δ Hachtel, Dale Arnold '68
IL Z Glait, Scott Steven '84
Woyna, Mark Anthony '87
IN A Grot, Arnold Stephen '71
Rea, David Richard '62
Reitz, Richard Alan '63
Rushworth, James Lynn '58
Weigand Jr., Karl Russell '66
IN Γ Kukla, James Alfred '72
Schuster, Gregory Michael '77
IN Δ Hartman, Richard Carl '63
Schmalz, Peter B. '69
Valenti, Paul M. '01
IA A Derr, Curtis R. '85
Maifield, Christopher James '95
Paris, Stephen Warren '75
Puffett, George E. '83
Shepherd, Kevin John '83
IA B Smith, Richard Kenneth '60
KS A Knapp, Roy Marvin '63
Leamon, Rich Gaylord '67
KS Γ Bucher, William Alexander '76
KY B Minsterl, James R. '71

Clarke Club
Elliot B. Ross
OH Γ '69
"I invest in ΤΒΠ, so I can help deserving engineering students the way I was helped."

Evans Club
Lyle D. Feisel, Ph.D., P.E. (*ret.*)
IA Α '61
"I support Tau Beta Pi because ΤΒΠ supports students."

LA Α Compton, Ronnie Ray '72
Millar, John S. '68
Richardson, John Daniel '72
Williams, Colleen Daniel '82
LA Β Buesinger, Bob Ford '78
Chaffe III, Black B H '55
Paul Jr., Howard Cochran '80
Perrin III, Shepard Francis '83
Quarles, Harry Fred '74
LA Δ Landry, Glen Ray '75
ME Α Gilman, Cynthia Margaret '80
Jefts, Alan Robert '73
MD Α Gutsmuth, Henry Ronald '56
Tate, David Marshall '84
MD Β Lambrechts, James Russell '73
Perkins, Michael Joseph '95
Toense, Robert Earle '76
Trimble, Alan Roy '71
MA Α Hubelbank, Mark '68
Lescoe, James Terrence '05
MA Β Clauss Jr., John Seebold '54
Grossweiler III, Philip J. '72
Hladik, Karen Jean '78
Patterson, John Bryan '68
Simpson, Richard Allan '67
Smallwood, Richard Dale '57
MA Δ Harty Jr., Frederick Russel '61
MA Ε Bittner, Douglas E. '83
Hayden, Thomas Lee '62
Pinkham IV, Tom A. '88
MA Ζ Harrison, C. Brett '64
Poulin, James Edward '66
MI Α Chamberlain, Adrian Ray '51
Smith, Harry '64
MI Β Sandretto Jr., Peter Patrick '64
Stromp, John Edward '78
Wacker, Don Herbert '52
MI Γ Engelhardt, Larry Norbert '77
Insprucker III, John Louis '78
Pendleton III, Winston Kent '62
Poy, Alfred Lim '91
Prescott, Thomas J. '69
Reines, Jose '59
Smithies, Henry '49
Stewart, Steve Russell '66
Washburn, John Robert '69
MI Δ Kogut, Ken Joseph '71
MI Ε Durisin, Mike John '81
MI Ζ Pettiford, Steven Douglas '72
MI Η Hill, Scott S. '83
Johncox, Robert Allen '83
Obudzinski, Gary Thomas '76
MN Α Petesch, Douglas John '84
Tucker, Randolph Lewis '83
MO Α Myles, Thomas Daniel '82
Younker, Ronald Lee '71
MO Β Ash Jr., Richard Lawrence '70
Eldred, Benjamin Todd '96
Peat, Robert James '79
MO Γ Byrne, Clare Theresa '78
Chambers, David Hugh '80
Anonymous '99
MT Α Whitcomb, David L. '64
NE Α Criswell, Marvin Eugene '65
Kaminski, Wayne Alan '79
Steube, Milan Ray '74
NH Α Scharfe, Alan Charles '78
NJ Α Gorog, Russell Mark '70
Murphy, Kevin Jay '78
Seventko, Joseph M. '60
NJ Β Carey, Mark '77
Kaufman, Peter Andrew '84
Pu, Chaohui Andrew '90
NJ Γ Krumins, Aivars Edgars '75
Kunyz Jr., Joseph John '73
Mauermeyer, Henry A. '72
Pecca Jr., John Anthony '87
NJ Δ Meyer, John Edward '81
NM Α Peace, Jeffrey Howard '76
NM Β Busch, Robert Douglas '72
NY Α Cohen, Adam Barrett '85
NY Β Carr, Donald Joseph '77
Spearot, James Anthony '67
NY Γ Kulis, Edward James '75
Lequar, James Kay '87
Svendsen, Harold Oliver '58
Thal Jr., Herbert Ludwig '53
NY Δ Abel, John Fredrick '63
McCloskey III, Charles Carroll '71
Randall, John Douglas '65
NY Ε Rubin, Lowell '61
NY Θ Beckeman, Bill Jerauld '79
Crompton, Kenneth H. '67
NY Ι Dujmich, Louis Charles '78
Grant, Richard Joseph '88
Neuschaefer, Howard Ernest '65
NY Λ Abrardo, Joseph M. '72
Moon, Monte Lee '75
NY Μ Rest, George B. '75
NY Ν Gluszak, Timothy John '88
NY Ξ Deierlein, Charles '82
Mathews, Joseph Raymond '81
NY Ο Imbrogno, Christina '14
Imbrogno, Joe Michael '12
NY Ρ Vebeliunas, Rimas V. '74
NC Α Caudle, Daryl Lane '85
Maybee, Clare Lee '77
Walker, Gary Kenneth '70
NC Γ Ando, Robert Ryoichi '73
Duncan, Matthew Albert '07
Franks, Marla Jane '79
Hansen, Mikkel Anders '78
Linker, Edward Markham '47
Vadnais, Paul A. '73
NC Δ Jones, Luellen Barnett '83
NC Ε Allen, James A. '88
ND Α Jacobsen, John W. '69
McLaughlin, Jenny Louise '84
OH Α Biery, Kurt Alan '85
OH Β Hamilton, Edward L. '73
Harner, Brian Lee '85
Pollock, Flavil Martin '77
OH Γ Condit, Dale O. '66
Dietz, James Francis '69
Guins, Thomas Sergei '69
Hagenlocker, Edward Emerson '62
Howland, Smith Eugene '69
Orkins, James E. '66
Anonymous '86
Robinette Jr., William Henry '68
Shelley, Bill Raymond '74
OH Δ Felice, Conrad William '79
Moore, Mathew Franklin '62
OH Ε Nock, Jeffrey Edward '80
OH Η Fraass, Ronald Guy '78
Hastings, Hal Leon '78
Kohlhaas, Richard L. '62
Senyk, Joseph Michael '67
Sweeder, James '82
OH Θ Doyle, James Thomas '65
OH Κ Billman, Randy William '82
OH Μ Dull, Daniel D. '90
OK Β Royce, Robert Michael '73
OK Γ Basore, Paul Alan '78
OR Α Buxton, Charles Edward '62
Jones, Reilly '75
Milton, Stuart W. '84
Thresher, Bob Wallace '62
PA Α Sherman, William Joseph '60
PA Β Anderson, Charles Alfred '57
Best, William Joseph '80
Kolivosky Jr., John Edward '92
Moore, Albert Lloyd '56
Weston, Matthew Wayne '93
PA Γ Robb, Frank Jay '73
Wisman, Craig Burton '75
PA Δ Sheker, Robert E. '91
PA Ε Mansfield, Brian David '91
PA Ζ Ebner, Alan Martin '61
Kasoff, David '55
PA Η Hotchkiss, Jeff R. '69
PA Θ Daniels Jr., Harold E. '66
PA Λ Honath, Mark F. '80
Janocko, David Jeffrey '81
PR Α Blasini, Francois Rene '82
Sanchez, Hector Luis '76
RI Α Fleming, Read T. '77
Fradkin, Henry Edward '68
Healy, Henry Stephen '71
Vascellaro, Jerome Charles '74
RI Β Brady III, William James '80
Luz, Jim J. '80
SC Α Doss, Thomas Glenn '71
Drennan Jr., Bob Francis '70
Harmon, Leon Carroll '71
Rushton, Floyd Robert '63
SC Β Endler, Elizabeth Elaine '98
Harris, Raymond E. '87
Pappas, Alexandros A. '71
Thomas Jr., Cunningham P. '58
Van Zee, John William '75
SC Γ Reed III, Hank McDavid '85
TN Α Cook Jr., Joseph Campbell '65
Jennings-King, Sherry Denise '93
King, Greg T. '93
Layman, Terry '77
Steelman, Joshua Scott '01
TN Β Marianelli, Walter David '75
Pentecost, Gene Edgar '50
TN Γ Buell, Phillip Ray '95
Steelman, James Taylor '71
TN Δ McLeod, Jeffrey Keith '83
TX Α Glasow, Brian Scott '99
Klump, D. Craig '77
Peterson, Robert Adrian '80
Wilson, Randy Wayne '97
TX Β Glenn, Stephen W. '66
TX Γ Hunter, David George '79
Johnson, Terry Robert '55
TX Δ Barger, David Carl '71
Simpson, Stancy Jean '79
Spahn, Rex Lee '80
Weisinger Jr., William Samuel '62
Zimmerman, Keith Donald '89
TX Ε Hon, Richard Wai-Leung '67
TX Η Brewster, William Howard '94
Godwin, Albert Eugene '84
Thompson, James A. '72
TX Θ Foster, Ottis Charles '82
TX Λ Alsop, Albert Walter '80
Rosenwald Jr., John Andrew '88
UT Α Davidson, Stuart Wayne '83
VT Α Cimonetti, Bill James '59
VT Β Cobb, Eben Charles '77

Alumni Giving

Eaves Club continued

VA Α Garner, Patrick Lynn '72
Harpel, Barbara McLaughlin '96
VA Β Hanley, Thomas Richard '67
Harras, Edgar Daehn '67
Jones, John Hamilton '73
VA Γ Labelle Jr., William M. '89
VA Δ Payne Jr., LF '67
WA Α Confer, Peggy Jean '81
Reichel, Jerel Dave '66
WA Β Opfer, Neil David '76
Ray, Edworth Lillard '48
WV Α McClung Jr., William Duane '88
WV Β Lorkowski, Tim Walter '93
WI Α Delucca, Gregory James '59
Guelker, Eric James '90
Klanderman, Kent Arlen '58
WI Β Hutton, Teresa Jean '91
McMorrow, Daniel Patrick '98
Mooney, Thomas Joseph '79
WI Γ Formella, John Patrick '81
WI Δ Whalen, David Alan '91
WY Α Cavalli, Matthew N. '98
Cook, Norman L. '79
Gallensky, Neil Ellis '82

$1,000+ Downing Club

SPEC Hepting, Jana
McDaniel, Patricia B.
AL Α Carey, George Walter '69
Goodwin, James Joseph '58
Hill, Gregory John '74
Shivers, Charles Herbert '75
Singley, John Charles '73
Slotkin, Arthur Lewis '68
Vollberg, Walter Karl '73
AL Β Hopper, Jeffrey Clark '78
Shields, Clark Richard '71
Slaughter, Charles Jeff '82
AL Γ Banasiewicz, Kenneth Adrian '79
Sahawneh, Mary Christine '76
AK Α Darrow, Margaret Marie '02
Leonard, Leroy Edward '72
AZ Α Bailey, Harold Earl '71
Bell, Edward Anthony '72
Frondorf, George '69
Heires, Daniel John '86
Krisa, Kenneth Charles '82
McLaughlin, Dennis Patrick '80
AZ Β Roose, Charles Edward '86
Takinen, Scott Alan '79
AZ Γ Bruening, Brenda I. '82
Bruening, Gregory Wilfred '80
AR Α Ball, Donald Harlin '66
Gunderman, Stacy Linda '88
Peters, Brett Avery '87
Reed, John Lee '68
CA Α Bruemmer, Timothy Michael '84
Magyary, Andrew '65
Robson, Clayton William '58
Secor, Kenneth Eugene '55
Van Dyke, Korbin S. '80
CA Β Hill, Roger Calvert '63
Young, Lawrence Renwick '71
CA Γ Dixon, Harvey Lewis '52
Edmundson, Bruce James '71
Ellgas, Robert Alan '74
Inouye, Lance Masao '68
Likins, Peter William '57
Love Jr., Ralph Edwin '57
Mitchell, Donald Beckley '59
Palmer III, Everett Arthur '65
Rassieur, Robert Terry '79
Roodhouse, James Greenlee '59
CA Δ Agajanian, Shooshanig Diana '79
Bolliger, James E. '71
Brooks, James Ray '72
Griffith, Glen Arthur '72
Hamilton III, Edsel Poston '72
Hedin, Richard Allen '69
Itamura, John Mindru '85
Johnson, Wesley Walter '66
Katin, Bob A. '74
Koppany, Charles Robert '63
CA Ε Anton, Philip Sean '85
Beguwala, Moiz '67
†Garnhart, Gordon Deane '53
Goodkin, Mitch Arthur '68
Hickling, Ron Michael '80
Kriguer, Marc Yared '88
Masumura, Robert A. '62
Reichert, Ralph Jeffrey '67
Woo, Raymond '72
Yoshizumi, Steven Akira '88
CA Ζ †Downey, James Bryant '62
Egan, Thomas Vincent '88
Masnada, Dan Angelo '75
Mathews, Steven Matt '69
Wagner, J. Arthur '61
CA Η Broadston, Robert Dean '94
Khalili, Azita '83
Pershon, James M. '79
Ramirez, Victor George '70
Rossow, Terry Lynn '66
Sakai, Tessi '75
CA Θ Gerwien, Phillip Harvey '77
Hill, Jo Ann Lucy '87
Kolderup, Nils Petter '60
Lowe, William Warren '79
Skalka, Gregory Dennis '82
Smith, John Mervin '70
Stone, Ronald E. '66
CA Ι Lee, Neil Yun-Liu '76
Schluer, David Wesley '82
CA Κ Moncsko, George Edward '68
Takashima, Yuji '78
Taylor, Robert Derek '82
CA Λ Chargin, David Anthony '97
Stanley, Richard Loren '79
Webb, Margaret Anne '79
Young, Jeffrey W. '69
CA Μ Hoos, John Stephen '70
Johnson, Bruce William '78
CA Ν Harmeyer, Michael Allen '90
Johnson, Michael Robert '86
Mayer, Robert James '85
Reukauf, Paul James '70
Rheinhardt, Mark Edward '84
Ruud, John Emil '73
Veit, Brian Richard '98
CA Ξ Baxley, Paul Alma '81
Curry, Monica Gossman '92
Curry, Robert S. '94
Fowler, David Michael '92
Nicoloff, Louise Therese '82
Nicoloff Jr., Nicholas '83
Schroeder, Steven Albert '78
CA Ο Caballero, Ross Charles '72
Fitzsimons, Michael Joseph '79
CA Π Steinberg, Dennis Philip '72
CA Ρ Alexander, Dean Lee '80
Costello, Vincent J. '08
Koehn, Calden R. '81
Koehn, Lisa Renee '82
CA Σ Black, Stephen H. '85
Frankel, Craig Alan '86
CA Υ Intagliata, John David '95
CO Α Devoe, Tracie Kay '82
Miks, Kathryn Fink '87
Trembly, Steven Alan '93
CO Β Eason, Ernest Day '71
Erickson II, Thurston Gunnar '74
Hamai, Daniel Masao '86
Herhold, Mark Kenneth '80
Hidahl, Jerry Paul Edward '77
Knapp, Barry Goodwin '81
Sorensen, Chris David '79
Velazquez, Jose F. '78
Watry, Michael Owen '86
Weber, Douglas C. '70
CO Γ Wittrock, Edward Paul '63
CO Δ Mehring, James Warren '72
CT Α Baublitz, John Eberhart '60
Bazuin, Bradley Jay '80
Gerson, Gordon '58
Kucera, Daniel Jerome '61
Lehman, Philip Lester '76
McLeod, Christopher Kevin '77
CT Β Altschuler, Steve '54
Brenna, Patricia Mary '81
Follette, Jean Marie '73
Seymour, Deborah Anne '86
Sobol III, Anthony Joseph '70
Whittlesey, Richard Allen '64
CT Γ Boccia, Chris-Michael '97
Judd, Kyle Peter '91
DE Α Bradley, Kevin Patrick '91
Buehler, John Henry '68
Clements, Thomas Carter '75
Hahn, Charles Rodney '73
Packard, Lawrence Bruce '88
Rae, Kirk Alfred '88
Winer, Harley Stanford '81
DC Α Drew Jr., Vernon Overton '61
Sharpe, Irene White '63
Wimberly, Mark Oliver '77
DC Β Delgado, Tony J. '93
Kosnik, Cris Josephine '95
Lee, Wah H. '73
Maggio, John Joseph '81
DC Γ Blackford, JP '95
FL Α Botwinik, Steven M. '95
Charlton, John Dunaway '72
Hayden, James George '69
Pitt, Gary Alvis '70
Townsend, Frank Charles '62
FL Β Dauer, Edward A. '72
Gonzalez, Cristina Maria '79
FL Γ Chenkin, Joseph Alan '82
Houmis, Nicholas James '74
Preslar, Daniel Alton '91
FL Ζ Fricke, Steven Allen '93
FL Ι Passarelli, Brian L. '10
GA Α Backhaus, George Peter '83
Coons, Louis Whatley '81
Dishongh, Jefferson Lee '66
Drawdy, Jean Elizabeth '78
Glover, Edmund Cook '60
Menges, Thomas Abel '78
Northington, Peyton Alexander '78
Oslick, Rochelle '83
Stuber, Donald Robelyn '71
Taylor, Hubbard Harvey '75

Downing Club
Steven M. Botwinik
FL A '95
"It is a privilege to be able to give back to ΤΒΠ and support excellence in engineering."

Downing Club continued

IL Α Baumgartner, Richard Albert '69
Bein, Robert Walter '56
Boehm, Ronald Jack '81
Brown, Harold Thomas '68
Campbell, Larry Milton '64
Davison, Brian C. '87
Ellis, Paul David '66
Flitman, Jeff Edward '82
Hanus, Daniel Joseph '86
Herning, Joel Gregory '69
Kipp, Lyle Dean '86
Krol, Allan Monforte '94
Kuske Jr., John Anthony '61
Olson, Robert David '88
Resman, Tom A. '84
Saltzman, Jay Adam '90
Smith, Leslie Garrett '48
Sorenson, Gregory Erik '03
Wilhelm, Dale R. '80
Williams, Allan Richard '71
IL Β Kinast, John Arthur '79
Lewis, Burton A. '48
Nelson, John David '60
Stocker, Danny Lee '86
Thomas Jr., Stanley Robert '72
IL Γ Bickes Jr., Robert William '63
Christopher, James Mosko '84
Gubisch, Roland Werner '64
Guest, Howard Brandon '81
Quint, James Peter '66
Williams, Molly Wells '63
IL Δ Klasing, Wayne Gill '65
Kobiella, Anthony Robert '93
Toon, James Bertram '87
IL Ε DeVantier, Bruce Allen '77
Garfield, Bill Michael '83
Hopkins, Mark Alan '82
IN Α Andrew, Stephen Peter '82
Brinson, Robert James '60
Bullions III, Robert Jackson '64
Carter, Eric Lee '72
Cheesman, Mark William '81
Danner, David Lee '70
Egilsrud, Richard Leslie '81
Fenwick, Bob B. '58
Flanigan, David Lawrence '66
Gilewski, Robert Leslie '73
Hall, Thomas Wayne '67
Hanover, Marilyn Kay '78
Herendeen, Robert Oliver '65
Hibbard, George Lewis '65
Lambert, Ralph Edward '68
Lin, Jeffrey Eugene '97
Massaro, Dominic Paul '76
Mosier Jr., Andrew C. '78
Muehlbauer, James Herman '63
Schwiesow, Ronald Lee '62
Shulaker, Edward Ray '72
Sommers, Steven Raymond '78
Ward, John B. '58
IN Β Cary, Jeffrey Mark '77
Mandeville, Tom '71
Martin, Jeffrey V. '78
Noblitt, Niles Leonard '73
Ruddick, Everett Lindley '64
Waterman, Robert Carl '70
IN Γ Colleran, William Thomas '83
Fitzgerald, Edward John '86
Fleckenstein, John Thomas '64
Flynn, Michael Joseph '89
Galeziewski, Thomas Michael '78
Hawes, William Michael '78
Kast, Steven James '69
Markel, Michael Lawerence '78
Quadrini, Mark L. '74
Shalvoy, Charles Edward '69
IN Δ Brems, Robert Ronald '63
Dietrich, Jay Michael '80
IN Ε Lund, Stephen R. '80
Tyler, Thomas Lee '54
IA Α Bosshart, David John '80
Carosella, Sandy L. '88
Coffey, Leo Frederick '64
Doyle, Kevin Richard '71
Drumm, Alfred Wendall '64
Morse, David Sanford '52
Owens, David Andrew '91
Rustwick, John Douglas '71
Veenstra Jr., Henry Robert '71
Wolfmeyer, Paul Albert '66
Zwiebel, Jeffrey Lee '82
IA Β Boldt, Donald Bernard '57
Coe, Roger Norman '57
Corrao, Debbie G. '93
Dawson, Robert Jerrold '60
Kumar, Neel Vasant '91
Reimers, Robert James '84
KS Α Black, Arthur Geiger '70
Carvell, Lee Arthur '84
Harden, Dan Roger '71
Pack, Garrett Edwin '60
Scamman, Franklin L. '66
Suelter, Leonard George '58
Vijgen, Paul '87
KS Β Hockett, James Keith '66
Howe, Donald Craig '78
Straka, James Lavern '89
Stuart Jr., James Franklin '67
KS Γ McKinnis, Steve Ray '74
KY Α Midkiff Jr., Kenneth Clark '79
Rhoads, Harold Spencer '68
Williams, Matthew Ryan '08
KY Β Hundley, John Smith '87
Hundley, Theresa E. '87
LA Α Brack, Karen Guenther '84
Bullard, Salem C. '63
Corripio, Armando Benito '63
Levert Jr., Freddie Joseph '62
Schexnayder Jr., Isby Louis '63
LA Β Clouatre, Martyn Albert '81
LA Γ Ball Jr., Pete Gordon '61
Bertsch, Paul Jeffery '79
Bertsch, Susan A. '80
Giering III, Edmund Jacob '80
LA Δ Gannuch, Rodney Joseph '68
Garber, James Daniel '66
Key, John Autry '75
Young, Ronald Dale '66
ME Α Degon, Robert John '66
Jones Sr., Jeffrey A. '75
McBurnie, Jeffrey Charles '82
Musk, Jeffrey Hill '86
MD Α Beatty Jr., Millard Fillmore '59
Capecci, Dennis W. '79
Dryden, Thomas E. '79
Hall, H. Thomas '56
Piedrafita, James L. '78
Scheinin, Warren M. '74
Sniegowski, Gary Howard '78
Wiseman Jr., William Joseph '64
MD Β Birkmire, John Christopher '95
Bohse, Michael Edward '85
Brenner, David Joseph '60
Hardesty, Donald Roy '64
Iacangelo, Gerard Felix '80
Kirschbaum, Alan Ira '71
Lawrence III, Joseph Parran '68
McCracken, Rich Paul '70
Sheen, Timothy Walter '72
Tregoning, Robert Lee '87
White, Anthony Albert '95
MD Γ Hauge, Todd Allen '83
Lipscomb Jr., George A. '87
Surina Jr., John Joseph '86
MA Α Andel, Robert Matthew '73
Auclair, Jared Robert '01
Bernacki, Stephen Edward '70
†Lancey, Roderic Charles '51
Steinka, Bradford Roland '81
Wright, Neal Timothy '76
MA Β Borrmann Jr., George H. '57
Braisted, Paul Evan '79
Brandes, Richard David '57
Charpie, David Wayne '82
Ditmeyer, Steven Roland '63
Dodson, John Orville '68
Goldman, Barry '76
Greene, David Lockwood '68
Hazen, Nathan Lord '56
Honke, James Kazuo '63
Karohl, David Allen '85
Klein, Harrison John '71
Rogers, Peter Todd '82
Smith, Alan Jay '71
Spradlin, Louis Woodson '57
MA Δ Adams, Randolph Keith '70
Colen, Frederick Haas '69
Curless, Richard Walter '66
Gunn, John F. '64
Hildebrant, Eric Michael '92
Munsey, Michael C. '89
Savage, Paul David '77
MA Ε Engler, Harold Frank '75
Jurczyk, Thomas William '71
Levesque Jr., George Emile '70
Lichtig, John Forrest '83
Marini, Robert Charles '54
Payne, Bob Joseph '86
MA Ζ Benwood, Bruce Robert '69
MA Η McKinstry, Bob C. '84
Whitley, Norm Lyle '75
MA Θ Burns, Nancy E. '84
Gregg, John Edward '84
MI Α Beck, Maureen E. '03
Chaffee, Stanley Wendell '74
Houthoofd, Janet Marie '76
Mueller, James Michael '70
Othmer, Hans George '65
†Ryckman, Jim '38
Santoro Jr., Thomas Vincent '66
Tscharner, Christopher G. '83
MI Β Durfee, George Lee '51
Groeneveld, Gerald Anthony '63
Hammar, Richard Harry '65
Sauer, Dan Michael '05
Stone, David Garth '69
Whitman, Brian Edward '92
MI Γ Anderson, Richard Walter '66
Barr, William Robert '70
Berno, Jeffrey William '63
Bloomer, Craig D. '80
Bloomer, Kristine M. '81

Continues on page 46.

IN THE COLLEGES

Tau Bates having an impact at institutions of higher learning.

Pranesh B. Aswath Ph.D.

Texas Eta '82

Pranesh has been named provost and executive vice president for academic affairs at Texas State University. He has worked for the past 33 years at the University of Texas at Arlington, most recently as Provost Ad Interim and Vice President for Academic Affairs, Senior Provost for Academic Planning and Policy, and Vice Provost for Academic Planning and Policy.

Sibani Lisa Biswal Ph.D.

California Beta '99

Sibani, a chemical eng'g professor at Rice Univ., was elected a fellow of the American Physical Society for her "fundamental contributions to the understanding of the assembly of superparamagnetic colloids in magnetic fields, discovering mechanisms governing multiphase flows in porous media, characterizing molecular transport in lipid membranes & developing porous silicon anodes for lithium-ion batteries."

Jason R. Blough Ph.D.

Michigan Beta '98

Jason received SAE International's Ralph Hillquist NVH Lifetime Achievement Award. He is chair and distinguished professor of the dept. of mechanical eng'g-eng'g mechanics. The award recognized Jason for being "instrumental in shaping the sound package material industry over the last 30 years, alongside unmatched dedication and commitment to industry and SAE."

SPOTLIGHT: UConn's Introduction to Brewery Engineering Course — It was launched three years ago as part of the capstone UConn Engineering senior design project by **Jennifer A. Pascal, Ph.D.,** *TN G '06,* associate professor in residence of chemical & biomolecular engineering and associate department head at the University of Connecticut. Students learn about brewing, a classical example of the chemical eng'g process, the fundamentals of fermentation science, and work on improving brewing procedures. Previous teams identified potential hazards in the pilot-scale brewery and created a risk assessment tool and standard operating procedure, leading to this year's students working on their first commercially available beer, named BrewConn, with sales starting in November.

University of Missouri Alumnus Endowment — Walter A. Storrs III, P.E., *MO A '66*, and his wife, Sharon, have established an endowment for Mizzou Racing. It's the engineering college's first such funding for a student organization and will be used to help ensure students continue to have opportunities to design, build, and race quarter-scale formula and electric formula cars. According to the announcement, The Storrs Ice & Coal Endowment for Formula SAE & Eco-Racing also pays tribute to the business his grandfather ran in Hannibal, MO. Walter earned his electrical engineering B.S. degree at Mizzou and worked for Boeing and the U.S. Army. After retirement, he began volunteering for the Society of Automotive Engineers Formula SAE competition in Michigan.

David M. Borrok Ph.D.

Missouri Beta '05

David joined ΤΒΠ in November 2023 as an eminent engineer, initiated by the MO Beta Chapter at Missouri S&T, where he is the vice provost and dean of the college of engineering and computing. He previously served as the college's associate dean for research, chair of the geosciences, geological & petroleum eng'g dept., and has a civil eng'g Ph.D. from the University of Notre Dame.

Matthew A. Clarke Ph.D.

District of Columbia Alpha '16

Matthew was included in the 2024 *Forbes* 30 Under 30 Science List for his research developments for the future of aircraft. An assistant professor at the University of Illinois Urbana-Champaign, "his new lab explores the interaction between aircraft and the environment to make more sustainable designs." He is a ΤΒΠ Scholar (2015), Fellow (2016), and MIT AeroAstro distinguished postdoc fellow.

Clay S. Gloster Jr. Ph.D.

North Carolina Epsilon '85

Clay was selected as recipient of the 2023 ASEE James H. McGraw Award for Outstanding Service in Engineering Technology Education by the American Society for Engineering Education. He is vice provost for graduate research and Dean of the Graduate College at North Carolina Agricultural and Technical State University, where he is an alumnus with B.S. and M.S. degrees in electrical engineering.

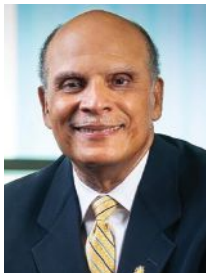
Andrea J. Goldsmith Ph.D.

California Alpha '86

Andrea is the 2024 IEEE James H. Mulligan Jr. Education Medal recipient "for educating, mentoring, and inspiring generations of students, and for authoring pioneering textbooks in advanced digital communications." She is Princeton University Dean of Engineering and Applied Science and a professor of electrical & computer eng'g. Her work has helped shape today's mobile technology.

Harold L. Martin Sr. Ph.D.

North Carolina Epsilon '73



Harold will retire at the end of the 2023-24 school year in his 15th year as Chancellor of North Carolina Agricultural and Technical State University. Under his leadership, NCAT has become the nation's leading producer of black STEM graduates and the largest HBCU in U.S. history. In 2019, Harold was recognized with the Thurgood Marshall College Fund's Education Leadership Award.

Jay W. McDaniel Ph.D.

Kansas Gamma '13

Jay will receive the 2023 IEEE Instrumentation and Measurement Society Outstanding Young Engineer Award during the society's 2024 conference in Glasgow, Scotland. McDaniel is the first American scientist to have received the award since 2016 and only the second U.S. recipient within the past decade. He is an assistant professor of electrical and computer eng'g at the Univ. of Oklahoma.

FACILITIES: ISU Grant for National Testing Facility — A research team at Iowa State University (ISU) has won a $14 million grant from the NSF to design and plan a National Testing Facility for Enhancing Wind Resiliency of Infrastructure in Tornado-Downburst-Gust Front Events, or NEWRITE. The facility would allow testing at large-scales and high wind speeds, simulating tornadoes, and measuring the wind loads they exert on homes and other structures and engineering improvements that reduce structural damage. The design grant does not commit the NSF to supporting the construction, but it would likely be built at ISU, require a five-story building with the square footage of four football fields, and will need 5 to 10 megawatts of electricity.

University of Wisconsin-Madison Eng'g Building Campaign — More than 40 business leaders across Wisconsin signed a letter detailing the urgent need to move the UW-Madison School of Engineering building project forward. The partnership has launched a campaign urging legislators to build a new state-of-the-art building to boost engineering enrollment and help address "critical workforce needs" in Wisconsin. The statewide campaign, funded by the Wisconsin Alumni Association, is focused on the importance of growing a strong labor and innovation pool to ensure the state's future economic success. In late February, WI Legislature approved a bill, that if signed by Gov. Evers, will amend the state's budget to borrow $347 million for a new eng'g building.

Glenn E. Moglen Ph.D., P.E.

Maryland Beta '88

Glenn joined the University of North Carolina at Charlotte as chair of the department of civil and environmental engineering. He will lead research activities and academics, including the new B.S. in environmental eng'g degree. Previously, he held faculty appointments at Virginia Tech and the University of Maryland and his research focuses on hydrology, the study of water resources.

Jennifer L. Rexford Ph.D.

New Jersey Delta '91

Jennifer was honored with the IEEE Alexander Graham Bell Medal "for contributions to Internet wide-area routing and software-defined networking." She serves as provost at Princeton Univ., where she earned her B.S. degree in electrical eng'g and previously served as professor and chair of computer science for nine years. Her industry experience includes working as a researcher at AT&T Labs in traffic engineering.

Jeffrey D. Rimer Ph.D.

Missouri Gamma '01

Jeffrey has been awarded an inaugural $5 million Catalyst for Discovery Program Grant from the Welch Foundation, to establish the Welch Center for Advanced Bioactive Materials Crystallization. He is a professor of chemical engineering at the University of Houston, globally known for his seminal breakthroughs that control crystals to help treat malaria and kidney stones, and will lead the new center.

Sean and Susan Murphy

Tau Beta Pi Families

Do you have a spouse, sibling, parent, son/daughter, or grandparent, who is a member of Tau Beta Pi? If so, we would like to recognize you in a future Tau Beta Pi Families. Send your information, and even a family photo, to tbp.media@tbp.org.

BI-SPOUSAL:

William J. Ceely, *FL Δ '07*
Michaelyn Thomas, *MD A '21*

Akshay D. Desai, *MI Γ '12*
Nikita Consul Desai, *MA B '13*

Cristine J. Kosnik, *DC B '95*
Paul E. Kosnik, *MI Γ '99*

Carl B. Leedy, *SD A '74*
Jane D. Leedy, *TX Z '78*

Hanna Wolf Segura, *OR Δ '21*
Mariano A. Segura, *OR Δ '22*

Michaelyn and William Ceely

CENTENARIANS:

Wilbur C. Bigelow, *MI Γ '44*
b. March 18, 1923

Justin R. Boeker, *IL A '40*
b. March 14, 1918
d. January 15, 2023

Charles E. Goodell, *MI Γ '43*
b. August 13, 1920
d. March 23, 2021

Robert S. Hahn, *OH B '40*
b. November 1, 1916
d. January 5, 2021

Sheldon J. Leavitt, *IL A '43*
b. October 9, 1922
d. October 11, 2022

Edwin C. Lindly, *KS Γ '42*
b. October 15, 1921
d. August 12, 2023

Sol M. Love, *MI E '41*
b. July 2, 1920
d. February 20, 2021

William R. Lucas, *SC Γ '84*
b. March 1, 1922

Robert H. Mueller, *IL A '42*
b. May 29, 1920
d. March 11, 2023

Harry S. Scott Jr., *MO B '44*
b. January 4, 1922
d. July 28, 2022

Paul W. Shadle, *IL A '45*
b. March 9, 1922
d. April 1, 2023

John B. Slater, *IA A '43*
b. October 10, 1921
d. October 31, 2021

Robert W. Stephens, *WA B '43*
b. June 5, 1918
d. December 14, 2021

Richard A. Tybout, *DE A '43*
b. September 28, 1920
d. March 18, 2022

SIBLINGS:

The Balderas Siblings
David M., *TX Λ '21*
Olivia M., *TX Λ '22*

The Berthold Brothers
Kristopher D., *TX B '04*
Ryan M., *CA Λ '05*

The Bjorgaard Siblings
Jason J., *ND B '16*
Stacy J., *ND B '10*

The Cabrera Rodas Brothers
Jose A., *WY A '17*
Manuel A., *WY A '22*

The Dreshfield Brothers
†**Arthur C. Jr.,** *IL A '51*
Robert L., *IL A '54*

The Francisco Twin Brothers
Alexander J., *NY N '24*
Marcus H., *NY N '24*

The Hawa Brothers
Aasim Z., *NY K '24*
Zuhair, *TX Γ '21*

The Peterson Twin Sisters
Grace E., *KS B '24*
Mary R., *KS B '24*

The Voglewede Brothers
Philip A., *IN Γ '94*
Paul E., *IN A '90*
Ronald L., *IN Γ '96*

In May, Katie Cretella graduated from the University of Rhode Island (URI) with a B.S. degree in civil engineering. She is now a third generation alumna of URI, joining grandfather John (left) and father David (right). All three are seen here with their Tau Beta Pi certificates as proud Tau Bates.

MULTI-GENERATION:

The Beitle Family
Robert R. Sr., *PA Γ '62* (grandfather)
Robert R. Jr., *PA Λ '87* (father)
Karen J. Lloyd, *PA Λ '90* (mother)
Stephanie R., *AR Α '21* (daughter)

The Brand Family
Ronald P., *VT Α '60* (father)
Terrance A., *NY Γ '90* (son)

The Burns Family
†**Richard M. Lord,** *PA Α '37* (grandfather)
Ralph M., *TN Α '60* (father)
Kathryn Black, *IL Α '92* (daughter)

The Capek Family
Thomas G., *NY Γ '86* (father)
Emily N., *NY Θ '14* (daughter)

The Casson Family
Walter A. Jr., *TN Β '56* (father)
Leonard W., *TN Β '81* (son)

The Chauvin Family
Wendy M., *TN Δ '89* (mother)
Jeremy M., *TX Α '24* (son)

The Craig/Linger Family
†**Joe L.,** *KY Α '50* (grandfather)
Noah J., *NC Α '15* (grandson)

The Cretella Family
John P., *RI Β '60* (grandfather)
David J., *RI Β '94* (father)
Katherine M., *RI Β '23* (daughter)

The Cross Family
†**Ray E.,** *MI Β '35* (father)
Harry L., *MI Γ '65* (son)

The DaGraca Family
Paul J., *NJ Γ '92* (father)
David, *NJ Γ '23* (son)

The DuFore/Dubois Family
†**Robert N.,** *IL Α '54* (grandfather)
Valerie J., *WI Α '94* (mother)
Ryan M., *CA Μ '23* (son)

The Fagel Family
Lawrence W., *NJ Α '59* (grandfather)
Christopher D. Payne, *PA Ζ '18* (grandson)
Carlos M. Mayer-Costa, *NJ Γ '90* (nephew)

The Field/Graham Family
†**Marshall J.,** *CO Β '49* (grandfather)
Colin A., *CO Β '00* (grandson)

BELOW: (Left) 2023 **ΤΒΠ** Scholar Aasim Hawa with brother Zuhair Hawa at his undergrad graduation.
(Right) 2023 **ΤΒΠ** Scholars Mary and Grace Peterson before a discovery flight taken during an internship at Textron Aviation.

MULTI-GENERATION:

The Glaister Family
David S., *CO A '84* (father)
Sean D., *MD A '22* (son/brother)
Jade M., *CO A '24* (daughter/sister)

The Gluck/Rhodes Family
Frederick G., *CO B '67* (father)
Dustin T., *CO A '17* (son)

The Hirschi Family
Joseph C., *UT A '83* (father)
Carl J.M., *UT B '23* (son)

The Jensen Family
Ruth S., *NE A '76* (mother)
Taryn J. LaFlamme, *AZ B '04* (daughter)

The Kawamura Family
Naoto A., *NY Δ '92* (father)
Maia S., *NH B '24* (daughter)

The Lester Family
P. Kreis, *TN A '78* (father)
Courtney L. Haggard, *TN A '05* (daughter)

The Maurer Family
†**John F.,** *MI Γ '45* (father)
Cynthia E. Read, *DE A '87* (daughter)

The Mirabile Family
Joseph, *NY P '92* (father)
Paul G., *NJ A '25* (son)

The Morton Family
†**Ben L.,** *CO B '46* (father)
Bruce L., *OK Γ '75* (son)

The Mukai Family
Larry H., *WA B '74* (father)
Elizabeth P., *OR Γ '18* (daughter)

The Murphy Family
Susan M., *PA B '85* (mother)
Sean R., *PA B '23* (son)

The Rabiner/Heinzelman Family
Lawrence R., *MA B '64* (grandfather)
Wendi R. Heinzelman, *NY Δ '95* (mother)
Nathaniel, *NY Δ '25* (son)

The Rouser Family
Kurt P., *OH H '11* (father)
Austin J., *OK Γ '24* (son)

The Sensmeier Family
Paul E., *IN A '63* (grandfather)
Mark D., *IN A '85* (father)
Lynda L. Oleksuk, *OH K '88* (daughter)
Oliver K. Davis, *AZ Δ '20* (son-in-law)

The Tellechea Family
†**Gabriel M.,** *LA A '48* (father)
Gabriel, *TX A '87* (son)

The Torson Family
John "Scott," *UT A '07* (father)
Jonscot "Kyle," *UT A '24* (son)

The Trigg Family
William W., *AR A '56* (father)
William W., *OK A '85* (son)

The Vaughan Family
Natalie, *IA A '92* (mother)
Sophia G., *IA A '23* (daughter)

The Young Family
Lincoln C., *NY Σ '01* (father)
Emma M., *NY Σ '19* (daughter)
Callum J.C., *NY Σ '25* (son)

BELOW: (Left) Kyle, UT Alpha Chapter vice president, after helping initiate his father Scott Torson. (Middle) Sophia and Natalie Vaughan beside the Bent monument on the Iowa State campus. (Right) Courtney Haggard and P. Kreis Lester.

Do you have a *passion* to share an experience that may inspire and intrigue others?

Since January 2021, Tau Beta Pi members have shared stories through monthly virtual talks about how they have used their engineering background to pursue fascinating experiences.

Recent talks include:

- **Paul Gross,** *MI G '83*
  "The Scientific Truth about Global Warming"
- **Henry Louie,** *MI Z '02*
  "Ending Energy Poverty through Off-Grid Solar Power"
- **David Nagel,** *IN G '60*
  "The Status, Momentum and Potential of Low Energy Nuclear Reactions (LENR)"
- **Matt Eisenberg,** *NJ A '69*
  "Zero Point Energy: An Unlimited Source of Energy & A Powerful Tool for Mitigating Global Warming"

Tau Bates:

Do you have a story you would like to share about the work you're doing, have done, or perhaps a life experience or area of interest outside of your profession?

We're recruiting speakers for the upcoming schedule. If you have an interesting subject for a 30-40 minute talk, please contact: *tbp.talks@tbp.org*. We would love to hear about it, and your story could motivate other engineers to reach further.

Upcoming speakers:

- April 14, 2024 @ 7 p.m. ET
  Paul Brierley, *CO B '87*
  "Once an Engineer, Always an Engineer: How My Engineering Degree Led to AgTech and COVID Wastewater Testing"
- June 9, 2024 @ 4 p.m. ET
  George Hamilton, *AL G '89*
  "Challenges & Solutions Needed for Farming on the Moon"

These interesting, inspiring speakers will get you thinking.
A full roster of previous speakers and videos of past presentations can be found here:
www.tbp.org/?TBPtalks

TAU BATE TALKS

The Tau Beta Pi Engineering Honor Society Speaker Series

CHAPTER ETERNAL

Our fellow Tau Bates who are gone, but never forgotten.

PA G

Pennsylvania Gamma '50
Bruce B. Barrow, Ph.D.
November 30, 2023
Co-author of first IEEE standard on metric practice, TBP Fellow (1950), IEEE Charles Proteus Steinmetz Award recipient and supporter of the PA G Chapter through CEI.

The condensed style of these notices is made necessary by the Association's large membership and space limitations in *The Bent*. You may contact the Editor for additional facts (if available) concerning the following deceased members. The assistance of all is earnestly sought in reporting the deaths of Tau Bates, including full name and date of death. You may report the death of a member by sending an email to ***tbp.memberupdate@tbp.org.*** Members 100 or more years when passing are identified with "***Cent.***"

ALABAMA

ALPHA AL Α

Peters, James E., *'58*, December 28, 2023.
Harris, Elmer Beseler, *'62*, Dec. 23, 2019.

BETA AL Β

Lee, Donald Howard, *'52*, January 2, 2023.
Delorenzo, Joseph David, *'57*, Aug. 23, 2023.
Sessions, Charles Edward, *'62*, Jan. 5, 2022.
Franklin, Joseph Cary, *'63*, no details.
Moore, Pamela Ann, *'82*, no details.

ARIZONA

ALPHA AZ Α

Bush, Glenn Clifford, *'51*, January 8, 2023.
Whitcomb, James S., *'51*, June 15, 2013.
Meitz, Robert Otto, *'56*, January 19, 2016.
Burns, Clence L., *'58*, July 12, 2003.
Sierka, Raymond A., *'60*, July 31, 2021.
Kenimer, Farrell Landrum, *'63*, Nov. 5, 2022.
Larson, Arlen Ellwood, *'63*, August 3, 2018.

BETA AZ Β

Wallace, Richard Asher, *'54*, March 6, 2018.
Bedworth, David D., *'55*, December 30, 2018.
Spragins, John D., *'56*, December 24, 2016.
Foster, Robert I., *'59*, June 13, 2019.
Allen, Frihoff Grant, *'63*, May 6, 2018.

GAMMA AZ Γ

Hartman, David E., *'56*, November 27, 2020.
O'Dell, Andrew Paul, *'06*, May 10, 2019.

ARKANSAS

ALPHA AR Α

Kelley, Harold Andrew, *'50*, Sept. 5, 2023.
Ghodsi, Bagher, *'62*, January 19, 2023.
Clampit, Harry Paul, *'66*, Nov. 25, 2017.

CALIFORNIA

ALPHA CA Α

Oldenkamp, John L., *'48*, Sept. 27, 2019.
Sawyer, Robert F., *'57*, November 17, 2022.

BETA CA Β

Burke, James Donahue, *'45*, August 19, 2023.
Lee, Roland Robert, *'75*, no details.

GAMMA CA Γ

Daniels, Lawrence H., *'47*, no details.
Geary, Richard, *'56*, October 19, 2014.

DELTA CA Δ

King, Wallace Bowen, *'61*, July 12, 2017.

EPSILON CA Ε

Hovanessian, Shahen, *'54*, October 31, 2023.
Barker, Alva Clifford, *'59*, no details.
Tully, John Wilbur, *'65*, August 17, 2023.
Gallagher, Raymond G., *'71*, Jan. 19, 2018.
Nakaki, David K., *'80*, December 9, 2019.

ZETA CA Ζ

Jones, Donlan Francis, *'52*, April 17, 2023.
Mackel, Lawrence O., *'56*, July 16, 2023.
Jacobberger, Donald H., *'58*, Oct. 17, 2023.
Douglas, Bruce Malcolm, *'59*, August 4, 2020.
Downey, James Bryant, *'62*, Nov. 13, 2022.
Kabanek, Richard Allen, *'70*, March 21, 2023.

THETA CA Θ

Lawrence, Patrick E., *'63*, January 11, 2021.

COLORADO

BETA CO Β

Morton, Ben Lincoln, *'46*, Sept. 15, 2023.
Oakes Jr., Harold S., *'50*, September 19, 2021.
Lavash, John Paul, *'51*, no details.
Walker, John Sherwood, *'53*, May 23, 2023.
Blanchard, David Dean, *'55*, Nov. 4, 2016.
Hiett, Duane Robert, *'56*, October 27, 2014.
Braudaway, Gordon W., *'58*, Feb. 18, 2023.
Moser, Harold B., *'59*, June 22, 2021.
Franchino, Robert Anthony, *'60*, no details.
Morrison, John Arling, *'60*, October 6, 2020.
Staubach, Stanley L., *'60*, Oct. 17, 2023.
Gurian, Marshall Irvin, *'62*, July 27, 2023.

GAMMA CO Γ

Huffman, Tommie Ray, *'57*, June 5, 2021.

CONNECTICUT

ALPHA CT Α

McDonald Jr., Theodore D., *'56*, July 9, 2016.
Hanks, Richard Wylie, *'57*, July 31, 2021.
Berger, Toby, *'62*, May 25, 2022.

BETA CT Β

Berson, Bernard R., *'57*, March 17, 2021.
Hudson Jr., Frederick J., *'58*, Dec. 21, 2023.

FLORIDA

ALPHA FL Α

Sawyer, Donald Albert, *'50*, Nov. 5, 2023.

BETA FL Β

Stewart, Charles M., *'69*, Sept. 29, 2023.
Kerper, Sheldon, *'70*, November 3, 2023.

GAMMA FL Γ

MacPherson, Douglas D., *'74*, Jan. 17, 2021.

GEORGIA

ALPHA GA Α

Stanley, John Lewis, *'44*, September 21, 2023.
Rymer, Richard Henry, *'48*, January 13, 2023.
Engelbrecht, Rudolf, *'51*, May 1, 2009.
Martin, Donnan, *'54*, July 30, 2019.
McMaster, David Gerald, *'58*, Oct. 12, 2021.
Skelley, Daniel F., *'70*, November 6, 2023.

ILLINOIS

ALPHA IL Α

Boeker, Justin Robert, *'40*, Jan. 15, 2023. ***Cent.***
Leavitt, Sheldon J., *'43*, Oct. 11, 2022. ***Cent.***
Hilton, Harry Herbert, *'47*, no details.
Doll, Phillip Brock, *'49*, February 14, 2014.
McDonald, Vincent Joseph, *'50*, Jan. 16, 2018.
Wakeland, Howard Leslie, *'50*, Aug. 9, 2023.
Kuhn, Paul Anton, *'54*, no details.
Nash, Donald Henry, *'54*, May 17, 2020.
Lichtenberger, William W., *'55*, Oct. 28, 2023.
Likander, George A., *'55*, April 23, 2017.
Wymer, James L., *'55*, March 26, 2022.
Huber, Edward Allen, *'56*, June 23, 2022.
Larson, Carl Shipley, *'56*, January 10, 2021.
Scala, Sigmund, *'57*, November 25, 2013.
Liebman, Judith S., *'58*, July 8, 2023.
Magnuson, William L., *'60*, Sept. 9, 2012.
Loblaw, James C., *'61*, September 6, 2022.
Madix, Robert James, *'61*, May 25, 2023.
Hintz, Norman Clare, *'62*, December 7, 2013.
Bartholomew, David Bruce, *'65*, Jan. 1, 2020.

BETA IL Β

Rosenvinge, Rolf C., *'53*, no details.
Bilsens, Gunars, *'58*, December 11, 2016.
Kozlik, John Francis, *'59*, December 2, 2017.
Hammond, Robert A., *'60*, February 14, 2016.

GAMMA IL Γ

Brunsenback, Richard W., *'50*, Oct. 27, 2015.
Wheeler, Robert Charles, *'55*, no details.
Taflove, Allen, *'71*, no details.

INDIANA

ALPHA IN Α

Salveter Jr., Robert Earl, *'49*, Aug. 11, 2023.
Denney, Ernest Leray, *'50*, March 2, 2023.
Neff, Warren Humphrey, *'50*, Oct. 29, 2022.
Rathbone, Donald E., *'51*, April 11, 2023.
Whitaker, Gordon Wallace, *'51*, Nov. 1, 2018.
Tusla Jr., Anthony A., *'53*, October 1, 2023.
Snell, Robert Ross, *'54*, June 24, 2022.
Conklin, Russell G., *'56*, September 29, 2018.
Chase Jr., Tom, *'57*, June 23, 2018.
Blasdell, William Earl, *'58*, no details.
Kleinedler, Gary Evan, *'59*, January 29, 2021.
Lindholm, John C., *'60*, January 10, 2020.
Kellems, Ronald Dean, *'61*, July 26, 2018.
Heirman, Donald Nestor, *'62*, Oct. 30, 2020.
Schott, Elizabeth Anne, *'66*, Dec. 2, 2023.
Hausser, Robert O., *'68*, November 22, 2023.
Fox, James Hoppes, *'70*, November 29, 2022.
Hall, Darryl Wayne, *'72*, October 15, 2023.

BETA IN Β

Flannigan, James Steven, *'68*, May 16, 2022.
Willman, Dale Alfred, *'72*, August 19, 2023.

IOWA

ALPHA IA Α

Bice, Don Corwin, *'49*, March 7, 2023.
Games, Keith Max, *'50*, May 4, 2017.
Crawford, Joseph, *'51*, Dec. 18, 2023.
Patrou, John Peter, *'51*, February 21, 2022.
Keeney, Martin Glen, *'52*, June 9, 2015.
Stocking, George Lane, *'52*, March 30, 2018.
Reid, Richard James, *'55*, February 20, 2022.
Hicks, Roger Dale, *'57*, December 4, 2023.
Woody, William Claire, *'57*, Dec. 18, 2017.
Rapp, Gary Barnum, *'61*, January 24, 2017.
Garrett, Kenneth L., *'64*, March 31, 2023.
Rodine, Thomas Gordon, *'66*, Nov. 25, 2021.
Wenger, Eric James, *'97*, May 7, 2022.

BETA IA Β

Sedlacek, Marvin F., *'53*, January 15, 2015.
Bear, James Edward, *'58*, April 8, 2023.
Kelly, Richard Walter, *'58*, January 25, 2021.
Warren, Charles Eugene, *'58*, Jan. 30, 2023.
Hemesath, Norbert B., *'59*, Dec. 8, 2019.

KANSAS

ALPHA KS Α

Hall, William Joel, *'48*, June 9, 2020.
Tyler, Ted, *'48*, December 6, 2022.
Meyer, John Edward, *'50*, January 24, 2021.
Harris, Max Hulen, *'53*, no details.
Phillips, Lewis Allen, *'55*, May 5, 2023.
McCall, Thomas Francis, *'56*, June 15, 2021.
Piatt, Phil Delbert, *'56*, July 25, 2023.
Gouty, Otis Dean, *'57*, April 1, 2019.
Gross, Ray George, *'58*, October 31, 2012.
Williams, Gary Allen, *'58*, May 21, 2014.
Marmoy, Samuel Frank, *'60*, August 18, 2020.
Zerwekh, Robert Paul, *'61*, May 5, 2023.
Geery, Alan James, *'63*, November 10, 2021.
Eichstadt, Francis Joseph, *'64*, April 3, 2020.
Shankles, Larry Earl, *'69*, June 5, 2023.

BETA KS Β

Joyner, H. Sajon, *'62*, August 9, 2023.
Ratzlaff, Melvin E., *'64*, February 9, 2015.
McKean, Michael Leon, *'65*, Sept. 21, 2023.
Satran, Dale R., *'76*, March 16, 2021.

GAMMA KS Γ

Lindly, Edwin C., *'42*, August 12, 2023. ***Cent.***
Dahl, Robert Eugene, *'51*, November 6, 2020.
Clark, Stanley J., *'54*, November 19, 2018.
Walker, Duane Eldon, *'61*, March 8, 2019.
Held, Jon Jay, *'82*, no details.

KENTUCKY

ALPHA KY Α

Phillips, William Henry, *'67*, no details.

LOUISIANA

ALPHA LA Α

Tellechea, Gabriel M., *'48*, Dec. 29, 2017.
Martin, Bruce Anthony, *'53*, Oct. 31, 2023.
Chauvin, Robert Louis, *'55*, June 18, 2023.
Oden, John Tinsley, *'59*, August 27, 2023.

BETA LA Β

Law, Victor John, *'60*, January 27, 2020.
Legendre III, Emile Joseph, *'60*, Oct. 3, 2023.
Mayberry, Douglas Gayle, *'77*, June 1, 2023.

GAMMA LA Γ

Gorton, Robert Lester, *'53*, May 19, 2018.
Walker, Donald Eugene, *'59*, June 23, 2017.
Richardson III, J. Thomas, *'61*, Dec. 22, 2023.

DELTA LA Δ

McClanahan, James M., *'57*, Jan. 18, 2022.

MAINE

ALPHA ME Α

Bunker, Clarence Edward, *'51*, Feb. 15, 2012.
Granger, Peter, *'52*, March 30, 2023.
Ellingwood, Franklin K., *'56*, June 14, 2004.
Petherbridge, David F., *'56*, Sept. 23, 2023.
Soini, Frank Richard, *'72*, January 30, 2013.

MARYLAND

ALPHA MD Α

Yuill, Stuart Joseph, *'56*, October 17, 2023.
Kane, Roger William, *'57*, February 3, 2021.

BETA MD Β

Bromley, Ralph Weaver, *'44*, August 21, 2021.
Johnson, Charles Otto, *'56*, October 16, 2023.
O'Neill, Lawrence Andrew, *'56*, Jan. 30, 2019.
Schelling, David Robert, *'61*, Sept. 11, 2023.
Witczak, Matthew W., *'62*, January 18, 2022.

MASSACHUSETTS

ALPHA MA Α

Lancey, Roderic Charles, *'51*, Dec. 6, 2023.
Malloy, John Francis, *'54*, October 27, 2016.
Galligan, Robert Francis, *'57*, April 1, 2022.
Gunter, Stephen Z., *'57*, April 15, 2023.
Duris, Robert Alan, *'74*, September 5, 2023.

BETA MA Β

Cradduck, Henry Eugene, *'46*, no details.
Ehrich, Fredric Franklin, *'47*, Aug. 17, 2023.
Dean Jr., Robert Charles, *'48*, Jan. 7, 2023.
Marshall, James Louis, *'49*, May 6, 2020.
Pounds, William Frank, *'50*, August 23, 2023.
Hennie III, Frederick Clair, *'55*, Oct. 24, 2023.
Luckett III, Paul H., *'56*, no details.
Miller, Kenneth Owen, *'56*, January 1, 2016.
Smoot, William Norris, *'56*, May 12, 2019.
Walters, Thomas Joseph, *'56*, July 3, 2023.
Duane III, Harry B., *'57*, June 19, 2012.
Goodman, James Allen, *'58*, Jan. 28, 2020.
Huang, Thomas Shi-Tao, *'60*, no details.
Kraver, Theodore Charles, *'60*, June 7, 2023.
Breon, Roy King, *'61*, September 23, 2016.
Woltz, Frank Earl, *'70*, May 18, 2020.

DELTA MA Δ

Kline, Jack, *'45*, July 3, 2019.
Burt, William Frederick, *'46*, October 4, 2022.
Lee, Richard Grayson, *'51*, Sept. 7, 2023.
Drazen, Erica L., *'68*, November 25, 2023.

EPSILON MA Ε

Williams, John Herbert, *'53*, July 18, 2017.
Bloom, Melvin Irving, *'55*, Dec. 30, 2017.
Magee Jr., Francis Robert, *'68*, no details.
Sullivan Jr., William F., *'73*, Dec. 2, 2022.
O'Leary, Raymond Paul, *'74*, June 26, 2023.

ZETA MA Ζ

Karshick, Frederick E., *'62*, Nov. 2, 2023.
Cashman, William F., *'71*, Sept. 22, 2022.
Capen, Richard F., *'74*, no details.

MICHIGAN

ALPHA MI Α

Lill, Melvin H., *'48*, April 27, 2023. ***Cent.***
Vaughn, David Ellsworth, *'48*, June 29, 2023.
Freiheit, Fred Edmund, *'52*, January 4, 2018.
Muir, John Nisbet, *'52*, September 10, 2012.
Farber, Bertrand Folco, *'53*, Sept. 24, 2018.
Triponi, D. G., *'53*, June 10, 2008.
Mah, Lee, *'54*, August 23, 2023.
Chipera, Thomas John, *'55*, no details.
Knott, Earl, *'56*, June 12, 2022.
Hamelink, Ronald Clare, *'58*, May 27, 2023.
Wochholz, Harold F., *'58*, Sept. 19, 2021.
Hager, Karl Arthur, *'59*, no details.
Bauerle, Russel Henry, *'60*, Nov. 17, 2021.
Burgett, Lee Ward, *'61*, December 21, 2014.
Vaughen, Marian Robert, *'61*, Sept. 13, 2018.
Kutchey, James Anthony, *'62*, Aug. 15, 2023.

BETA MI Β

Maney, Edward John, *'51*, July 31, 2016.
Zollinger, Howard Allison, *'51*, July 19, 2021.
Miotti, Willis Frank, *'54*, October 21, 2023.
Beatty, Owen John, *'56*, November 21, 2023.
Plutchak, Raoul Edward, *'62*, Sept. 29, 2023.
Burnette, Keith Thomas, *'64*, Sept. 11, 2023.
Bohren, James Frederick, *'67*, no details.

GAMMA MI Γ

Maurer, John Frederick, *'45*, Oct. 3, 2023. ***Cent***
Sagaser, Donald D., *'48*, August 7, 2021.
Stinchcombe, James D., *'49*, Sept. 16, 2020.
Chute, Robert Donald, *'50*, October 4, 2019.
Rice, James Howard, *'50*, November 2, 2015.
Voice, Clifford Carl, *'50*, May 19, 2020.
Asmus, Frederick John, *'53*, January 5, 2017.
White, Lynn Taylor, *'55*, July 2, 2020.
Gray, Jerry McNicoll, *'56*, January 1, 2021.
De Vries, Donald H., *'57*, August 3, 2015.
Reed, Calvin Lynn, *'58*, January 18, 2023.
Jankowski, Daniel F., *'60*, Nov. 10, 2020.
Wareing, Albert John, *'63*, April 1, 2022.

DELTA MI Δ

Grau, James Edward, *'57*, August 7, 2021.
Tuffile, Fred Michael, *'63*, October 20, 2022.

EPSILON MI Ε

Rosenstein, Aaron Donald, *'52*, no details.
McCarty, Perry L., *'53*, June 4, 2023.
Wang, Edward Yeong, *'54*, no details.
Snell, Jay Francis, *'60*, September 29, 2019.
Schaaf, James Robert, *'65*, no details.
Malosh, James Boyd, *'66*, August 14, 2020.

ZETA MI Ζ

Engel Jr., Royce George, *'53*, Nov. 15, 2023.
Henry, Samuel Patrick, *'54*, June 30, 2023.
Penhorwood, Herbert F., *'60*, Nov. 3, 2022.

ETA MI Η

Hatch, Robert Dean, *'53*, no details.
Smith, Shawn Michael, *'10*, Nov. 11, 2020.

MINNESOTA

ALPHA MN Α

Engebretson, William E., *'54*, April 14, 2023.
Hrycak, Peter, *'55*, March 7, 2013.
Smits, Talivaldis Ivars, *'59*, Sept. 20, 2022.
Guyaux, James Robert, *'60*, Oct. 12, 2015.
Landgren, John Jeffrey, *'69*, Nov. 22, 2022.

MISSISSIPPI

ALPHA MS Α

Josey, James Larry, *'56*, January 14, 2022.
Mitchell, Willard Neal, *'57*, May 29, 2016.
Sheely Jr., Clyde Quitman, *'59*, Sept. 8, 2011.
Haynie, Robert Lowrey, *'62*, July 9, 2023.
McKay, Walter Jasper, *'65*, June 20, 2023.
Robinson, Rex Gorman, *'76*, July 1, 2009.

MISSOURI

ALPHA MO Α

Honerkamp, Joseph David, *'48*, Aug. 20, 2021.
Satterlee Jr., George L., *'52*, August 23, 2023.
Blinne, Robert Edward, *'60*, July 29, 2009.
Schaberg, Steven Donald, *'60*, Nov. 27, 2022.
Wesselhoeft, Adolf J., *'71*, Feb. 17, 2023.

CHAPTER ETERNAL

Continued

TX E

Texas Epsilon '83

Miguel A. Gonzalez-Ramos, Ph.D.

December 27, 2023

He served as dean of engineering at UT-Pan American, first Hispanic dean at UH-Clear Lake, and led efforts to establish the TX Nu Chapter at UTPA (now UTRGV).

BETA MO Β

Hackman, Vernon Emil, *'52*, Oct. 24, 2023.
Scott, Julius Norman, *'55*, June 28, 2023.
Pressly, Harold Bruce, *'58*, April 29, 2022.
Denise, Richard William, *'59*, May 16, 2014.
Grinker, Richard William, *'59*, July 10, 2016.
Denney, Gary N., *'60*, October 28, 2022.
Brost, Frederic Benjamin, *'63*, Sept. 9, 2020.

GAMMA MO Γ

Berger, Roger Lee, *'56*, September 27, 2021.
Hejnal, Albert Florie, *'57*, no details.
Wiese, John Morgan, *'57*, January 6, 2022.
Schwartz, Robert John, *'58*, Dec. 12, 2020.
Haas, Larry Allan, *'59*, August 12, 2021.
Rolling, Robert Edward, *'59*, Sept. 28, 2016.

MONTANA

BETA MT Β

Hoffer, Gregory James, *'04*, October 3, 2021.

NEBRASKA

ALPHA NE Α

Roelle, Wayne Berton, *'55*, Sept. 20, 2023.
Kersten, Leendert, *'56*, January 18, 2021.
Watson, Gene D., *'59*, September 22, 2018.
Boellstorff, James C., *'74*, April 8, 2020.

NEW HAMPSHIRE

ALPHA NH Α

Giguere, Winfield Joseph, *'54*, June 16, 2020.
O'Malley Jr., Robert E., *'60*, Dec. 31, 2020.
King, Gerard Francis, *'64*, October 4, 2023.

NEW JERSEY

ALPHA NJ Α

MacMillan, Robert Neilson, *'52*, May 12, 2015.
Blohm, Raymond William, *'57*, Jan. 14, 2008.
Frohreich, Robert James, *'69*, Aug. 17, 2023.

BETA NJ Β

Colosky, Benjamin Paul, *'53*, Nov. 13, 2023.
Puri, Narindra Narindra, *'55*, Dec. 4, 2015.
Duffy, Raymond W., *'57*, February 11, 2014.
Griffin, Ronald, *'58*, no details.
Rodkin, Dennis Leslie, *'58*, Nov. 5, 2020.
Juhl, Peter B., *'60*, October 22, 2023.

GAMMA NJ Γ

Heuman, Ralph, *'47*, May 30, 2002.
Cordes, Robert Gerhardt, *'48*, Nov. 25, 2023.
Kennedy, Peter Dean, *'49*, May 30, 2023.
Wojciak, Thaddeus J., *'52*, Sept. 11, 2017.
Scrupski, Stephen E., *'54*, June 30, 2020.
Yaworsky, Yaroslaus J., *'55*, April 16, 2017.
Zentmaier, Karl Henry, *'55*, March 3, 2018.
Wasyliw, Basil, *'56*, May 18, 2012.
Bien, John Dow-Ming, *'65*, February 5, 2021.

NEW YORK

ALPHA NY Α

Smith, Marshall Donald, *'52*, June 15, 2019.
Kramer, Henry William, *'53*, October 18, 2023.

BETA NY Β

Conine, Robert Dunlap, *'50*, Dec. 11, 2020.
Letizia, Alfonso, *'51*, November 19, 2016.
Rider, John Clifford, *'58*, May 30, 2020.

GAMMA NY Γ

Hansen, Bernard Leslie, *'48*, Jan. 16, 2013.
Feldman, Max, *'50*, no details.
Fleming, John Augustus, *'53*, Oct. 22, 2023.
Siegel, Harris T., *'53*, June 15, 2023.
Bowman, Richard Clark, *'54*, Sept. 28, 2023.
Carter, Thomas Lynn, *'54*, no details.
Doviak, Richard James, *'56*, March 12, 2021.
Graebner, John Conrad, *'58*, Oct. 30, 2004.
Stowell, Walter Henry, *'59*, Sept. 13, 2018.
Delair Jr., William, *'61*, July 7, 2020.
Fanning, Daniel Patrick, *'61*, Sept. 20, 2019.

DELTA NY Δ

Howell, John Keller, *'52*, March 20, 2023.
Spehalski, Richard J., *'58*, January 1, 2023.
Bowes, Alan Theodore, *'59*, July 11, 2018.
Kessler, David Steven, *'62*, no details.
Miller, James Harold, *'66*, no details.

EPSILON NY Ε

De Santo, Daniel Frank, *'52*, Jan. 16, 2020.
Kerr, Arnold D., *'52*, May 27, 2012.
Topper, Leo, *'54*, July 29, 2022.
Hatzakis, Michael, *'64*, February 3, 2023.

ZETA NY Ζ

Weber, Norman Daniels, *'59*, no details.
Bonomi, Marco John, *'60*, July 25, 2018.
Schrager, Morton Irving, *'61*, Dec. 16, 2021.

THETA NY Θ

Springfield, William Kinzly, *'55*, Jan. 30, 2023.
Pogozelski, Ronald, *'64*, March 23, 2022.

IOTA NY Ι

Mathisen, Melvin Kenneth, *'53*, Jan. 1, 2023.
Castine, Peter H., *'59*, December 22, 2021.

PI NY Π

Nilsen, Chris Frederick, *'56*, June 6, 2018.

NORTH CAROLINA

BETA NC Β

Meyers, Sam Sidney, *'34*, November 19, 2000.

GAMMA NC Γ

Stewart, Wilbur Clarence, *'58*, May 5, 2013.

NORTH DAKOTA

ALPHA ND Α

Schoephoerster, Delbert J., *'56*, Dec. 13, 2020.
Fiala, Harvey E., *'58*, September 8, 2023.
Ashley, Edward Ernest, *'59*, March 16, 2020.
Irwin, Gordon Ardell, *'59*, November 4, 2015.
Crowder, Harry Richard, *'60*, Sept. 24, 2018.
Olson, Dewey Erling, *'60*, May 28, 2020.

OHIO

ALPHA OH Α

Bell, Kenneth John, *'51*, April 17, 2023.
Brockett, Roger Ware, *'60*, March 19, 2023.
Prahl, Joseph Markel, *'63*, April 19, 2018.
Spreen, James Harold, *'71*, July 6, 2023.

BETA OH Β

Follstaedt, Donald William, *'59*, Dec. 1, 2021.
Shultz, Robert Dale, *'73*, September 19, 2014.

GAMMA OH Γ

Wilkinson, Bruce W., *'51*, March 16, 2016.
Ditrick, Norman Harold, *'52*, June 17, 2019.
Dempster, Harry Howard, *'58*, Oct. 22, 2020.

DELTA OH Δ

Prati, William M., *'60*, August 14, 2021.

EPSILON OH Ε

Malafa, Richard Leonard, *'54*, March 19, 2021.
Maisel Jr., James Edward, *'55*, Feb. 9, 2017.
Shubert, Ronald James, *'59*, July 24, 2015.
Putre, Henry A., *'62*, March 17, 2020.

ETA OH Η

Iden, David John, *'63*, May 3, 2023.
Eichinger, William Edward, *'85*, Jan. 30, 2023.

THETA OH Θ

Dryden, David Richard, *'65*, August 20, 2023.
Smedinghoff, John Francis, *'76*, April 9, 2023.

KAPPA OH Κ

Bruno, Richard, *'86*, no details.

MU OH Μ

Rathbun, Richard K., *'58*, October 19, 2023.

OKLAHOMA

ALPHA OK Α

Shapiro, Robert Allen, *'53*, August 12, 2015.
Shebester, Jerry Lee, *'59*, December 7, 2013.
Swihart Jr., John Donald, *'59*, Nov. 5, 2023.
Appl, Franklin John, *'60*, October 15, 2023.
La Gere, Gary Carl, *'61*, June 30, 2023.
Landrum, Ronald Grey, *'62*, August 24, 2022.
Lake, Jerome Glen, *'72*, no details.

BETA OK Β

Jackson, Lloyd E., *'49*, November 7, 2014.

GAMMA OK Γ

Hauck, George F. W., *'59*, November 20, 2008.

OREGON

ALPHA OR Α

Nichols, Richard Stanley, *'49*, Feb. 19, 2016.
Minea, William Keith, *'53*, October 19, 2023.
Cogan, Arnold Maurice, *'54*, no details.
Herndon, Laroy Burnard, *'54*, Oct. 9, 2022.
Smith Jr., Clifford V., *'54*, March 13, 2020.
Rector, Robert Earl, *'55*, September 25, 2018.
Heiken, Max Dee, *'59*, May 15, 2015.
McCann, Curtis Earl, *'62*, no details.

BETA OR Β

Savery, C. William, *'57*, January 14, 2022.

PENNSYLVANIA

ALPHA PA Α

Chen, John C., *'56*, no details.
Krizan, John Ernest, *'56*, no details.
Pennebaker Jr., William B., *'57*, Sept. 8, 2021.
Larsen, Bruce Osborn, *'59*, Nov. 28, 2018.
Donley, Clark Stephen, *'62*, October 27, 2021.
Fucci, Michael John, *'82*, no details.
Costa, Peter Anthony, *'84*, no details.

BETA PA Β

Horlacher, Robert Lee, *'57*, July 5, 2017.
Reed, William Gerald, *'63*, July 6, 2022.

GAMMA PA Γ

Barrow, Bruce Barton, *'50*, Nov. 30, 2023.
Appl, Fredric Carl, *'54*, November 15, 2018.

EPSILON PA Ε

Wilson Jr., Albro Carl, *'52*, August 19, 2010.
Philipp, Ronald Emerson, *'54*, Jan. 27, 2020.
Shupp, Franklin Richard, *'54*, March 15, 2021.
Lissenden Jr., George C., *'58*, Dec. 21, 2018.
Fishberg, Lewis David, *'60*, October 1, 2016.

ZETA PA Ζ

Ritchie, Allan Russell, *'53*, Sept. 24, 2023.
McQueston, James C., *'57*, Oct. 29, 2015.
Kennedy Jr., Thomas J., *'68*, July 17, 2019.

ETA PA Η

Van Dine Jr., Howard A., *'49*, Nov. 24, 2012.
Edgett, Norman Scott, *'61*, Sept. 8, 2022.

THETA PA Θ

White, Gerald Andrew, *'57*, April 23, 2022.
Samson, Robert, *'61*, May 14, 2005.
Woods Jr., Howard James, *'77*, Sept. 17, 2023.
Delecki, Adam T., *'05*, October 15, 2023.

KAPPA PA Κ

Zerbe, John E., *'44*, July 11, 2016.

RHODE ISLAND

BETA RI Β

Martin, James Singleton, *'76*, Nov. 19, 2017.

SOUTH CAROLINA

ALPHA SC Α

Howe, William Hazel, *'60*, March 20, 2018.
McKinney, Donald Edward, *'60*, Jan. 19, 2016.
Curlee III, Thomas Oscar, *'64*, Dec. 5, 2023.

BETA SC Β

Brown, James Garland, *'55*, June 25, 2023.
Bales, Ervin Lynn, *'57*, December 3, 2022.
Beard Jr., John Nelson, *'58*, Nov. 27, 2020.
Saimovici, Liviu-Bruno, *'74*, January 28, 2022.

GAMMA SC Γ

Stewart Jr., William Hogue, *'59*, May 8, 2010.
Wallace, Pete, *'59*, October 12, 2022.

TENNESSEE

ALPHA TN Α

McClung, Robert Warren, *'50*, Oct. 18, 2023.
Brewington Jr., Percy, *'54*, October 25, 2023.
Hafley, David C., *'56*, December 4, 2023.
Langley, Jesse Kenneth, *'56*, Sept. 30, 2012.
Mynatt, Fred Richard, *'62*, December 20, 2023.
Nieri, Jorge Antonio, *'79*, October 24, 2023.
Greeley, Ian Matthew, *'20*, October 21, 2023.

BETA TN Β

Westbrook Jr., Jimmy, *'58*, April 25, 2014.
Pack, Randall William, *'61*, Dec. 2, 2022.
Paul, William Joseph, *'77*, June 6, 2018.

DELTA TN Δ

Caldwell, Billy Boyd, *'77*, March 8, 2022.

TEXAS

ALPHA TX Α

Horneyer, Robert L., *'46*, no details.
Saye, Jack Elmer, *'47*, April 7, 2003.
Hugger, Bodin Anthony, *'56*, August 28, 2023.
Moore, Thomas S., *'56*, March 13, 2007.
Edgar, Arlen Lewis, *'57*, no details.
Erzurumlu, H. Chick M., *'57*, October 5, 2020.
Ford, Davis Lee, *'59*, September 15, 2023.
McCroskey, William James, *'60*, May 26, 2023.
Genz, Ralph Herman, *'61*, February 11, 2021.
Lemmons Jr., Robert Todd, *'74*, Oct. 27, 2023.

BETA TX Β

Gibson, Robert Lee, *'55*, June 20, 2012.

GAMMA TX Γ

Russel, William B., *'69*, September 24, 2023.

DELTA TX Δ

Emery, Harold B., *'49*, July 6, 2020.
Carroll, Lloyd Earl, *'50*, March 11, 2021.
Weiner, Peter Douglas, *'54*, January 1, 2015.
Jacobson, Peter Earl, *'55*, July 25, 2020.
Minter, Charles Henry, *'55*, Nov. 10, 2019.
Dokos, Nick George, *'57*, May 10, 2022.
Ash Jr., Henry G., *'59*, August 26, 2023.
Lednicky, Edward Frank, *'59*, April 3, 2006.
Urbanosky, Thomas F., *'59*, January 2, 2024.
Palmer, Lawrence Jones, *'60*, Oct. 20, 2023.
Wilder, J. Barry, *'61*, May 12, 2022.
Frazier, Walter Ronald, *'62*, Nov. 1, 2010.
Jordan-Culler, Teresa M., *'80*, Feb. 17, 2015.

EPSILON TX Ε

Gonzalez-Ramos, Miguel A., *'83*, Dec. 27, 2023.

ZETA TX Ζ

Carson Jr., Arthur Maxwell, *'56*, Nov. 19, 2020.

UTAH

ALPHA UT Α

Chapman, Arthur Collins, *'54*, Nov. 5, 2012.
Madsen, Blaine Marion, *'57*, Dec. 11, 2013.

VERMONT

ALPHA VT Α

Carpenter, Howard J., *'43*, April 24, 2010.
Berryman, John Elliott, *'54*, March 2, 2015.
Dawson, Robert Frank, *'57*, March 28, 2022.
Plumb, Stephen Clay, *'57*, May 31, 2022.
Hermance, Clarke E., *'58*, Sept. 18, 2016.
Wallace, Donald M., *'60*, Nov. 18, 2018.
Perry, Robert J., *'62*, December 2, 2023.

BETA VT Β

Klinger, Lloyd Edwin, *'57*, Sept. 13, 2023.

VIRGINIA

ALPHA VA Α

Ellett, D. Maxwell, *'43*, no details.
Chopey, Nicholas Paul, *'55*, no details.
McGalliard, Russell Lee, *'57*, Jan. 24, 2022.
Jones, Stuart Earl, *'58*, October 15, 2015.

BETA VA Β

Lechner, Richard Albert, *'59*, May 12, 2018.
Grindstaff, Donald A., *'64*, December 6, 2023.
Smith, David Lee, *'67*, no details.
Kerestes, Gary Joe, *'70*, January 1, 2016.
Oatts, Michael Lee, *'79*, May 21, 2015.

GAMMA VA Γ

Clemens, Neil William, *'88*, August 11, 2023.

WASHINGTON

ALPHA WA Α

Kieburtz, Richard Bruce, *'55*, Nov. 26, 2013.
Englund, Edward J., *'56*, March 29, 2021.
Keski, James Richard, *'57*, no details.
Hokanson, Ragnar Verner, *'60*, Nov. 28, 2011.
Gaudio, David Arthur, *'61*, no details.
Vrouwes, Jacobus Hendrik, *'67*, July 31, 2021.
Sabado, Maurice M., *'75*, no details.

BETA WA Β

Reese, Clyde LeRoy, *'50*, November 27, 2015.
Witt, James Herman, *'50*, October 6, 2020.
Brunstrom, Gerald Roy, *'51*, Nov. 29, 2023.
Slaughter, John Brooks, *'56*, Dec. 6, 2023.
Schutz, Gerald D., *'78*, January 23, 2023.

WEST VIRGINIA

ALPHA WV Α

Payne, Harold Ray, *'56*, February 24, 2023.
Gould, Marvin Burl, *'63*, May 6, 2022.
Stone, Robert Brand, *'65*, November 6, 2023.

BETA WV Β

Heindel, John F., *'66*, June 25, 2023.

WISCONSIN

ALPHA WI Α

Votava, Francis Anthony, *'55*, Jan. 27, 2018.
Berndt, Martin M., *'56*, no details.
Suelflow, Robert Eugene, *'58*, Dec. 28, 2022.
Waldenberger, James E., *'59*, March 1, 2022.
Wagner, Wayne Michael, *'62*, Jan. 26, 2019.

BETA WI Β

Rehagen, Herbert Anthony, *'51*, Oct. 12, 2023.
Mountain, John, *'55*, May 5, 2022.

THE AMERICAN UNIVERSITY OF SHARJAH

The petition for UAE Alpha at the American University of Sharjah, to be established as the 262nd Chapter of Tau Beta Pi, was approved by the 2023 Convention. The chapter will be installed March 3, 2024.

SHAPING LEADERS OF TOMORROW

American University of Sharjah (AUS) has a distinctive approach to higher education. Its focus on students and commitment to fostering entrepreneurial knowledge, through its comprehensive liberal arts education grounded in the American higher education system, has seen it recognized among the top 10 Arab universities for the past nine years in the QS Arab Region Univ. Ranking.

AUS is an independent, non-profit, coeducational institution formed on the American liberal arts model. It provides students of more than 90 nationalities, and with diverse ambitions the opportunity to learn, grow, and thrive. AUS students are challenged academically and benefit from the expertise of world-class faculty who are active researchers and leaders in their fields.

Beyond the classroom, AUS students enjoy a wide range of extracurricular activities, clubs, teams, and associations.

Founded in 1997, we continue to be one of the best-known and most highly respected universities in the Middle East, inspiring thousands of students to achieve academic excellence and engaging world-class faculty with outstanding credentials.

Our graduates have established a tradition of success as leaders and innovators in workplaces across the United Arab Emirates, the region, and the world. Apart from being hired by prominent multinationals such as Ernst & Young, Unilever, and Proctor & Gamble, our alumni have also gone on to shape the innovation landscape by creating start-ups that have a positive community impact, such as *Boksha.com*.

Our diverse body comprises award-winning students in all areas of research, innovation, and academia, as well as highly acclaimed and widely published faculty, from Fulbright Scholars to seasoned industry professionals.

Founded by His Highness Sheikh Dr. Sultan bin Mohammed Al Qasimi, Member of the Supreme Council of the United Arab Emirates and Ruler of Sharjah, the university was envisaged as a leading educational institution in the Gulf region. Consciously based upon American institutions of higher education, AUS is thoroughly grounded in Arab culture and is part of a larger process of the revitalization of intellectual life in the Middle East.

PROGRAM OFFERINGS

AUS offers 28 majors and 45 minors at the undergraduate level, 16 master's

degree programs, and 4 Ph.D. programs through the following academic divisions:

- College of Architecture, Art and Design
- College of Arts and Sciences
- College of Engineering
- School of Business Administration

While Arabic is the official language of the United Arab Emirates, the language of instruction at AUS is English. All classes and administrative functions are conducted in English.

As a university for the real world, AUS has far-reaching associations with the region's business and industry leaders. We offer students exciting opportunities to be part of industry-based research, professional internships, and projects in partnership with industry professionals. These opportunities are at the heart of many of our undergraduate programs.

DEMOGRAPHICS

AUS is a popular choice for students from around the world, thanks to our outstanding academic programs and our broader extracurricular student experience. AUS also boasts an almost 1:1 ratio of female and male students, bringing the perfect balance to our university community.

Our popular international exchange program brings students from across the world to our campus. Many AUS students enjoy immersing themselves in other cultures by spending a semester or a year abroad.

LICENSING AND ACCREDITATION

Students graduating from AUS earn a highly regarded degree from an American-accredited university, without having to travel to the USA. All of our degrees are internationally recognized, which means our graduates are eligible to secure employment and pursue further studies anywhere in the world.

POSTGRADUATE AND RESEARCH OPPORTUNITIES

We offer a wide range of graduate programs, from engineering and urban planning, to business, science, and the liberal arts. Through these programs, we nurture, guide, and develop student ambition, making them ready to innovate, influence, and lead as a professional.

Those seeking a career in research can join AUS as we seek to solve some of the most complex problems impacting our region and world, from finding new ways to treat and cure cancer to finding more sustainable approaches to urban development, and more.

FACILITIES

The AUS campus, known for its beauty, architecture, and exceptional facilities, includes the region's only Bloomberg-equipped International Trading Floor, along with state-of-the-art science and engineering laboratories, fully equipped multimedia and art studios, and a comprehensive library.

Our full-service campus also features a large multi-use sports complex; comprehensive health center; a wide range of restaurants and cafes; residential halls for on-campus living; and many other amenities.

LOCATION

The university's strategic location between Europe and Asia, and its proximity to the Dubai and Sharjah international airports, have been cited as reasons for the popularity of AUS.

Sharjah is one of the UAE's seven Emirates. The city center of Sharjah is just a short drive from the metropolis of Dubai, one of the world's leading tourism and business destinations. Known as one of the Islamic world's cultural centers and the UAE's sporting hub, there is no shortage of activities outside of campus for students. Along with museums and historical sites, desert camping, and camel racing are high on the list for AUS students looking to experience a real piece of Sharjah.

FACULTY

AUS has more than 300 full-time faculty dedicated to help students reach their potential. Our faculty are active researchers uniquely positioned to deliver a rigorous university education in the Arabian Gulf region, as they combine a breadth of international knowledge with deep, regional understanding.

STUDENT LIFE

Many students live on campus, along with our community of faculty and their families. We offer a range of student-led extracurricular activities, from ethnic and national clubs, to personal interest groups in areas such as performing arts, photography, science, and philosophy, to community service campaigns, and more. Students who are part of our sports teams compete in local, national, and international events.

SUSTAINABILITY COMMITMENT

Sustainability is a strategic priority of AUS and recognizes that students, regardless of their major, should be well prepared to facilitate positive sustainability outcomes in their future careers. Therefore, 72 percent of all AUS undergraduate and graduate courses have at least some element related to sustainability. Aligning its sustainability efforts with the UAE's Net Zero by 2050 strategic initiative, AUS has developed a Climate Action Plan that will help reduce carbon emissions.

TEXAS A&M UNIVERSITY AT QATAR

Above image: The Bent monument on the Qatar campus.

The petition for Qatar Alpha at Texas A&M University at Qatar, to be established as the 263rd Chapter of Tau Beta Pi, was approved by the 2023 Convention. Operating since April 20, 2011, as a sub-chapter unit of Texas Delta at Texas A&M, the Qatar Alpha Chapter will be installed March 5, 2024.

UNIVERSITY PROGRAMS

Since 2003, Texas A&M at Qatar has graduated more than 1,500 students spanning four crucial undergraduate engineering disciplines: chemical engineering, electrical engineering, mechanical engineering, and petroleum engineering. Our program also extends to include two master's degrees in chemical engineering. Recently introduced, the Texas A&M at Qatar Ph.D. Fellows Program, which further enriches Qatar's educational and research landscape, focuses on research directly relevant to Qatar's needs.

Students at the Qatar campus receive an identical curriculum to that offered at our flagship campus in College Station, Texas, while also gaining diverse opportunities for research engagement in both Doha and College Station.

A large percentage of our students experience student life at the flagship campus during their study-abroad trips or other student exchanges.

AGGIE STUDENT VALUES

What truly sets our students apart is our emphasis on cultivating the complete engineer, rather than focusing solely on technical knowledge. Alongside their technical education, students undergo rigorous training in vital professional skills, such as communication, leadership, critical thinking, and negotiation. Texas A&M students are called Aggies, and the Aggie Core Values of Respect, Excellence, Leadership, Loyalty, Integrity, and Selfless Service are instilled in each of our students. This comprehensive approach equips them to become engineering leaders not only within Qatar but also across the broader region.

SHARED LEARNING

Our collaborations within the academic sector are significant. We work closely with partner universities in Qatar Foundation's Education City — which hosts branch campuses of some of the world's leading educational institutes, a homegrown research university, start-up incubators, technology parks, and heritage and cultural sites — to create a multifaceted educational experience for our students. They have the flexibility to cross-register for diverse disciplines and minors, enriching their learning journey. This shared learning experience is at the heart of Qatar Foundation's goals for multiversity, and we are excited to be supporting that effort.

MISSION

It is our mission to educate engineers who have solid knowledge and expertise grounded in the understanding of the limits of knowledge, the challenges of industry, and the consequences of a rapidly transforming world. Such education requires a vibrant research environment, where new knowledge and solutions are created that have a positive impact on industry and society at large.

RESEARCH

Regarding research, our esteemed faculty and students undertake projects with tangible real-world implications, extending beyond Qatar's borders to impact global challenges. The ongoing research covers a range of pivotal areas, including energy conversion, carbon capture, desalination, agriculture, and healthcare. A multitude of impactful projects have left a significant mark on Qatar, showcasing our research prowess.

- The chemical engineering program is aiding Qatar's efforts to mitigate the environmental impact of hydrocarbons through new technologies to reduce emissions while working to accelerate the transition of Qatar's energy industry to meet the demands of a low or zero-carbon world.
- The electrical and computer engineering program is responding to Qatar's goals for sustainable energy, advanced healthcare, and robust national security through research and advancement of emerging technologies such as artificial intelligence, machine learning, and data analytics.
- The mechanical engineering program is responding to Qatar's economic-diversification ambitions to become a global center for smart and sustainable manufacturing. This research will address a range of topics such as advanced materials, additive and hybrid manufacturing, artificial intelligence, energy-efficient technologies, and data-driven modeling and optimization.
- The petroleum engineering program is supporting Qatar's aims for global energy leadership by applying data science to maximize the value of Qatar's upstream and midstream energy sectors. This research will leverage big data and machine learning technologies to improve production efficiency and carbon capture

INTERNATIONAL ENGINEERS

Our commitment remains steadfast in cultivating the next generation of engineering leaders for Qatar and the region — innovative thinkers at the forefront of driving positive transformations in the world around us. We aim to continue delivering engineering excellence to all our stakeholders, aiding Qatar in discovering pivotal solutions for its grand challenges in energy, water, and the environment. Texas A&M at Qatar engineers will not just have superior technical perspectives but also acquire other essential skills crucial for achieving success.

The Texas A&M at Qatar campus.

Acronyms continued from page 19.

respiratory care context. In fact, one website lists 214 definitions of the acronym AMC.[8] Obviously, the speaker (or writer), and the listener (or reader) must have synchronized interests in order to know which meaning is understandable.

Airport designations are given by three-letter codes, but are not truly TLAs:[9] DFW (Dallas Fort Worth), LGA (LaGuardia airport), ORD (O'Hare airport, standing for OrchaRD field, referring to the use of the property prior to building the airport), and SEA (Sea Tac Airport, serving Seattle & Tacoma, Washington State).

Whereas most TLAs are spoken as the three letters that they comprise, some TLAs are given nicknames and pronounced as their own words, such as BBC (British Broadcasting Corporation), sometimes called "the beeb," FRC (Federal Regulatory Commission), pronounced "ferk," GUI (Graphic User Interface), pronounced "gooey," RAM (Random Access Memory), said as "ram," and ROM (Read Only Memory), articulated as "rom." Previously mentioned TLAs, FET, and PFAs are pronounced "fet" and "pee-fas." Notice that, in each of these cases, the spoken nickname requires less effort to articulate than saying the actual acronym, and certainly less effort than saying the words for which the acronym stands for.

AKA (Also Known As, for an alias, nickname, or other moniker) is an acronym that doesn't seem quite right, with a "K" in the place of a word that begins with an "n" sound. Similarly, the American Psychological Association (APA) has a "P" in place of a word starting with an "s" sound. On the other hand, IOU (I Owe You), is almost the opposite, with a "u" included to reflect the sound of the word "you," rather than a "y," which might typically be expected to be included. The more familiar TLA of UFO (Unidentified Flying Object) has been replaced by NASA with the acronym UAP (Unidentified Anomalous Phenomenon), with a "P" in place of an "F" sound. The above are just a few examples of the many TLAs that have peppered our language in recent years. The list is really so much longer, and most people could add at least a few without too much thought.

The common practice of cell phone texting has led to the proliferation of TLAs for repetitively used phrases. We have gotten so used to using three-letter acronyms that they slip off our tongues (or the tips of our fingers, in the case of texting) without thinking about whether or not others understand what we are talking about. Authors and speakers must be sure to define whatever TLAs they use in their writings or conversations to be sure that their audiences understand what is being introduced. TLAs are so common that it would be easy to forget that all listeners or readers may not have previously encountered some of them. Contrarily, it is likely that some other people may be more familiar with some TLAs that are commonly used among their peers.[10] Perhaps there will come a time when all of our speech will consist of AMWs (Abbreviated Meaningful Words).

ARTHUR T. JOHNSON served as an officer in the U.S. Army and in Vietnam at the rank of captain. He was awarded the Army Commendation Medal and Bronze Star Medal. Arthur earned B.S., M.S., and Ph.D. degrees in agricultural engineering from Cornell University. He joined the Univ. of Maryland faculty in 1975, and became Professor Emeritus of bioengineering in 2009. He was co-chairman of the founding committee for the American Institute for Medical and Biological Engineering (AIMBE), served as its Executive Director (2004), and president of the Alliance for Engineering in Medicine and Biology (1984-88). He is a Founding Fellow of AIMBE, Fellow of the American Society for Engineering Education, and Fellow of the Institute for Electrical and Electronics Engineers. He has written three books on biomechanics, transport processes, and biology for engineers and holds six patents related to respiratory mechanics and measurement.

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NEST

NEW ENGINEERING SOLUTIONS FOR TOMORROW

What Is NEST?

NEST is a yearly TBP competition where students submit solutions that address a general topic chosen by the Convention body each year. We classify these student submissions as EGGS, or Engineered for the Greater Good Solutions (EGGS). Students are encouraged to work in teams and present their unique EGGS to Convention to try and persuade alumni and industry sponsors that their ideas are the best investment to solve the NEST challenge. A panel of alumni selects the most innovative and practical EGGS(s) to be awarded an investment. Those funds are used to build the prototype and then present at the following Convention to show what was made possible!

So what does that mean?

- TBP Convention selects the societal or organizational problem
- Adds a "Main Event" to Convention
- Solutions are presented as pitches and posters vying for the best overall EGG

Who can participate?

- All Engineering Students!

Find out more!

https://tbpnest.wixsite.com/home/

Why do this?

- Give back to society
- Create meaningful solutions to real world problems
- Generate awareness for the Association

Alumnus Involvement

- Engagement with a new generation of engineers
- Give back and immortalize great engineering knowledge

Student Involvement

- Recognition at a national level
- Exposure to industry best practices and resources
- Mentorship and "on-the-job" type training

Alumni Giving

Downing Club continued from page 29

MI Γ
Capelli, Ronald B. '73
Drago, Gary Alan '75
Duncan, T. Michael '75
Earl, George Clayton '66
Fertel, Howard Kevin '79
Foulke, James Alvin '59
Friess, John George '57
Gray, Jeffrey James '94
Hand III, Mike J. '11
Holm, John Gustaf '89
Kleinau, Julie Ann '84
Kosnik, Paul E. '99
Lisiecki, Gayle B. '79
Lisiecki, Robert Joseph '78
Lugten, John Butterfield '76
Mohsberg III, Sidney Augustus '71
Sanguinetti, John Winston '70
Sheets, Alan '81
Sherman, Larry Glenn '66
Smith, Thomas Murray '72
Taylor, Mark Edward '74
Weber, Michael Frederick '78
Winter, Steven D. '81
Ye, Eric Thomas '84
Zuk, David Michael '70

MI Δ
Caste, Richard Alan '68
Dauerer, Walter Peter '60
Marino, Joseph Anthony '72
Minnich, Katherine Patricia '78
Rutkowski, Paul John '69

MI E
Basberg, Douglas Spencer '69
Hill-Stramsak, Colleen Lynn '00
Kellar, James Stephen '60
King, James Bartholomew '65
Siepierski, Michael Anthony '80
Sigler, David Rudolph '76

MI Z
Foraker Jr., David Ernest '58
Haines, John Gregory '72
Lachele, Roger Eric '75
Scarlatelli, Michael George '76

MI H
Harder, Shawn Jay '80
Stramsak, Steve A. '01

MI Θ
Beck, B. Terry '71

MI I
Curry, Crystal Rae '83

MN A
Bakke, Mark Alan '88
Braaten, David Laverne '75
Fleming, David Paul '61
Holm, John David '62
Larson, Michael Lane '59
McLeod, Gary Wayne '70
Petrich, Gale Sean '86
Schwantz, Gary Lynn '73
Thompson, Richard Alvin '77
Tran, Binh Van '89

MS A
Cleveland, William Peter '10
Gelman, Stephen '73
Hatmaker Jr., John William '79
Hibbard, Janet C. '86
Hibbard, Michael Joseph '78
Hilkert, James Michael '71
Hodge, B. Keith '65
Johnson, Rodger Lee '71
Jones, Donald Rush '61
Miller, Elton Ray '70
Mills, Marvin Leon '65
Siler, Raymond David '83
Steele Jr., W. Glenn '68
Yates, Karen '73
Yates, Michael D. '74

MS B
Simmons, Mary Ann '85

MO A
Caruthers, James Ronald '69
Crabbe, Emmanuel Francois '81
Gardner, Roger William '63
Henderson, Betsy Anderson '84
Herman Jr., Donald Louis '84
Hibner, Dale Vern '74
Lange, Stephen Joseph '85
Stiefermann, Michael Charles '86

MO B
Bodenhamer, Steven D. '75
Buenemann Jr., Morris C. F. '82
Cawns, Albert Edward '59
Ernest, Terry Lee '82
Hardebeck, Harry Elmer '57
Horstmann, Paul William '73
Jenkins, Glenn Willard '59
Mank, Del Aloysius '69
McJimsey, Edward Clair '71
Sedovic, Pete Stephen '81
Steinman, Rebecca Lee '96
Stevens II, Oramel Dale '72

MO Γ
Dyson, Karen A. '81
Dyson, Peter Bernard '80
Stephens, Mary Elizabeth '88
Sullivan, Gregory Alan '81

MT A
Delaney, Robert Charles '88
Egeland, Monte Dean '81
Kolb, Robert C. '61
MacKin, Peter '81

MT B
Erickson, Elizabeth Jeffery '93
McDonnell, Kathleen Gayel '83

NE A
Claar, Stephen Beryl '73
Hazzard, Russell Lynn '83
Langford, Susan Kathleen '90
Matthews, Deborah Jo '82
Paxton, William Glenn '87
Stransky, David Wayne '92

NV A
Karably, Kenneth B. '83

NH A
Charron, Ronald Harvey '64

NH B
Cloyd, Joseph R. '02

NJ A
Chen, Kevin Emmanuel '06
Ehrhardt, William Christopher '68
Osborne, Scott Reynard '70
Schell, Robert Dallas '74
Schmidt, Arthur Joseph '68
Stein, Gary Richard '67
Tensfeldt, Thomas George '81
Tompetrini, Kenneth Frank '65

NJ B
Andre, Gerald R. '75
Babb, John Everett '71
Bubenick, David Virgil '73
Palko, John Raymond '69
Renkart, Brandon M. '08
Tanner, Bob Brand '64
Wolf, David '65
Wollmann, Norman P. '81
York, Brian J. '82

NJ Γ
Castaldi, Frank James '69
De Caprio, Vincent '72
Goodrich Jr., Robert Rhoades '70
Kobylarz, Thaddeus John '58
Labos, William Joseph '73
McWilliams, John Paul '65
Rij, Jerry Jerome '72
Szebenyi, Tom A. '69

NJ Δ
Bennett, Karl Edward '76
Lisle Jr., Thomas K. '69
Anonymous '78
Stern, Hal Lawrence '84
Wise, Frank W. '80

NM A
Bradt, David Jay '81
James, Jonathan Christopher '97

NM B
Gonzales, Michael Anthony '74
Turner, Diane '78

NM Γ
Bakkom, Erik Iver '97
Rocco, Jim Robert '85

NY A
Bucknor, Norman Kenneth '84
Epling Jr., William Young '83
Franco, Peter Flavio '76
Silbert, Glenn Richard '75
Thomashower, William Jay '70

NY B
Bickley, Thomas Duane '78
Chandler, George Dennis '70
Olson, John Frederick '64

NY Γ
Antelman, Robert W. '73
Blakeman II, Robert Denis '89
Brown Jr., Alfred Winsor '66
Bruch, Charles Gregory '59
Capek, Thomas George '86
Foust Jr., Tilman Harrison '68
Ives, Jon Robert '61
Joyce, Michael Edward '82
Lewandowski, Michael '96
Lyden, Michael Joseph '78
McCormick, Peter Elliott '80
Natale, Michael Robert '02
Staudinger, James Robert '77
Veldman, John Peter '70
Walter, Buff Arthur '60

NY Δ
Broadhead, James Lowell '58
Carino, Nicholas Joseph '69
Day, Jamison Edward '92
Funke, Richard Harrison '71
Gordon Jr., James Power '83
Hodgson Jr., Edward William '68
Jureller, Steven Francis '87
Lampell, David Mark '73
Reth, Thomas Bernard '64
Sasso, Joseph Allen '70
Thomson Jr., James Bruce '68
Wiley, David Robert '82

NY E
Brodsky, Wesley G. '71
Dobbins, Bob Mark '73
Feldman, Robert E. '59
Pinnes, Edward Lawrence '71
Rosen, Fredric Kenneth '62

NY Z
Gersten, Marvin Charles '60
Hamm Jr., Bill '67
Kaczmarek, Richard '73
Labianca, Frank M. '61
Parisse, Richard F. '61
Pawelko, Michael James '53
Sindel, Fred Hans '59
Young, Raymond Joseph '74

NY H
Lauer, Spencer David '67
McClean, Jomo L. '92
Minton, Evelyn Ann '73
Valcourt, Jean-Mary K. '85

NY Θ
Candelora II, John Philip '91
Grubb, Mike Alan '78
Lester, John Welch '52
Meyer, Bruce George '69

NY I
Berman, Jay Ira '78
Roos, Gregory Joseph '79

NY K
Alcaro, Domenic John '87
Epstein, Benjamin Ross '78
Hinshaw, David John '86
Isaacson, Morton Sanford '66
Peters, Kenneth Jerome '87
Singer, Bart Alan '82

NY Λ
Cilento, Eugene Vito '73
Ganetis, George Louis '78
Killeen, Michael James '73
Passut, Charles Albert '67
Taylor, Alwyn '75
Widmann, Bradley Howard '69

NY M
Bunk, Donald Samuel '55
Wilcox, Robert E. '73

NY Ν
Bloom Jr., Gordon Lee '66
Darroch, Michael Edward '84
Dristy, Mark Edward '85
Feldman, Scott '75
Havas, Donald William '67
Mann, Michael '77
Morris, George Craig '63
Theoclitus, David Thomas '86

NY Ξ
Byrnes, Richard Dennis '83
Glynn, Sean Francis '97
Haller, Marc Frederick '85
Mercandetti Jr., Anthony John '99
Mohan, Anne Elizabeth '09
Mohan, Marguerite Anne '04
Short, Rosemarie '91
Snyder, William Joseph '81
Steinle, Kathleen Susan '77
Storch, Florian Joseph '61
Tamaro, George John '59
Taylor, Maryanne Barbara '80

NY Ο
Doynow, Donald '75
Farrell, Timothy Michael '82

NY Π
DeVoe, Charles George '76
Drexel, Peter George '69
Kaemmerlen III, John T. '76

NY Ρ
Abreo, Leslie Anthony '97
Wong, Wai Kin '85

NY Τ
Chacko, Vinny James '09
Torres, Peter '02
Venable, Richard Robert '95

NC Α
Baker, Fred Eugene '60
Burkart, Alex Raymond '72
Capps, Dickson Michael '75
Karesh, Lewis James '81
Machnik, Nicholas Jan '76
Redano, Richard '78
Shelton, Monty Lee '84
Skinner, James Orville '73
Trivette, Wendell Allison '82
White, Samuel Ernest '69
Wilson, Mark Philip '79

NC Γ
Bullard, John Carson '47
Chambers, William Forrest '60
Farst, Douglas Edson '79

ND Α
Nyhus, Orville Kenneth '63
Sauvageau, Donald Richard '70

OH Α
Cares, William Ronald '63
Fernbacher, John Matthew '62
Hoh, Ka-Pi '84
Honious, Robert Todd '89
Kirkland, Earl J. '75
Weddell, James Kenneth '76

OH Β
Bulcher, Thomas J. '76
Dobashi, Harry Hideo '68
Fazzoni, Gregory Francis '76
Kojola, Scot Alan '95
Nair, Suresh Neelakantan '83
Olt, Richard A. '80
Robinette, Lisa Marie '03
Ruebusch, Robert Joseph '70
Shields, John L. '75
Smelser, Ronald Eugene '71

OH Γ
Au, Ralph Daniel '71
Frey, Mary Ellen '89
Kirner-Pribe, Susan M. '85
Magee, John V. '81
Mendelsohn, Richard H. '71
Meredith, David B. '72
Nodes, Scott Everett '84
O'Neal, Joe Edward '55
Verner, William James '58

OH Δ
Brademeyer, David Lee '62

OH Ε
Cull, Ronald Carl '70
Kubinec, William Richard '67
Rutledge, Sharon Kay '84
Yeamans, Jerry Andress '73

OH Ζ
Herman, Madison Rachelle '13
Spicer, Alvin L. '67

OH Η
Ball, James Allan '65
Breuder, Andrew Joseph '70
Eggers, James Arthur '72
Freyer, Gustav John '60
Hartman, Dean H. '99
Palazotto, Anthony Nicholas '55
Reid, Jim Henry '73

OH Θ
Brennan, Thomas J. '83
Keller, Robert Lee '63
Kelly, John Bernard '67
Walter, Ken Leo '63

OH Ι
Johnson, Scott D. '76
Schilling Jr., Walter William '97
Snyder, Sharon E. '09

OH Κ
Bunnell, Robert Lee '76
Duffy, Stephen Francis '78

OH Λ
Hallochak, Andrew John '77
Murphy, Charles James '77
Suhar, Richard Allen '83

OH Μ
Hill, Leah Beth '10

OK Α
Bastron, Victor Christian '66
Kleinsteiber, Stanley Warren '78
Lampl, Maurice Bernard '89
Quigg-Young, Nancy Belle '78
Wolf, Jerald Michael '88

OK Β
Strattan, Bob '58
Weston, Kenneth Clayton '55

OK Γ
Dean, Philip Maxwell '74
Miani, Lino M. '86

OR Α
King, Warren Edward '69
Miller, Mark Wade '89
Shaw, Jim Walter '70
Wilt, Jay N. '74

OR Β
Buchanan, Marlowe James '92

PA Α
Barndt, Ronald LaMar '58
Bradley, Gordon Hoover '62
Fowler Jr., W. Beall '59
Galella, Nancy Marie '85
Haist, Randall Matthew '80
Hjorth, Beverly Ellen '79
Hopkins, Richard Henry '63
Jonas, Cynthia Joy '82
Parsons Jr., Donald Francis '70
Ruth, Richard Lloyd '68
Wentzel, Alan Ray '75

PA Β
Bova, Francesco Antonio '05
Bradt, Andrea '76
Ciuca, James Allen '72
Cohen, Bruce Alan '72
Longenecker, John Robert '71
Matthias, Tracey Dawn '89
Mayers, Douglas L. '74
McNair Jr., Irving Maxwell '54
Naffin, Richard Keith '06
Olinick, Stephen Andrew '71
Orosz, Matthew P. '02
Ross, David Stanley '69
Sonsteby, Jon Michael '95
Zahora, Kenneth Richard '76

PA Γ
Cavalier III, Forrest J. '89
Cavalier, Nina Leslie '89
Cooley, Wils Lahugh '64

PA Δ
Nackoney, Ogden G. '63
Sokal, Allen M. '68
Turner, Michael Bryan '89

PA Ε
Almquist, Richard Paul '60
Guest, Frederick Charles '59

PA Ζ
Hill Jr., Albert Meredith '67
Anonymous '84

PA Η
Chick, Donald James '71
Gilman, Thomas Carter '66
Grier, Bruce Hood '77
Stiger, David Laverne '83
Swartz, William Ewing '54

PA Θ
Aschenbrenner, George T. '82
Braun, James Francis '84
Lombardi, Charles G. '65

PA Ι
Haigh, Bruce Whittemore '71
Schoenberger, Lewis Robert '84

PA Κ
Beseler, Jan W. '88
Mangelsdorf, Frederick E. '53

PA Λ
Hovanec, Andrew Stephen '58
Kaplan, Kenneth J. '84
Kulik, David Benedict '83
Tjader, William Stephen '79

PR Α
Brana-Mulero, Francisco Jose '74

RI Α
Campbell, Neal Stone '68
Clarke, Edward Nielsen '45

RI Β
Adamedes, Zoe '84
Bershtein, Margaret '85
Binns, George '59
Fletcher, Gilbert Alan '68
James, Charles Franklin '58
Karnes, Jeffrey S. '80
Knickle, Harold Norman '62
Silva, Ronald Ernest '74

SC Α
Barnwell Jr., Thomas Osborn '69
Cox Jr., Jacob H. '03
Prothro, Joseph E. '63
Rankin, Anne Marie '90
Scherer, John Harry '65
Snider, Eric H. '75
Stecker, Marc Kevin '82

SC Β
Bradey, Jeffery Ervin '85
Hidlay, Charlene Marie '96
Massey, Kristina Logue '71
Prunty Jr., Robert Wayne '71
Wilson Jr., Robert Lewis '69

SC Γ
Baggett, Charlie Cleveland '63
Gooley, Thomas Joseph '55
Kennedy Jr., Thomas William '64
Vergnolle, Bob Roland '65

SD Α
Beacom, E. Kevin '82
Berggren, Mark Harry '76
Brass, Lorin Lee '75
Byg, Jerald Norman '72
Callahan, Karla M. '99
Eisenbraun, Daniel Dale '75
Eizember, Thomas Richard '76

SD Β
Bocklund, Lori Sue '83

TN Α
Ayers, William Ralph '80
Bowers, Bob '68
Cavender, James Milton '66
Ellis, Jeffrey Thomas '93
Exum, Joe Hardman '52
Hunt, Roy Joe '67
Jackson, Karen Elizabeth '81
Kirby, Charles Anthony '74
Miller, Freddy M. '79
Moore, James Arthur '77
Olberding, Robert L. '82
Olberding, Terry Darlene '78
Peugeot, Richard Scott '60
St Clair, Edward Garland '70
Tomlinson, Edward Thomas '72
Totten, Barry Nelson '82
Ward, Joanne Schaich '81
Williamson, James Moore '79

Alumni Giving

Downing Club continued

TN Β
Convery, Thomas Patrick '02
Gray, William Harvey '70
Green Jr., Thomas Bagley '75
Heflinger, Richard Scott '72
Macchio, Gregory John '84
Morton, Wayne King '63
Petersen, Eric Scott '84
Petersen, Stephanie A. '84

TN Γ
Clevenger, Jerry Anderson '65
Crawford Jr., Walter Keith '62
Howey, James Edwin '68
Murphy, Fred Anthony '71

TN Δ
Luttmann, Lisa M. '82
Luttmann, Mark Joseph '82
Mancini, Vincent Eugene '86

TN Ζ
Rethwilm, Craig Richard '92

TX Α
Badgwell, Thomas Alan '92
Damek, Herman Andrew '97
Dodge, Nathan B. '68
Garrett, Darrel Wayne '70
Horton, Larry Earl '83
Hurst, Terry Lee '76
Marshall, James L. '72
Matlock, John Hudson '67
Parent, Laurence Edward '81
Stanbery, Sam R. '64
Wong, Lucas '84

TX Β
Boyd, Joseph Gregory '76
Cummins, Ronald Allen '75
Davis, David Lynn '75
Evans III, Peter '80
Jain, Ravinder K. '71
Marasco, David Foster '87
Schacht, John Paul '63

TX Γ
Cox, Bill E. '76
Fisher, John David '70
Hagler, Marion Otho '63
Horn, Kenneth Porter '61
Lucas, Raymond David '60
Smith, Fred Lewis '62

TX Δ
Boedecker, Tom Jay '64
Boutte, Jennifer Lynne '89
Caso, Gregory Scott '87
Coman, Paul Daniel '03
Cox, Ralph Frank '54
Kasch, Vernon Ray '73
Murthy, Prahlad N. '92
Newton, Philip Lynn '67
Perkins, Thomas Keeble '52
Pollock, Stephen Theodore '70
Sharp Jr., Allen Clemmons '55
Sturrock, John Michael '72
Vittetoe, James Edward '67

TX Ε
Herrmann, Edwin Peter '67

TX Ζ
Mars Jr., Jim Floyd '72

TX Η
McBay, Michael Raymond '73
Tepper, John C. '82
Totten, Dwight Lee '66
Williams, Larry Donal '80

TX Θ
Van Reet, Leo Joseph '70

TX Κ
Davis Jr., Hulen Mack '80
Davis, Pamela Walker '79
Jolley, Lawyer Curtis '79

TX Λ
Coon, John W. '91
Garcia, Danny '85
Perez, Romeo Rene '82
Wallace, Weldon Lee '74

UT Α
Carn, Ronald M. '72

UT Β
Enke, Glen Graham '62
Hardy, Mark Douglas '84
Thompson, James Rowley '76

UT Γ
Torgesen, Greg Lau '80

VT Α
Bouchard, Donald Raoul '81
Goddard, Eric Hapenny '86
Shatz, Jonathan Ary '82

VT Β
Berkman, Richard Lewis '69
Clark, David Thomas '81
Dekalb, Shawn Wayne '85
Kloster, Mark Seawell '95
Melzar, Jonathan Preston '85

VA Α
Anderson, Willie Corevis '75
Ashton, Michael Duane '74
Colonna, James Lewis '65
Cosby, James Gordon '61
DeYoung, John Howie '99
Evans, Gary Kyle '77
Forziati Jr., Ken Thomas '92
Ginader, Ken Lee '76
Lanford Jr., Stanard Franklin '55
Price, Michael Glendon '74

VA Β
Dalton Jr., Eddie Gene '86
Doughty, Gary Springer '77
Haight, Roger Quentin '82
Long, David A. '91
Reading, Christopher Russell '00
Sloan, Forrest Eugene '83
Snidow III, Lyle Christian '74
Wayne, Jennifer S. '83

VA Γ
McGowan, David Michael '89

WA Α
Bullock, Dennis Eugene '76
Chandler, Alan Scott '77
Chou, Chung-Kwang '75
Follett, Mark Samuel '74
Fosberg, Ted Michael '59
Levin, Marc E. '80
Miller, Stefan John '63
Otteman, Lloyd Gilbert '54
Schwam, Susan Elaine '88
Smith, Jeffrey Francis '82

WA Β
Groat, J. Everett '94
Hudspeth, James Charles '88
Langley, Duane Douglass '55
Scott, Norman Ray '58
Turi, Michael Allen '07

WA Δ
Burton, Brian Carver '97
Campion, Paula JoAnne '00

WV Α
Bibbee, Dennis Evans '75
Campbell, Donald Franklin '78
Fleischer, Charles John '70
King, Staci Renee '96
Rowe Jr., Eldridge Eugene '68
Zimmerman Jr., Albert Ray '58

WV Β
Harding, Thomas Wayne '86
Stevens, Ellen Weber '84

WI Α
Diedrich, Donald Leo '69
Fahrbach, David Rolland '69
Martell, Donald Louis '60
Nesbitt, John David '82
Pristelski, James Stanley '66
Schroeder, Jeffrey Alan '96
Sieker, Frederick A. '70
Washechek, Howard Charles '50

WI Β
Lubinski, Paul John '87
Oehler, Daniel Arthur '79
Wick, Paula M. '81
Wolf, Thomas Francis '59

WI Γ
Simon, Karen Anne '83

WI Ε
Eichman, Donald Gerald '06

WY Α
Fassett, Jeff W. '74
Galles, Daniel Joseph '74
Hill, Janet Lynn '95
Lester, Roger N. '87
Simon, Ronald Wayne '81

Seeking Executive Council Nominations

The 2024 ΤΒΠ Convention will elect three members to serve on the Executive Council (EC). Members interested in serving on the EC must be nominated by an alumni or collegiate chapter no later than July 1.

The Executive Director can work with candidates needing a formal nomination.

Candidates with experience in a variety of functions: business, finance, management, research, teaching, etc. and those with knowledge in the areas of advising collegiate chapters, alumni relations, branding, fundraising/development, and image enhancement are strongly encouraged to consider applying.

Read the position description at *www.tbp.org/?ECjob* for additional information.

If you know of a qualified candidate or are interested in learning more, review this letter, at *www.tbp.org/?ECnom* Nominations can be sent via email to *tbp@tbp.org*.

2024 ΤΒΠ Executive Council members: (left to right)
President Ron Hickling, CA E '80;
Councillor Tom Pinkham, MA E '88;
Councillor Rachel Alexander, CA U '15;
Treasurer Mike Hand, MI G '11;
Councillor Colleen Hill-Stramsak, MI E '00;
Executive Director Curtis Gomulinski, MI E '01;
Vice President Marla Peterson, AZ A '83, and
Secretary Henry Houh, MA B '89.

Councillors Joan Sciacca, CA M '87, and MingDe Lin, NY G '01, not pictured.

WANTED: VOLUNTEERS FOR CONVENTION

The Association is interested in identifying members who might wish to serve in supporting roles at future ΤΒΠ Conventions. The Collegiate and Alumnus Chapters and Association Officials may submit nominations for permanent Convention Chair to the Executive Council by June 1 of the Convention year for which the Chair will be selected. This individual must be a member familiar with Robert's Rules of Order and should have experience in conducting meetings with that philosophy.

At the same time a Convention Chair is selected, a Convention Parliamentarian will be selected. This individual must be a member with experience in using Robert's Rules of Order and have resources to help the Chair during Convention.

To assist the Chair and Parliamentarian in their duties, Tau Beta Pi also seeks volunteers to serve as the Tellers Committee Chair and Credentials Committee Chair.

Funding is available to cover most, if not all, of the expenses for these volunteers to attend the Convention. This includes travel, lodging, and meals.

These volunteers must be able to attend the Convention in Rapid City, SD, from October 23-27, 2024. Candidates should express their interest to the ΤΒΠ Executive Director (**tbp@tbp.org**) no later than June 1. Please include your resume and indicate the position for which you wish to apply.

★★★★★★

ASSOCIATION BRIEFS

Indiana Zeta Chapter officers joined Indy Alumni Chapter members at their fall initiation.

Alumni and collegiate Tau Bates at Drexel University.

ALUMNI ACTIVITY:
INDIANAPOLIS (IN) ALUMNI CHAPTER

The Indy Alumni Chapter had the honor of participating in the IN Zeta Chapter's fall initiation at Indiana University-Purdue University Indianapolis. A total of ten new members were initiated and the following Tau Bate Indy alumni were present:

Elaine B. Ivy, *PA A '15*, treasurer; James Sedoff, EIT, *IN B '09*; and Steve C. Meyer, P.E., *MO B '84*, president.

IN Z officers included: Alec N. LaPlant, *IN Z '24*, vice president; Shelby S. Busker, *IN Z '24,* president; and Nathaniel L. Lazorchak, *IN Z '22*, recording secretary.

Thanks to the Indy AC for posting the image and info to social media. Contact the chapter at: *tbpindy@gmail.com*

ALUMNI ACTIVITY:
CENTRAL JERSEY (NJ) ALUMNI CHAPTER

At Red Moon Pizzeria and Restaurant in Howell Township (NJ), the Central New Jersey Alumni Chapter hosted TBΠ Executive Director Curt Gomulinski and Director of Alumni Affairs Tricia Gomulinski during their fall East Coast trip. Eleven Tau Bates joined them for the gathering.

To join the Central Jersey Alumni Chapter, email: *CJAlumni@tbp.org*

ALUMNI ACTIVITY:
PHILADELPHIA, PENNSYLVANIA

On October 28, the PA Zeta Chapter at Drexel University hosted a lunch on campus for area alumni and local student chapters. Three collegiate chapter presidents spoke about their chapters, TBΠ Executive Director Gomulinski provided an update on the organization, and TBΠ Director of Alumni Affairs addressed the topic of alumni chapters as the Philadelphia Alumni Chapter is attempting to reactivate.

If you are interested in joining the reactivation efforts, contact: *t.gomulinski@tbp.org*

JOIN AN ALUMNI CHAPTER

Director of Alumni Affairs **Tricia E. Gomulinski**, *SD A '98*, works for Teledyne Brown Engineering in Knoxville, TN. Visit: www.tbp.org/?ACcontact or contact t.gomulinski@tbp.org, to discuss the possibility of joining/establishing a chapter.

REINSTALLATION OF BENT MONUMENT AT WEST VIRGINIA BETA

On January 29, 1972, at West Virginia Tech (now known as West Virginia University Institute of Technology) the 140th chapter of Tau Beta Pi was installed. **Leonard C. Nelson, Ph.D.,** *WV B '43*, then President of WV Tech, founded the local engineering honor society that petitioned for a ΤΒΠ chapter. At the WV Beta Chapter installation ceremony, 5 eminent engineers, 43 alumni, and 14 student members were initiated. The WV Beta Chapter has initiated 1,152 total members, since 1972.

When WVU Inst. of Tech. moved its campus in 2017 from Montgomery to Beckley, the Bent monument was removed. Since that time, there were several discussions about where to place the Bent on the campus and what type of support was needed.

The WV Beta student membership examined many options and on September 22, 2023, students, faculty, and alumni gathered for the reinstallation of the Bent monument with the original plaque mounted on a rock on the Beckley campus. **Mr. Bob DeHart II, P.E.,** *WV B '72*, (one of the student members inducted in 1972) also attended the reinstallation. A special thanks to WV Beta Chapter Advisor **Steven D. Leftwich, Ph.D., P.E.,** *WV B '75*, for submitting a summary and image.

Group image from the installation of the new WV Beta Bent monument location.

FRESHMAN STEM SCHOLARSHIPS:

Every year, six incoming college freshmen are awarded a Tau Beta Pi — SAE International Engineering Scholarship of $1,500 to pursue an engineering degree from an ABET accredited program. The 2023-24 recipients include:

Andrew Fujimoto (Oconomowoc, WI) - environmental engineering at Cornell University

Amira Hamilton (Caledonia, MI) - chemical engineering at Southern Univ. and A&M College (LA)

Aadit Jain (Bloomfield, MI) - computer engineering at the University of Michigan

Morgan Pfister (Waxhaw, NC) - mechanical engineering at Tennessee Technological University

Vittoria Riedling (Prospect, KY) - electrical & computer engineering at Vanderbilt University

Daniel Rojas (Weston, FL) - computer science at the University of Central Florida

Submit 2024 Award Nominations

The following Association award nominations are due by **April 1:**

The **Laureate Program —** recognizes members who excel in areas outside of engineering (arts, athletics, service, and diverse achievements). Nomination reference letters must be emailed to HQ. Selections will be made in June by a committee of District Directors appointed by the Executive Council. Winners will be announced in July, and each will receive $2,500 and a recognition plaque.

The **McDonald Mentor Award —** celebrates excellence in mentoring. The winner receives an engraved medallion, replica pin, and $1,000, and the nominating chapter receives $1,000.

The **Outstanding Advisor Award —** recognizes exceptional performance among the ΤΒΠ Chapter Advisors. The winner receives a plaque and $1,000, and the nominating chapter's dean receives $1,000 for its discretionary fund.

All award recipients are invited to the annual Convention. Information and nomination instructions are available for all three awards on the ΤΒΠ website:

www.tbp.org/memb/awards.cfm

ASSOCIATION BRIEFS

Continued

ALUMNI ACTIVITY:

OHIO'S NORTH COAST CHAPTER

In January, the Ohio's North Coast Alumni Chapter, in the Cleveland area, hosted an event with both ΤΒΠ alumni and several multi-collegiate chapters in attendance.

The New Year's activity took place at a local axe throwing venue and the day ended at a nearby restaurant for a meal and fellowship.

A total of 27 Tau Bates took part, including "new" local alumni joining for the first time. It was a pleasure to see the interaction between the alumni and the three area collegiate chapters, OH Alpha, OH Epsilon, and OH Kappa.

Thank you to ONC president Shelton D. Caruthers, *LA G '89*, for the summary and image (below). If you are interested in learning more about the ONCAC, contact: *oncac.tbp@gmail.com*

THE MYSTERIOUS LONG ISLAND, NY BENT MONUMENT

In February, Tau Beta Pi HQ was contacted by John Freijo regarding a "bronze symbol" found in the yard of a house he recently purchased in Shirley, NY. After exchanging images of this 100 lb object with HQ, it was determined that it is a 4' Bent monument, without the "stem" or base.

He had made plans to haul it to a junk yard, but curiosity won out. Mr. Freijo did deduce that ΤΒΠ was part of this "mystery" monument, but providing HQ with additional details was nearly impossible. All that we can surmise is that the *Long Island Bent* belonged to a previous owner of this address.

Given the location, it's possible that this Bent came from the NY Lambda Chapter at Pratt Institute, which was installed in 1952 as the 92nd chapter of the Association. However, it became inactive in 1993 after the school discontinued engineering classes and degrees.

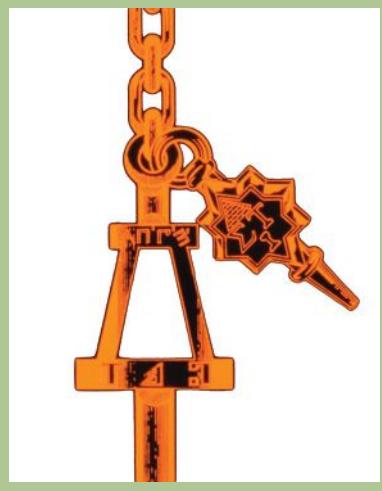
An image of the Bent monument in question provided by Mr. Freijo.

We explained to Mr. Freijo that these monuments, cast by a foundry, are ordered through our office and in some cases are cast at a local campus facility. Executive Director Gomulinski also shared that he has heard stories over the years about Bent monuments being stolen from a campus or misplaced during a construction project.

A plan is in place to inquire if one of the collegiate chapters in the New York area "lost" their Bent monument and to save this mystery Bent from the junk yard.

If you have information about this Bent monument, you can contact us at *tbp.media@tbp.org*.

GOLDEN ANNIVERSARY OF THE SIGMA TAU MERGER



Fifty years ago, on January 1, 1974, the Sigma Tau Fraternity merged into The Tau Beta Pi Association. The action was taken by the collegiate chapters of the two organizations following lengthy study and recommendation by their Councils. Sigma Tau was founded in 1904 at the University of Nebraska as an engineering honor society. At the time of merger, Tau Beta Pi had 146 collegiate chapters, with Sigma Tau having 34 and a total initiated membership of 45,000. The basis of merger was the conviction that a single, strong honor society would better serve the engineering profession.

The 22 Sigma Tau chapters at institutions formerly without Tau Beta Pi chapters began functioning under ΤΒΠ rules on January 1, 1974, and were converted to Tau Beta Pi chapters in formal ceremonies. The 12 Sigma Tau chapters that were located on campuses with ΤΒΠ chapters simply merged with the existing chapters by initiating their active members in 1974.

On June 30, 1974, the Sigma Tau national headquarters in Lincoln, Nebraska, was closed and its records were transferred to the ΤΒΠ Headquarters.

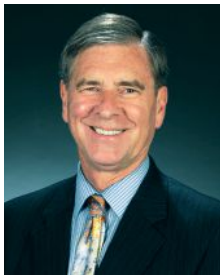
This year, we celebrate the 50th anniversary of the Sigma Tau chapters (in parentheses) that were converted to form new chapters of Tau Beta Pi (in bold) on the dates shown below.

Nebraska Alpha (Alpha) — January 26, 1974, University of Nebraska–Lincoln (147th ΤΒΠ chapter)
Pennsylvania Kappa (Nu) — March 20, 1974, Swarthmore College (152nd ΤΒΠ chapter)
Pennsylvania Lambda (Psi) — March 21, 1974, University of Pittsburgh (153rd ΤΒΠ chapter)
Kentucky Beta (Omicron) — March 24, 1974, University of Louisville (154th ΤΒΠ chapter)
Tennessee Delta (Alpha Mu) — March 30, 1974, Christian Brothers University (155th ΤΒΠ chapter)
Texas Iota (Alpha Beta) — April 2, 1974, Southern Methodist University (156th ΤΒΠ chapter)
Texas Kappa (Alpha Lambda) — April 3, 1974, Prairie View A&M University (157th ΤΒΠ chapter)
Texas Lambda (Alpha Eta) — April 4, 1974, Texas A&M University–Kingsville (158th ΤΒΠ chapter)
New Mexico Alpha (Alpha Gamma) — April 5, 1974, New Mexico State University (159th ΤΒΠ chapter)
New Mexico Beta (Chi) — April 6, 1974, University of New Mexico (160th ΤΒΠ chapter)
Oklahoma Gamma (Sigma) — April 7, 1974, Oklahoma State University (161st ΤΒΠ chapter)
Wyoming Alpha (Omega) — April 19, 1974, University of Wyoming (162nd ΤΒΠ chapter)
Colorado Delta (Alpha Alpha) — April 20, 1974, Colorado State University (163rd ΤΒΠ chapter)
South Dakota Alpha (Tau) — April 22, 1974, South Dakota School of Mines (164th ΤΒΠ chapter)
South Dakota Beta (Delta) — April 23, 1974, South Dakota State University (165th ΤΒΠ chapter)
North Dakota Beta (Pi) — April 24, 1974, University of North Dakota (166th ΤΒΠ chapter)
Idaho Alpha (Rho) — May 2, 1974, University of Idaho (167th ΤΒΠ chapter)
California Rho (Alpha Kappa) — May 9, 1974, California State University, Fresno (168th ΤΒΠ chapter)
Nevada Alpha (Alpha Epsilon) — May 10, 1974, University of Nevada, Reno (169th ΤΒΠ chapter)
Utah Gamma (Alpha Delta) — May 11, 1974, Utah State University (170th ΤΒΠ chapter)
Ohio Kappa (Phi) — May 21, 1974, University of Akron (171st ΤΒΠ chapter)
Ohio Lambda (Alpha Theta) — May 22, 1974, Youngstown State University (172nd ΤΒΠ chapter)

Additional information about the merger can be found at **www.tbp.org/?SigmaTau**

ALUMNI NOTES

Your fellow Tau Bates are interested in news about **you.**



CALIFORNIA EPSILON '75

William R. Goodin Ph.D.

Bill was elected as a Fellow of the Society of Women Engineers (SWE) for "leveraging deep experience and connections in the interest of women engineering students; and for demonstrating personal generosity and mentoring support that ensures their visibility and success." He serves as a CA Epsilon Chapter Advisor.

CALIFORNIA NU '84

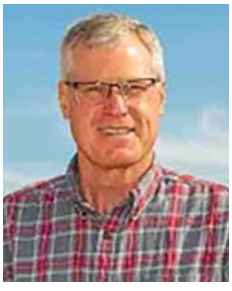
James S.B. Chew

James was inducted into the Antelope Valley High School Hall of Fame in Lancaster, California, October 13, 2023. He is currently senior global group director, aerospace and defense for Cadence Design Systems and chairs the National Defense Industrial Association Science and Engineering Technology Division.

CALIFORNIA UPSILON '04

Joseph R. Burnett P.E.

Joe joined Blue Origin as Director – PMO/IPT Lead. Most recently, he was business development manager at General Dynamics Ordnance and Tactical Systems. Joe has a B.S. degree in mechanical engineering from Sacramento State University and served as a ΤΒΠ District 15 Director from 2007-15.



COLORADO BETA '87

Paul E. Brierley P.E.

Paul was appointed director of the Arizona Department of Agriculture and will also serve in the governor's cabinet. Previously, he was founding executive director of the Yuma Center of Excellence for Desert Agriculture and has an electrical and computer engineering degree from CU Boulder.

ILLINOIS GAMMA '86

Gwynne E. Shotwell

Gwynne received the 2023 Washington Award from the Western Society of Engineers and Award Commission. As president/COO of SpaceX, she led the building of the Falcon launch vehicles, oversaw 170 orbit launches, and was honored for her "leading role spearheading private enterprise space exploration."

LOUISIANA GAMMA '78

George A. Baldwin Jr. P.E.

George was named the newest Tower Medallion recipient and inductee into the Hall of Distinguished Alumni by the Louisiana Tech Alumni Association. He is a principal of Baldwin Madden Energy, LLC, president and CEO of three EnSight Energy oil and gas partnerships, and a petroleum engineering Tech alumnus.

MISSOURI BETA '05

Julia C. Hilton

Julia was inducted into the Missouri S&T Academy of Engineering Management. She is vice president of Made in America Task Force Strategy, North America Operations for Schneider Electric, where she has worked for 17 years in a variety of global and regional roles. Julia also has experience in diesel product management.

MONTANA BETA '03

Capt. Christopher S. Casne P.E.

Chris was inducted into the Montana Tech Digger Athletics Hall of Fame 2023 class. He was a kicker for the football team from 1998-2002, team captain his senior year, and served as student body president and MT Beta Chapter president. Chris is the U.S. Navy installation commanding officer DC-region and has a B.S. in general eng'g.

NEW YORK GAMMA '86

Thomas G. Capek

Thomas was named to the Clarkson University Board of Trustees and will serve on the financial affairs committee and the facilities subcommittee. He is senior vice president and chief engineer at Corning Inc. His daughter Emily is an alumna of Clarkson, Tau Bate, and glass-making operations supervisor at Corning.

NORTH CAROLINA ALPHA '08

Joel W. Roberts

Joel was recognized as the Naval Facilities Engineering Systems Command, officer in charge of construction Florence Civilian Engineer of the Year. He works at the U.S. Marine Corps Base Camp Lejeune (NC) and his team has closed out 74 projects and executed $1 billion of work-in-place. Joel previously served as an air traffic control technician and earned a civil eng'g degree.

Send news about promotions, honors, civic activities, weddings, etc. to Tau Beta Pi, P.O. Box 2697, Knoxville, TN 37901-2697 or to tbp.media@tbp.org. Deadlines: May 1 for **Summer** issue and August 1 for the **Fall** issue. Include a recent head shot, name, address, chapter/class year, and email address or phone number. We cannot accept graduation announcements. Thank you!

PUERTO RICO ALPHA '13

Dennis A. Negrón-Rivera

Dennis has been commissioned as an oceanography officer with the U.S. Navy after completing Officer Candidate School. He will be based in Norfolk, VA, working at Fleet Weather Center. Dennis previously worked at Boeing as a software engineer and has B.S., M.S., and MBA degrees.

RHODE ISLAND BETA '14

Carlos R. Javier Ph.D.

was named a Hero Honoree in Great Minds in STEM by the Hispanic Engineer National Achievement Awards Conference. He is a mechanical engineer & principal investor in the Naval Undersea Warfare Center Undersea Warfare Platforms and Payload Integration Dept. with a focus in underwater explosives research.

SOUTH DAKOTA ALPHA '94

John W. Henderson P.E.

John was named CEO of HDR, an employee-owned architecture and engineering firm, where he had been serving as chief administrative officer. In his career, he has held command and staff positions in the U.S. Army, the Army Corps of Engineers, and served as the assistant secretary of the Air Force for Installations.

TEXAS ALPHA '88

Neil A. Graff P.E.

Neil has been promoted to president and COO of HDR after previously serving as the firm's director of U.S. and North America operations, since 2021. He began at HDR in 1991, is a leader in implementing water and wastewater projects, and has a B.S. in civil engineering from the University of Texas at Austin.

VIRGINIA BETA

William J. Dally Ph.D. (electrical engineering)

Essex E. Finney Jr. Ph.D. (agricultural engineering)

David E. Parekh Ph.D. (mechanical engineering)

Three of the six newest members inducted into the Virginia Tech Academy of Engineering Excellence are Tau Bates. The 2023 inductees were chosen from 77,000+ living college of engineering alumni, bringing the academy's total membership to 179.

"We welcome a group of exceptional inductees whose career achievements have made a significant impact on the field of engineering," said **Julie M. Ross, Ph.D.,** *IN A '90*, Virginia Tech Dean of Engineering. "As members of the academy, they represent the height of professional success ... ."

The college of engineering established the academy in 1999 under the direction of Dean Emeritus **F. William Stephenson, Ph.D.,** *VA B '61*, and the college's advisory board. Academy members have sustained contributions to engineering and leadership throughout their careers.

Dr. Dally began his career as a member of the technical staff for Bell Labs and transitioned into academia at MIT. Since 2004, he has taught computer architecture, digital systems engineering, very large-scale integration, and "green" electronics at Stanford University.

Dr. Finney was one of the first black students to attend Virginia Tech. He went on to have a 30-year career with the U.S. Dept. of Agriculture and was called to work as a senior policy analyst in the Office of the Science Advisor under Presidents Jimmy Carter and Ronald Reagan.

Dr. Parekh has worked for Boeing, McDonnell Douglas Research Labs, Georgia Tech Research Institute, and the United Technologies Research Center. He is CEO of SRI International, a nonprofit research institute with a rich history of supporting government and industry.

William J. Dally
VA B '80

Essex E. Finney Jr.
VA B '59

David E. Parekh
VA B '82

2024 DISTRICT CONFERENCE SCHEDULE

District 1: *April 13-14*
MA Epsilon – Boston

District 2: *April 6-7*
NY Tau – Binghamton

District 3: *Feb. 9-10*
DE Alpha – Newark

District 4: *April 6*
MD Beta – College Park

District 5: *Feb. 3-4*
SC Beta – Columbia

District 6: *Feb. 16-17*
MS Beta – Oxford

District 7: *April 5-6*
OH Theta – Dayton

District 8: *April 13-14*
IN Alpha – W. Lafayette

District 9: *Feb. 24*
MO Epsilon – St. Louis

District 10: *March 8-10*
TX Xi – Dallas

District 11: *April 12-13*
MN Beta – Duluth

District 12: *Feb. 23-24*
CO Delta – Ft. Collins

District 13: *April 13*
NM Alpha – Las Cruces

District 14: *Feb. 17-18*
WA Alpha – Seattle

District 15: *March 9*
CA Alpha – Berkeley

District 16: *Feb. 24-25*
CA Epsilon – Los Angeles

Note: Conference dates are subject to change.
For the latest information, check our website at:
www.tbp.org/off/districtConference.cfm

BENEFITS OF MEMBERSHIP

More at: ***www.tbp.org/?Benefits***

DELL: Discount program on Dell branded personal products, electronics, and accessories.

LINKEDIN: Join 35,700 members in our official group for professional networking and career discussions (search: Tau Beta Pi Engineering Honor Society).

CIVIL SERVICE: Receive automatic entry-level advancement of U.S. Government applicants to GS-7.

LOCAL HOSPITALITY: Access to a worldwide inventory of hotels at exclusively discounted rates.

PPI: 20 percent discount on professional licensing exam review materials (FE/EIT, PE, and more).

TAU BETA PI JOB BOARD: Post a resume online and browse hundreds of engineering jobs at top companies.

NAE 2024 International Member

Qinghuang (Ken) Lin, Ph.D.
Director, Lam Research Corp.
For electronic materials (and) for the manufacturing of integrated circuit products.

The 31st Tau Bate elected as an international member of the National Academy of Engineering, Ken, *MI G '93*, earned B.S. and M.S. degrees in polymers and chemical engineering at Tsinghua University in China.

He attended the University of Michigan for his Ph.D. in materials science and engineering. Ken also has an MBA from the NYU School of Business and his post-doc research was at the Univ. of Texas at Austin.

He previously worked at IBM as a project manager and at ASML as a director in the technology development center.

See page 5 for complete list of new 2024 Tau Bate/NAE members.

Member Change of Address

Be sure to keep your email and mailing addresses current in our system so you don't miss any issues of *The Bent*!

Updated information can be sent to ***tbp.memberupdate@tbp.org.*** Please include your name, initiating chapter, class (year of graduation), and any preferred name changes as well.

COLLEGIATE CHAPTERS

263 COLLEGIATE CHAPTERS
257 ACTIVE — 636,772 MEMBERS

6 Inactive chapters shown in ***BLUE***

Α = ALPHA
Β = BETA
Γ = GAMMA
Δ = DELTA
Ε = EPSILON
Ζ = ZETA
Η = ETA
Θ = THETA
Ι = IOTA
Κ = KAPPA
Λ = LAMBDA
Μ = MU
Ν = NU
Ξ = XI
Ο = OMICRON
Π = PI
Ρ = RHO
Σ = SIGMA
Τ = TAU
Υ = UPSILON
Φ = PHI
Χ = CHI
Ψ = PSI
Ω = OMEGA

AL ALPHA Auburn University
BETA University of Alabama
GAMMA Univ. of Ala. at Birmingham
DELTA Univ. of Ala. in Huntsville
EPSILON Univ. of South Alabama
AK ALPHA Univ. of Alaska Fairbanks
AZ ALPHA University of Arizona
BETA Arizona State University
GAMMA Northern Arizona University
DELTA Embry-Riddle Univ., Prescott
AR ALPHA University of Arkansas
BETA Univ. of Ark. at Little Rock
CA ALPHA UC Berkeley
BETA Calif. Institute of Technology
GAMMA Stanford University
DELTA University of Southern Calif.
EPSILON UC Los Angeles
ZETA Santa Clara University
ETA San Jose State University
THETA Calif. State Univ., Long Beach
IOTA Calif. State Univ., Los Angeles
KAPPA Calif. State Univ., Northridge
LAMBDA UC Davis
MU Calif. Poly St. Univ., San Luis Obispo
NU Calif. State Poly Univ., Pomona
XI San Diego State University
OMICRON Loyola Marymount Univ.
PI Northrop University (inactive)
RHO California State Univ., Fresno
SIGMA UC Santa Barbara
TAU University of California, Irvine
UPSILON Calif. St. Univ., Sacramento
PHI University of the Pacific
CHI California State Univ., Fullerton
PSI UC San Diego
OMEGA Harvey Mudd College
ALPHA ALPHA Calif. St. Univ., Chico
ALPHA BETA UC Riverside
ALPHA GAMMA San Francisco St. Univ.
ALPHA DELTA UC Santa Cruz
ALPHA EPSILON Univ. of San Diego
CO ALPHA Colorado School of Mines
BETA Univ. of Colorado at Boulder
GAMMA University of Denver
DELTA Colorado State University
EPSILON Univ. of Colorado at Denver
ZETA U.S. Air Force Academy
CT ALPHA Yale University
BETA University of Connecticut
GAMMA University of Hartford
DE ALPHA University of Delaware
DC ALPHA Howard University
BETA Catholic Univ. of America
GAMMA George Washington Univ.
FL ALPHA University of Florida
BETA University of Miami
GAMMA University of South Florida
DELTA University of Central Florida
EPSILON Florida Atlantic University
ZETA Florida Institute of Technology
ETA FL A&M Univ.-FL State Univ.
THETA Florida International Univ.
IOTA Embry-Riddle Aero. Univ.
GA ALPHA Georgia Institute of Technology
BETA Mercer University
GAMMA Georgia Southern Univ.
DELTA University of Georgia
ID ALPHA University of Idaho
BETA Idaho State University
GAMMA Boise State University
DELTA Brigham Young Univ.-Idaho
IL ALPHA Univ. of IL at Urbana-Champaign
BETA Illinois Institute of Technology
GAMMA Northwestern University
DELTA Bradley University
EPSILON S. Illinois Univ. at Carbondale
ZETA University of Illinois at Chicago
IN ALPHA Purdue University
BETA Rose-Hulman Inst. of Technology
GAMMA University of Notre Dame
DELTA Valparaiso University
EPSILON Trine University
ZETA Indiana Univ.-Purdue Univ. Indpls.
IA ALPHA Iowa State University
BETA University of Iowa
KS ALPHA University of Kansas
BETA Wichita State University
GAMMA Kansas State University
KY ALPHA University of Kentucky
BETA University of Louisville
GAMMA Western Kentucky University
LA ALPHA Louisiana State University
BETA Tulane University
GAMMA Louisiana Tech. University
DELTA Univ. of Louisiana at Lafayette
EPSILON University of New Orleans
ME ALPHA University of Maine
MD ALPHA Johns Hopkins Univ.
BETA University of Maryland
GAMMA U.S. Naval Academy
DELTA Univ. of Maryland Baltimore Co.
EPSILON Morgan State University
MA ALPHA Worcester Polytechnic Inst.
BETA Massachusetts Inst. of Tech.
GAMMA Harvard University (inactive)
DELTA Tufts University
EPSILON Northeastern University
ZETA University of Mass. at Amherst
ETA Boston University
THETA Univ. of Massachusetts Lowell
IOTA Western New England Univ.
KAPPA Merrimack College
MI ALPHA Michigan State University
BETA Michigan Technological Univ.
GAMMA University of Michigan
DELTA University of Detroit Mercy
EPSILON Wayne State University
ZETA Kettering University
ETA Lawrence Technological Univ.
THETA Oakland University
IOTA Univ. of Michigan-Dearborn
KAPPA Western Michigan Univ.
LAMBDA Grand Valley State Univ.
MN ALPHA Univ. of Minnesota-Twin Cities
BETA Univ. of Minnesota, Duluth
MS ALPHA Mississippi State University
BETA University of Mississippi
MO ALPHA Univ. of Missouri-Columbia
BETA Missouri Univ. of Science & Tech.
GAMMA Washington University
DELTA Univ. of Missouri-Kansas City
EPSILON Saint Louis University
MT ALPHA Montana State University
BETA Montana Tech. of the Univ. of MT
NE ALPHA Univ. of Nebraska-Lincoln
NV ALPHA University of Nevada, Reno
BETA Univ. of Nevada, Las Vegas
NH ALPHA Univ. of New Hampshire
BETA Dartmouth College
NJ ALPHA Stevens Institute of Technology
BETA Rutgers University
GAMMA New Jersey Inst. of Tech.
DELTA Princeton University
EPSILON Rowan University
ZETA The College of New Jersey
NM ALPHA New Mexico State University
BETA University of New Mexico
GAMMA NM Inst. of Mining & Tech.
NY ALPHA Columbia University
BETA Syracuse University
GAMMA Rensselaer Polytechnic Inst.
DELTA Cornell University
EPSILON New York Univ. (inactive)
ZETA Brooklyn Polytechnic (inactive)
ETA City College of CUNY
THETA Clarkson University
IOTA Cooper Union School of Eng'g.
KAPPA University of Rochester
LAMBDA Pratt Institute (inactive)
MU Union College
NU SUNY at Buffalo
XI Manhattan College
OMICRON SUNY at Stony Brook
PI Rochester Institute of Tech.
RHO NYU Tandon School of Eng'g.
SIGMA Alfred University
TAU Binghamton University
UPSILON U.S. Military Academy
NC ALPHA North Carolina State Univ.
BETA Univ. of North Carolina (inactive)
GAMMA Duke University
DELTA Univ. of NC at Charlotte
EPSILON NC A&T State University
ZETA East Carolina University
ETA Western Carolina University
ND ALPHA North Dakota State University
BETA University of North Dakota
OH ALPHA Case Western Reserve Univ.
BETA University of Cincinnati
GAMMA Ohio State University
DELTA Ohio University
EPSILON Cleveland State Univ.
ZETA University of Toledo
ETA Air Force Institute of Tech.
THETA University of Dayton
IOTA Ohio Northern University
KAPPA University of Akron
LAMBDA Youngstown State Univ.
MU Wright State University
NU Cedarville University
XI Miami University
OK ALPHA University of Oklahoma
BETA University of Tulsa
GAMMA Oklahoma State University
OR ALPHA Oregon State University
BETA Portland State University
GAMMA University of Portland
DELTA Oregon Institute of Tech.
PA ALPHA Lehigh University
BETA Pennsylvania State University
GAMMA Carnegie Mellon University
DELTA University of Pennsylvania
EPSILON Lafayette College
ZETA Drexel University
ETA Bucknell University
THETA Villanova University
IOTA Widener University
KAPPA Swarthmore College
LAMBDA University of Pittsburgh
MU Penn State Erie, Behrend College
PR ALPHA University of Puerto Rico
QATAR ALPHA Texas A&M Univ. at Qatar
RI ALPHA Brown University
BETA University of Rhode Island
SC ALPHA Clemson University
BETA University of South Carolina
GAMMA The Citadel
SD ALPHA S. Dakota Sch. of Mines & Tech.
BETA South Dakota State University
TN ALPHA University of Tennessee
BETA Vanderbilt University
GAMMA Tennessee Tech. University
DELTA Christian Brothers Univ.
EPSILON University of Memphis
ZETA Univ. of Tenn. at Chattanooga
ETA Lipscomb University
TX ALPHA University of Texas at Austin
BETA Texas Tech. University
GAMMA Rice University
DELTA Texas A&M University
EPSILON University of Houston
ZETA Lamar University
ETA Univ. of Texas at Arlington
THETA Univ. of Texas at El Paso
IOTA Southern Methodist University
KAPPA Prairie View A&M University
LAMBDA Texas A&M Univ.-Kingsville
MU Univ. of Texas at San Antonio
NU Univ. of Texas Rio Grande Valley
XI University of Texas at Dallas
UAE ALPHA American Univ. of Sharjah
UT ALPHA University of Utah
BETA Brigham Young University
GAMMA Utah State University
VT ALPHA University of Vermont
BETA Norwich University
VA ALPHA University of Virginia
BETA Virginia Poly. Inst. & State Univ.
GAMMA Old Dominion University
DELTA Virginia Military Institute
EPSILON Virginia Commonwealth Univ.
WA ALPHA University of Washington
BETA Washington State University
GAMMA Seattle University
DELTA Gonzaga University
WV ALPHA West Virginia University
BETA West Virginia Univ. Inst. of Tech.
WI ALPHA Univ. of Wisconsin-Madison
BETA Marquette University
GAMMA Univ. of Wlisconsin-Milwaukee
DELTA Milwaukee School of Eng'g.
EPSILON Univ. of Wisconsin-Platteville
WY ALPHA University of Wyoming

ALUMNI CHAPTERS

81 ALUMNI CHAPTERS
50 ACTIVE

31 Inactive chapters shown in ***BLUE***

DISTRICT 1
Central CT, Hartford
Greater Boston Area, MA

DISTRICT 2
Buffalo, NY
Central Jersey, NJ
Long Island Suburban, NY
Newark, NJ
New York City, NY
New York Capital District, NY
Rochester, NY
Southern Tier, Binghamton, NY

DISTRICT 3
Lehigh Valley, Bethlehem, PA
Philadelphia, PA
Pittsburgh, PA
Wilmington, DE

DISTRICT 4
Baltimore, MD
Charlotte, NC
Hampton Roads, Newport News, VA
Kanawha Valley, Charleston, WV
Research Triangle, Durham-Chapel Hill-Raleigh, NC
Richmond, VA
Washington, DC

DISTRICT 5
Atlanta, GA
Central FL, Orlando
Daytona Beach, FL
Gainesville, FL
Miami, FL
Midlands, Columbia, SC
Palm Beach/ Broward, FL
Piedmont, Clemson, SC
Puerto Rico
Southwest FL
Tampa Bay, FL

DISTRICT 6
Bluegrass, Lexington-Frankfort, KY
Central Alabama, Birmingham
Great Smoky Mountains, Knoxville-Oak Ridge, TN
Greater Gulf Coast, Mobile, AL
Louisville, KY
Mid-South, Memphis, TN
Rocket City, Huntsville, AL

DISTRICT 7
Ann Arbor Area, MI
Central MI, Lansing
Cincinnati, OH
Columbus, OH
Dayton, OH
Flint, MI
Ohio's North Coast, Cleveland
SE Michigan, Detroit
West Michigan, Grand Rapids

DISTRICT 8
Chicago Area, IL
Central Illinois, Urbana-Champaign
Indianapolis, IN
Milwaukee Area, WI

DISTRICT 9
Kansas City, KS
Pioneer, OK
Rolla, MO
St. Louis, MO

DISTRICT 10
Central Texas, Austin/San Antonio
North Texas, Dallas-Fort Worth
Greater New Orleans, LA
Texas Gulf Coast, Houston

DISTRICT 11
Ames, IA
Minnesota, Twin Cities, MN

DISTRICT 12
Pikes Peak, CO
Front Range, CO/WY
Salt Lake City, UT
Treasure Valley, Boise, ID

DISTRICT 13
Albuquerque, NM
El Paso, TX
Phoenix, AZ
Sun City, AZ
Tucson, AZ

DISTRICT 14
Columbia River Basin, Richland, WA
Portland, OR
Puget Sound, Seattle, WA

DISTRICT 15
Sacramento Vly, CA
SF Bay Area, CA
SF Peninsula, Palo Alto, CA

DISTRICT 16
Los Angeles, CA
Orange County, CA
Greater San Diego, California
Southern California

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