SUMMER 2026

The Bent

Of Tau Beta Pi

THE ENGINEERING HONOR SOCIETY

Giant Telescopes of the 1800s

TBP Fellows 2026

New Chapter Installations

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., Sc.D., A.B., A.C., E.M., LL.D. (1849-1933). Key and name registered in U.S. Patent and Trademark Office.

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

On the COVER: Joseph von Fraunhofer's great Dorpat refractor of 1824 inspired nearly 75 years of U.S. telescope design (see "From Dorpat to Yerkes," page 6). The instrument is now on display at the University of Tartu Old Observatory in Estonia. Courtesy Paolo Brenni, restoration team, University of Tartu Old Observatory.

Cover artist: Dali Polivka

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

SUMMER 2026

The Bent

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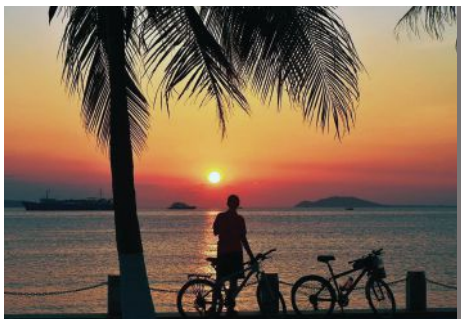

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COUNCIL'S CORNER

Sue L. R. Holl, Ph.D., *CA Λ '76,* ΤΒΠ 2026 Executive Councillor

BECOME A LEADER IN LIFE

Who are you going to be, at least for the near future, and once you decide who that is, how do you make that happen? Who knows the impact the choices you make today will have?

Earlier in my life, I was someone who liked to be engaged and enjoyed the "game," but I never felt a burning need to "win" the competition. To me, participating, interacting, and learning from others was the true reward. As it turns out, I discovered that I love to be a person who effects positive change, but have never needed a title to be an influential leader. I learned how to be effective in enacting significant change through my lifelong collaboration with Tau Beta Pi (TBP).

My engagement with TBP has been a cornerstone of my career and life. As an undergrad I was, in fact, one of those students "eagerly seeking membership" when many of my engineering friends were invited. Because I hadn't officially declared my major, I wasn't on the invitation list. This was a hurdle easily corrected by simply asking the faculty advisor to check my record. At the time, none of us really knew what TBP was, other than a "good for the resume" honor. Then came the initiation.

The ceremony was transformative. Hearing the Association's history — how one professor decided to start an organization to honor his students — showed me how one individual could positively affect the lives of thousands. The ceremony reminded us that much is expected of engineers because we possess the skills to be leaders on campus and in the world. That struck a chord with me. At the next chapter meeting, despite never having run for office before, I ran for president. I wasn't elected, but didn't stop; I ran for every subsequent office until I was elected treasurer.

It was wonderful to work with my peers, reacquainting myself with freshman-year classmates and making new friends, as we accomplished what was required to successfully run the chapter. I have remained involved with TBP ever since because the path to involvement was always made to feel welcoming.

Several years later, as a new engineering professor, I asked a senior colleague how to connect with the TBP chapter on campus. To my surprise, he told me the school didn't have one. When I asked to explore establishing a chapter, I was met with enthusiastic encouragement. That was my second great leadership opportunity. The result of that small inquiry is a stable chapter that has been successful for decades.

That experience led me to my first TBP Convention where I befriended colleagues who became Association leaders. I learned about various opportunities and asked them to "keep me in mind" for future roles. That "ask" led to years of service on the Fellowship Board and, eventually, a seat on the Executive Council (EC) in 2013. During that term, I was part of the leadership team that helped restructure the entire organization.

Even after my EC term ended, my journey continued. I had long admired the Engineering Futures (EF) Program, believing it was where my own leadership skills were enhanced. When the timing finally aligned, I trained as an EF Facilitator. Today, as a Professor Emerita, I serve as a CA Upsilon Chapter Advisor, an EF Facilitator, and was re-elected to the EC at the 2024 Convention.

Looking back, none of these opportunities were simply handed to me; I had to seek them out. But because of the collegiate relationships I had built and the number of opportunities in the Association, the "ask" was never difficult, and the reward was priceless.

Of course, TBP is not my only leadership experience. In my role as a faculty member, I've served as a department chair, headed campus-wide committees, and as a volunteer led my children's PTAs, and currently preside over retired employee groups. While I have held many titles, that isn't what leadership means. A true leader only holds a title some of the time, but they are ***always*** working to ensure goals are clear and success is unavoidable.

Tau Beta Pi is a massive organization filled with talented people and great ideas. It is a "low-stakes" training ground where you can let your interests be known and develop skills that will eventually serve you in your professional career. If your initial idea doesn't work, lean on your colleagues and the support system around you as you work out the ways to achieve your ultimate goal.

I encourage you to look for the things you want to do — in all realms of your life — and engage with people to make them happen. You are the embodiment of the words you heard at initiation:

"Be a leader — not just in your career, but in life!"

SUE HOLL is a Professor Emerita, materials science department of mechanical engineering at California State University, Sacramento, where she established the CA Upsilon Chapter and has been its Chief Advisor ever since. She earned a B.S. in electrical engineering, B.S. and M.S. degrees in materials science and engineering from the Univ. of California, Davis, and a Ph.D. in materials science and engineering from the Univ. of California, Berkeley. Sue previously served on the Executive Council, including as vice president and president (2017 and 2018, respectively).

YOUR LETTERS

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

Dudey McDuderton

I greatly enjoyed the Spring issue's cover art, created by a human artist mimicking artificial intelligence. If artist Mat Ollig is not above a multi-lingual pun, he could call his style "trompe l'AI."

Daniel L. Stock, *OH A '80*

AI — A Personal Story

I wanted to say that it was so refreshing to be presented with other parts of humanity's creative prowess (vice techy). Reading the story regarding the message the artist aspired to convey is very, very freeing. Please keep up the surprises! Thanks so much!!

Ed T. Wunner, *CA Ξ '83*

I recently received the Spring issue. I enjoyed reading the story about AI, the Minnesota artist, and the human touch. Just submitted my subscription order so looking forward to future issues.

Nastassja A. Lewinski, Ph.D., *TX Γ '06*

FROM THE EDITOR: CORRECTION

In the Spring 2026 issue Families section (page 31), there was a misspelling and some confusion related to the listing of the "Castellano/Chiarito" families.

Michael A. Chiarito, *MD B '84*, submitted details on the Tau Bate descendants related to himself and his sister, **Joanna M. Castellano,** *MD B '80*. Full details below:

Joanna M. Castellano, *MD B '80*
[wife to James, mother to Richard, sister to Michael, and aunt to Peter]

James J. Castellano, *NJ G '80*
[husband to Joanna, father to Richard, brother-in-law to Michael, and uncle to Peter]

Richard J. Castellano, *NJ Z '12*
[son to Joanna/James, nephew to Michael, and cousin to Peter]

Michael A. Chiarito, *MD B '84*
[father to Peter, grandfather to Alexandra, brother to Joanna, brother-in-law to James, and uncle to Richard]

Peter L. Dunn, *VA B '97*
[father to Alexandra, son to Michael, nephew to Joanna, and cousin to Richard]

Alexandra J. Gibbs, *GA B '21*
[daughter to Peter and granddaughter to Michael]

ERRATUM:

The solutions to the Winter bonus that were published in the Spring 2026 issue had an error in the second part of the problem, where it still assumed the contact point was fixed, even though we had entered the slipping phase! To properly solve this problem, we could develop a system of coupled nonlinear ODEs with state variables θ, $\dot{\theta} = (d\theta/dt)$, x, $\dot{x} = (dx/dt)$.

Using Newton's second law for translation of the center of mass and the rotation about the rod's center of mass and a bunch of algebra, we can ultimately find:

$$\ddot{\theta} = \frac{(g - (L/2)\,\dot{\theta}^2 \cos\theta)(\sin\theta + \sigma\mu\cos\theta)}{(L/6) + (L/2)\sin\theta(\sin\theta + \sigma\mu\cos\theta)} \quad \text{and} \quad \ddot{x} = \sigma\mu g + L/2\ddot{\theta}(\sigma\mu\sin\theta - \cos\theta) + L/2\dot{\theta}^2(\sin\theta + \sigma\mu\cos\theta)$$

where $\sigma = \mathrm{sgn}(\dot{x})$ ensures that kinetic friction always opposes the instantaneous sliding direction. The normal force is computed from $N = mg - mL/2(\ddot{\theta}\sin\theta + \dot{\theta}^2\cos\theta)$ and we wish to see if and when N becomes zero.

When numerical integration is employed, it can actually be shown that the normal force never dips below zero (it reaches its minimum value of about 0.17 mg around 65° from vertical), so the bottom of the rod will not ever leave contact with the ground. Interestingly, it turns out that the contact point of the rod reverses direction as the rod tips when it reaches about 60° from vertical!

WHO'S WHO IN TAU BETA PI

Recognizing Tau Bate accomplishments.

Shelton D. Caruthers Ph.D.

Louisiana Gamma '89

was inducted as a fellow of the American Institute for Medical and Biological Engineering. He is a senior global strategic manager, clinical validation & collaboration in the CT-MR Solution Planning Dept. at Canon Medical Systems. Shelton was recognized "for leading industry partnerships in medical imaging that promote innovation, technology translation, and new educational initiatives to improve human health."

Jenna P. Carpenter Ph.D.

Indiana Alpha '83

was selected by the ΤΒΠ Executive Council to fill a vacancy, effective March 20. Her appointment will be presented to the 2026 Convention for confirmation in accordance with the Association's Constitution & Bylaws. Dr. Carpenter is Founding Dean and professor of engineering at Campbell University and President of the Mathematical Association of America.

A national thought leader and expert on STEM education and workforce development, she is past president and Fellow of the American Society of Engineering Education and sits on ABET's Engineering Accreditation Commission. Collectively, she has 30 years of experience serving on boards of directors and worked to secure the recently installed NC Theta Chapter at Campbell University.

Henry Samueli Ph.D.

California Epsilon '75

was inducted as part of the 2026 National Inventors Hall of Fame for "advancing broadband communications and creating solutions that enabled affordable, high-speed digital data transmission to homes & businesses." A co-founder of Broadcom Inc., he is technically retired, however, the Samuelis have been owners of the NHL Anaheim Ducks franchise since 2005 and continue philanthropic endeavors in education.

Michael J. Vinarcik P.E.

Ohio Gamma '90

received the Engineering Society of Detroit Affiliate Council Gold Award, its highest honor recognizing a career of sustained contributions to the profession. Mike serves as Director of mission, systems, and lifecycle engineering at SAIC, focusing on digital engineering and model-based systems eng'g. He's taught systems architecture and MBSE at Univ. of Detroit Mercy and CIDESI (Mexico) for nearly two decades.

José L. Zayas Castro Ph.D.

Florida Gamma '78

was elected to the American Association for the Advancement of Science 2025 class of Fellows. At the University of South Florida, he is a professor of industrial eng'g, directs the Center for Exemplary Mentoring, sponsored by the Sloan Foundation, and is a member of the USF I-CORPS. His work focuses on healthcare systems engineering and improving the delivery of care, engineering entrepreneurship, and innovation.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

In March, the AAAS announced its 2025 class of Fellows, which included 449 new members added to the Fellows Program. Below are several of the known Tau Bates who were elected.

Raheem A. Beyah Ph.D., *NC E '98*
Georgia Tech, Engineering Section

John O. Dabiri Ph.D., *NJ D '01*
Caltech, Engineering Section

Edward J. Delp III Ph.D., *OH B '73*
Purdue Univ., Engineering Section

Tejal Ashwin Desai Ph.D., *RI A '94*
Brown Univ., Engineering Section

Ahmed M. Eltawil Ph.D., *CA Q '82*
King Abdullah Univ., Engineering Section

Elizabeth A. Lipke Ph.D., *MD A '00*
Auburn Univ., Engineering Section

Albert P. Pisano Ph.D., *NY A '76*
UC San Diego, Engineering Section

Arvind Raman Ph.D., *IN A '93*
Purdue Univ., Engineering Section

Gabriel Rincón-Mora Ph.D., *GA A '94*
Georgia Tech, Engineering Section

Paul D. Ronney Ph.D., *CA A '78*
USC (CA), Engineering Section

Sonya T. Smith Ph.D., *VA A '94*
Howard Univ., Engineering Section

Julie L. Swann Ph.D., *GA A '96*
NC State Univ., Engineering Section

The STORY BEHIND The PHOTO

Announcing the Summer 2026 "Caption This Photo" Contest!

Taken at the recent District 5 Conference in Athens, GA, Florida Iota Chapter attendees were instructed to meet at a spot across the UGA campus for the group picture. As they prepared to embark on this daunting voyage, they found inspiration in the scene of George Washington crossing the Delaware River during the Revolutionary War and decided to recreate the image.

How to Enter: Send us your witty caption(s) for this image. 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: *https://www.tbp.org/?CaptionSub* or mail to *The Bent* of Tau Beta Pi, Caption Contest, P.O. Box 2697, Knoxville, TN 37901-2697.

DEADLINE: SATURDAY, AUGUST 1

Questions? Contact *d.lane@tbp.org*

A special thanks to John J. Yonkauske, *FL I '24*, for leading his fellow Tau Bates and providing details on this image.

WINNERS of the Spring 2026 "Caption This Photo" Contest:

The judges reviewed 34 ingenious captions created by 20 Tau Bates. You can read all entries, including captions and results from recent contests, at ***https://www.tbp.org/bent-features.cfm#caption***. ***If you are interested in serving as one of our judges, contact Dylan Lane at d.lane@tbp.org.***

1st PLACE:

"Due to tensile strength under-estimation and yielding under excessive weight, the bottom program appears 'bent,' resulting in the Leaning 'Tau'er of 'Pi'sa."

Alec G. Richardson, *PA L '87*

2nd PLACE:

"Students are surprised at the structural integrity of the 'TBP Bent Tower,' designed to bend, but not break!"

Sandy Dawson, *CO D '23*

3rd PLACE:

"Who's got a match for the Bent Burning Man?"

Armondo DeCarlo, *UT B '95*

4th PLACE:

"See what happens when you leave engineers with too much time and materials!"

Cynthia F. Burham, *TX A '05*

CONGRATULATIONS TO OUR WINNERS!

▲ Attendees at the 1989 Convention, in Columbia, SC, show off their work after constructing the first known "House of Bent" programs.

From Dorpat to Yerkes: Evolution of Giant Telescopes in Nineteenth-Century America

By: ***Trudy E. Bell, M.A.***

One underappreciated expression of the Industrial Revolution that swept 19th century America was the evolution of mechanical design for giant astronomical telescopes.

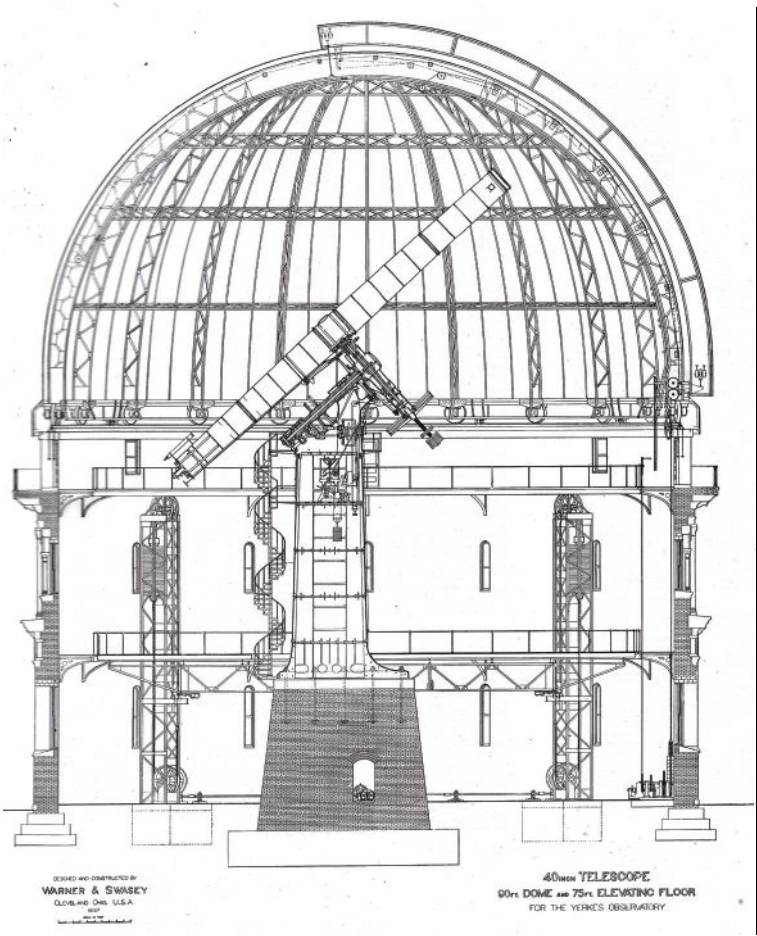


Figure 1 (left): The architectural drawing shows the giant 40-inch refractor mounted in 1897 at the Yerkes Observatory in Williams Bay, Wisconsin; its tube was 63 feet long and its objective lens in its cell weighed half a ton. Credit: Yerkes drawing, Plate 34 in *A Few Astronomical Instruments* (picture book published by Warner & Swasey, Cleveland, Ohio, 1900) (original in the collection of Trudy E. Bell).

Think of the U.S. Industrial Revolution from about 1820 to 1900, what comes to mind? The steam engine, railroads, textiles, and the McCormick reaper perhaps? Maybe steelmaking on a large scale, skyscrapers (and elevators), the Brooklyn Bridge (longest suspension bridge in the world at the time)? And of course, the telegraph, telephone, and manufacturing with interchangeable parts.

One underappreciated beneficiary of the U.S. Industrial Revolution, however, was the design and sheer size of refracting (lens) telescopes. Indeed, the 19th century was the golden age of giant refractors. It culminated in the highly publicized construction of a monumental precision marvel of glass and steel with 20 tons of moving mass, mounted in 1897 at the Yerkes (pronounced YER-keez) Observatory of the University of Chicago, in Williams Bay, Wisconsin.

This giant instrument had an exquisite objective lens fully 40 inches — three and a third feet (about the diameter of a round card table) — in diameter. The telescope's optics were ground, figured, and polished by premier U.S. telescope opticians Alvan Clark & Sons; the mechanics were by foremost engineers Warner & Swasey. It remains the world's largest refractor ever used for astronomical research.

How did artisans and engineers evolve such breathtaking technological prowess in less than one human lifetime?

THUMBNAIL BACKSTORY

Lenses have been around for centuries as magnifiers, burning glasses, eyeglasses, and even spyglasses for military application. The person usually credited with first directing a telescope toward celestial objects was Galileo (although other contemporaries did as well but Galileo published his observations first). But this nuts-and-bolts article is primarily about telescope mechanics (too often underappreciated), instead of the more usual history of optics (whose history has been better documented).

To be practical for astronomical use, a telescope must have a sturdy mount that allows the telescope to point in all directions around the heavens, anchored to a steady stand or pier to minimize shaking of the image in the eyepiece when the instrument is touched by a person or a breeze. In most telescopes, the mount should also have a driving clock to track a celestial object across the night sky as the Earth turns, so the image remains centered in the eyepiece instead of drifting across the field of view as the Earth turns.

For a couple of centuries, people experimented with many mount designs, ranging from ultralong aerial structures to a ball-and-socket universal joint (Isaac Newton's concept). But most varied in their degree of awkwardness for practical use, and essentially none had a driving clock.

Many early observers defaulted to some form of an altazimuth mount, one with vertical and horizontal axes that moved in local altitude (up and down) and azimuth (left and right parallel to the local horizon). An altazimuth mount could be made sturdy; however, as the Earth turns, an observer needed to keep adjusting the telescope's pointing direction in a stair-step pattern to keep a star or planet in the eyepiece's field of view.

ENTER THE EQUATORIAL MOUNT

What was needed was a sturdy *equatorial mount* — a design in which one axis (the "polar axis") is not vertical but is tilted to be parallel to the rotational axis of the Earth, that is, inclined at the angle of the observer's latitude. With an equatorial mount, the telescope swings around the polar axis in a plane parallel to the plane of the equator, smoothly tracking a star across the sky to compensate for Earth's rotation.

The first truly workable design for an equatorial mount was the so-called "English" mount, usually credited to Jesse Ramsden around 1791.[1] In an English mount, the polar axis is supported at each end by a pillar, one being short and the other tall, to hold the polar axis at an angle equal to the observer's latitude. While working well for a telescope fixed in an observatory, an English mount was bulky and not adjustable or readily transportable for expeditionary astronomy (such as traveling to a different latitude to observe a total solar eclipse).[2]

In 1824, all that changed with the installation of a refracting telescope in the Observatory at the Imperial University at Dorpat (now called the Tartu Observatory in Estonia).[3] The telescope was placed atop a revolutionary new type of equatorial mount, the handiwork of brilliant optical designer and physicist Joseph von Fraunhofer in Munich — yes, the same guy who directed sunlight through a prism and identified dark absorption lines in the solar spectrum still called Fraunhofer lines, which set a foundation for spectroscopy.

In addition to grinding and figuring the largest and finest objective lens of the time (9.6-inches aperture),[4] Fraunhofer gave the refractor one center of motion atop a single pier. Moreover, he gave it a gravity-powered clock drive that automatically compensated for the Earth's rotation to keep the telescope focused on one celestial object.[5]

The clock drive used a centrifugal regulator rotating one way in a conical housing, akin to the type of regulator developed for steam engines. Moreover, the regulator's speed was adjustable, allowing the clock to be slightly sped up or slowed so it could track the motion of the moon, asteroids, a comet, or other relatively nearby solar system objects moving against the background of distant stars.

In 1824, clockwork for a telescope was virtually a novelty, (although the basic idea dates back to Newton's contemporary and rival Robert Hooke).[6] Variable drive rate became especially important later in the century after the advent of long-exposure photography and spectroscopy.

In sum, with the Dorpat refractor, Fraunhofer incorporated the fundamentals of what is now called the German equatorial mount (GEM for short). Indeed, in the early-middle 19th century, German-mounted refractors came to be called simply "equatorials" (although reflecting telescopes later in the century also used German equatorial mounts).

Fraunhofer died prematurely at age 39 in 1826, but his design innovations were carried on by his former partners in the Merz dynasty of telescope makers in Munich.

As a result, by the 1840s, German-mounted refractors closely modeled on the Dorpat instrument were installed in several European observatories. Indeed, one mounted in 1828 at the Berlin Observatory achieved worldwide fame in 1846 when two young astronomers there optically discovered the solar system's outermost major planet Neptune, whose existence had been hypothesized by mathematical predictions. [7]

MODIFYING THE DESIGN

Historian James Lequeux, in France, has called the Dorpat telescope "the first modern refractor."[8] Although he did not specify what he meant by "modern," the Dorpat instrument's overall design was hugely influential on the general morphology of both portable and observatory telescopes worldwide in the 19th century.

No place was this truer than in the young United States. In the 1840s, published descriptions of U.S. observatories reveal that more than a dozen fixed main equatorial refractors were explicitly described as having been modeled after the "Dorpat," "Fraunhofer," or "German" style. By 1860, the number was closer to three dozen. Even later in the 19th century, images and descriptions show that most refractors had German mounts, even though that fact was no longer called out as a special point — likely because by then the style had become so universally accepted.

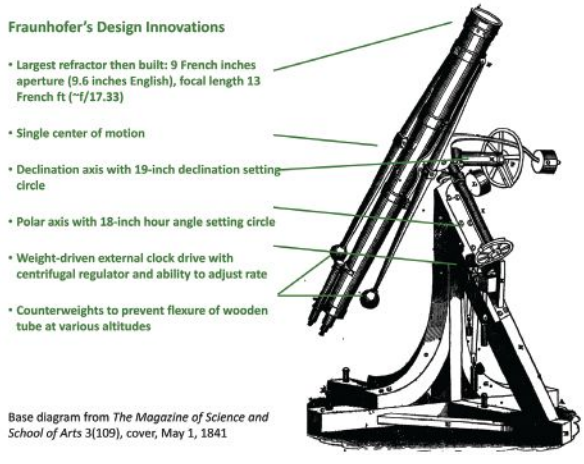
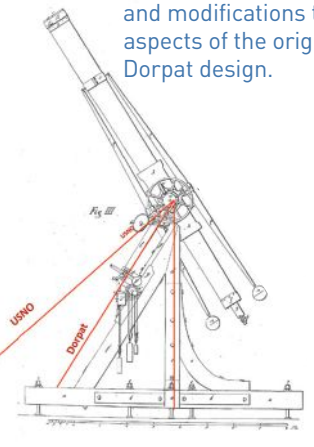


Figure 2 (bottom, left): Several of Fraunhofer's innovations for the Dorpat refractor heavily influenced 19th century telescope design.

Figure 3 (bottom, right): By 1840, U.S. (and European) instrument makers began experimenting with improvements and modifications to many aspects of the original Dorpat design.



But as brilliant as it was, Fraunhofer's prototype design was not perfect. Illustrations and text in periodicals, books, instrument catalogues, and observatory publications document that U.S. (and European) astronomers and instrument makers immediately began modifying or improving the pier, mount, clock drive, and tube to reduce cost or weight, or to increase the ease or comfort of visual observing. Further modifications were made later in the 19th century to accommodate the new technologies of spectroscopy and long-exposure photography.

NO BROKEN LEGS

One of the first and most obvious alterations for the American market was elimination of Fraunhofer's inclined beam supporting the polar axis and clock drive. Indeed, no U.S.-mounted Fraunhofer-style refractor ordered from any nationality of maker, including Merz, included a full-length inclined beam. Instead, the beam was truncated close to the lower end of the mount's polar axis.

That major design change is evident right from the first Merz refractor mounted in 1840 at the Philadelphia High School Observatory — a telescope credited as introducing the work of German instrument makers (plus rigorous German observational and mathematical techniques) to U.S. astronomers.[9]

Although no 19th century document explains the change, the reason for eliminating the inclined beam seems self-evident. The Dorpat Observatory was at latitude 58.4 N, so the angle of the inclined beam was very steep, remaining relatively close to the vertical support. But most of the United States falls at a substantially lower north latitude, from the mid-40s to the mid-30s. Thus, a telescope's polar axis in the U.S. must point at a lower angle than one in northern Europe.

That means that any perpendicular inclined beam would have extended a foot or two farther horizontally — posing an access challenge and even a tripping hazard. As it was, in the Dorpat Observatory itself, European astronomers Wilhelm Struve [pronounced STROO-vay] and Heinrich Schumacher each broke a leg while using the telescope.[10]

ROCK SOLID

The U.S. Navy, for its "Depot of Charts and Instruments" (the U.S. Naval Observatory at its first site in the Foggy Bottom neighborhood of Washington, D.C.) ordered a telescope from Merz identical in size (9.6 in) and detail to the Dorpat refractor with one major exception — instead of a wooden stand, the telescope was ordered to be ready to mount to a pier of stone laid in hydraulic cement and capped with a block of Maryland granite.[11] It was mounted in 1844–45.

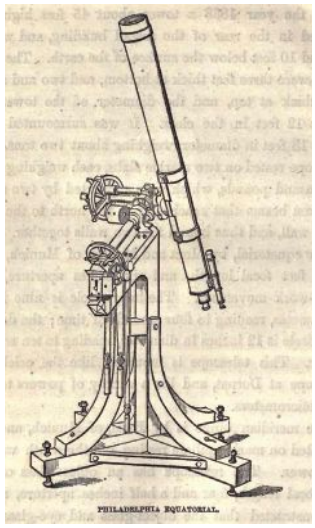
Similarly, the Cincinnati Observatory for its 11-inch Merz refractor (installed in April 1845) and the Harvard College Observatory for its 15-inch Merz (installed in June 1847) also ordered their instruments to be adapted for mounting on a stone or masonry pier. All three instruments were fitted with Fraunhofer-style polished wooden tubes with two long brass counterweights running the full-length of the tube to prevent flexure.

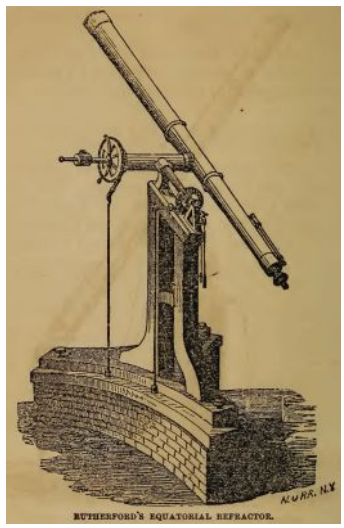
COMPACT DESIGNS

Meantime, at least by the winter of 1847–48, the early U.S. commercial telescope maker Henry Fitz in New York City was experimenting with making more compact and economical versions of Fraunhofer's wooden stand for mounting an equatorial in smaller observatories.

For a new 6-inch refractor for Lewis M. Rutherfurd's private observatory in New York City (a few blocks from Fitz's workshop in what is now Manhattan's lower east side), Fitz had his mountmakers Gregg and Rupp build a compact, streamlined three-legged variation of Fraunhofer's four-legged stand. The next year (1849), Fitz completed another three-legged wooden stand for a 5.6-inch refractor for the observatory at Erskine College in Due West, South Carolina.

Fitz also experimented with light-weighting the equatorial mount atop the wooden stand. In 1851, he completed a clock-driven 8-inch refractor for the housetop observatory of John Campbell in New York City, installed in 1852. The mount "after the Frauenhofer plan" was not made of brass, but of cast iron; both axes were cast hollow, "which gives great firmness [i.e., stiffness] with little weight."[12]





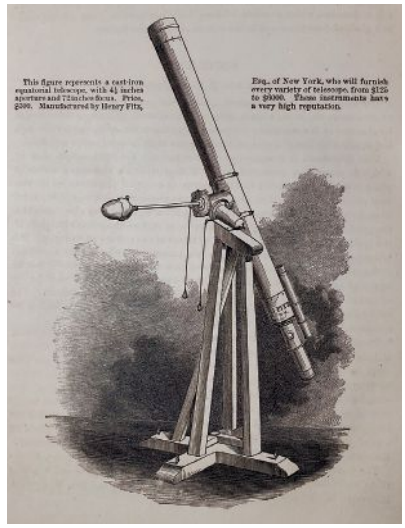


Figure 4 (bottom left): The 6½-inch Merz and Mahler refractor of the Philadelphia High School Obs., installed in 1840, is credited with introducing German telescopes and methods to the U.S. It was mounted like the famous Fraunhofer refractor at the Dorpat Obs., with two notable exceptions: there was no full-length inclined beam, and the declination counterweight no longer passed through the declination setting circle. Source: *Elias Loomis, Recent Progress of Astronomy; Especially in the United States*, (New York: Harper & Brothers, 3rd edition, 1856): p. 216. (collection of Trudy E. Bell).

Figure 5 caption is located on page 11.

By 1852, Fitz was advertising the superiority of "using a single piece of cast-iron in the place of several pieces of brass-work," which he claimed lowered the prices of his telescopes by up to $900, depending on aperture.[13]

MOVING A BIG TELESCOPE

Mid-century, before the advent of electric motors, slewing a telescope from one celestial object to another elsewhere in the sky was a manual task: the observer pushed or pulled the refractor's tube to the correct celestial coordinates (trying not to overshoot). Then he or she (or an assistant) then grabbed a handle to muscle the dome's slit in the right direction. But as telescopes grew to record size and moving mass, some other more effective, safer method was clearly needed for manhandling both telescope and dome.

One of the first changes, employed by Alvan Clark & Sons for their second world's largest refractor — the 26-inch, mounted in 1873 at the U.S. Naval Observatory (USNO)— was a system of pulleys and ropes for pointing the telescope. But ropes could absorb moisture, fray, slip, tangle, jam, snag on projections, or just be confusing in the dark.

So, astronomers and instrument makers in both Europe and the U.S. experimented with rigid control rods that could be turned and clamped by the observer from the eyepiece end. Individual functions could be distinguished in the dark by different shapes, textures, positions, or distances of the rods' wooden handles. Control rods also eliminated whatever safety hazard was posed by festoons of dangling ropes.

Figure 6 (far right, p. 8): Fitz reduced the cost and the price of a small telescope by dispensing with all elegance and ornamentation in a plain but serviceable wooden stand, such as the stand for this 4½-inch refractor. Such a crude option did not seem to be popular with school observatories — at least no description or illustration of one in that context has yet been found, but it may have found a market with budget-minded individuals. Source: Hannah M. Bouvier, *Bouvier's Familiar Astronomy ... for the use of Schools, Families, and Private Students* (Philadelphia: Sower, Barnes & Potts, 1855) p. 286. Courtesy: Astronomical Lyceum, Magdalena, New Mexico.

Fraunhofer's original 1824 clock drive for the Dorpat refractor was externally mounted on the inclined beam supporting the polar axis. So, the falling weights that powered the drive plus the rest of the mechanism were open to the air — and presumably also to bumps and dust.

At least as early as the USNO's 9.6-inch Merz refractor installed in 1844, U.S. builders fashioned piers having a vertical recess or channel to protect the falling weights. As problematic as such an external design must have been, it lasted well into the 1880s.

In the early 1880s, the placement of a telescope's clock drive changed. In 1881, when Warner & Swasey designed and built their first observatory telescope — having a 9 ½-in Clark lens for the John Smith Observatory at Beloit College in Wisconsin — they enclosed the clock drive and falling weights inside a hollow flared cylindrical iron pier. A metal door in the pier allowed access to the gravity-powered drive's centrifugal regulator.[14]

One of the first published write-ups describing Warner & Swasey's repositioning of the clock drive was a June 1884 account in *The Sidereal Messenger* of their installation of a second 9½-inch refractor, this one at the Hartford High School Observatory in Connecticut. For this instrument, a glass door allowed an observer to keep an eye on the centrifugal regulator; a handle outside the pier enabled an astronomer to raise the falling weights (necessary about every two hours) without disturbing the drive's ongoing operation.

At that time, Warner & Swasey were hoping to land the contract to mount the prospective record-breaking 36-in refractor at Lick Observatory. The Hartford instrument gave them a chance to combine all their improvements, as well as introduce the iconic rectangular pier that became Warner & Swasey's signature style.[15] Subsequently, they used images of the Hartford telescope in their advertising.

Ultimately, the Hartford instrument (plus a few other developments) so impressed the James Lick trustees with Warner & Swasey's capacity for engineering innovation and reliability that they were awarded the contract to design and mount the mechanics for the Lick 36-inch. [16]

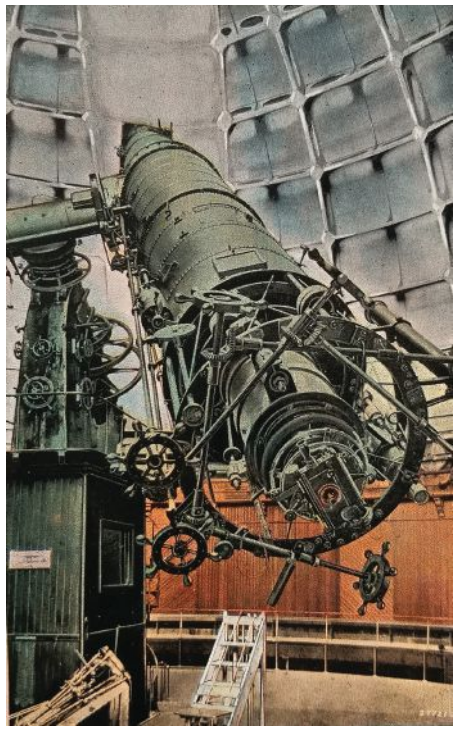


Figure 7: This undated, colorized postcard image shows the eye end of the Lick Obs. 36-inch refractor (mounted in 1888) with handles of various control rods for moving and clamping the instrument. This telescope (and its obs. building) incorporated many innovations from Warner & Swasey. Source: Postcard in the collection of Trudy E. Bell.

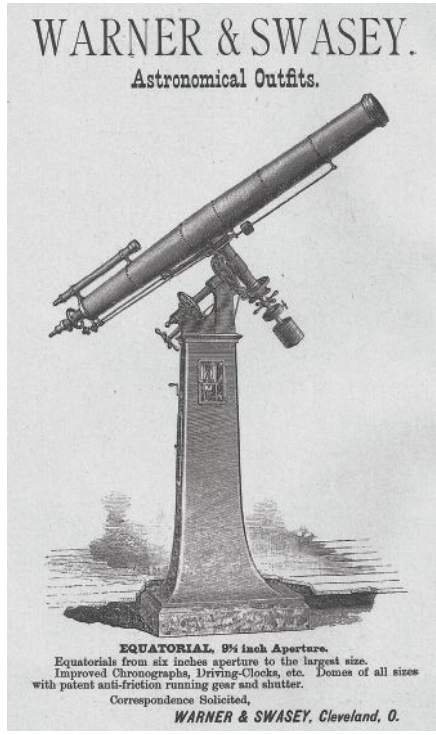


Figure 8: The 9½-inch refractor at the Hartford High School Obs. in Connecticut — about the same size as Fraunhofer's original Dorpat telescope — gave Warner & Swasey a chance to combine all their mechanical improvements, as well as introduce the familiar iconic rectangular telescope pier that became their iconic style. Credit: *The Sidereal Messenger*, March 1886, outside back cover.

OF DOMES AND FLOORS

The four largest world's-record refractors were precision instruments of truly monumental scale. Although telescope objective lenses grew larger in aperture, their focal ratios remained roughly the same as that of Fraunhofer's Dorpat refractor, in the range of f/15 to f/18 (to use modern notation). Lick Observatory's objective lens mounted in 1888 was three feet across and had a focal length of 672 inches (56 feet) for a focal ratio of f/18.7.[17]

Thus, it required a tube 57 feet long. This unprecedented length posed at least two notable engineering challenges.

First, tube length determined the diameter of an observatory's dome to allow adequate clearance for the telescope to point in all directions. Larger domes meant more moving mass, thus affecting how much effort was needed to rotate the dome. Smaller observatories relied on minimizing friction in a circular track so a dome could be pushed or pulled manually using an attached handle. Slightly larger observatories used a hand crank and gearing. But for a dome big enough to house a telescope larger than 12 inches aperture, significant problems could arise, especially since over time domes tended to go slightly out of round, increasing friction.

Genuinely big domes, however, completely defied human power. The hand-cranked dome for the Dearborn Observatory 18½-inch refractor at its first site, for example, had a circumference of about 100 feet. "It requires 666 revolutions of the crank for one [revolution] of the dome," stated director George W. Hough (pronounced HUFF). He remarked wryly, "The physical labor involved in rotating such a dome … does not leave the observer in the best condition for making observations."[18]

Ever inventive, Hough devised a way of propelling the dome using a quarter-horsepower gasoline engine. "With this arrangement one can observe with ease and comfort in any region of the heavens on the same night," he wrote in 1883.[19] This motorized solution, which came to be known as "the Hough plan," was widely adopted in observatories.

Second, tube length determined the height of the pier. It thus also determined how low or high the telescope's eyepiece would be for observing a celestial object near the horizon (tube nearly horizontal) versus one near the zenith (tube nearly vertical) — the longer the tube, the more extreme the range. For visual observation of objects high in the sky, the astronomer might recline on a movable observing couch. For objects at lower altitude, the astronomer perched on a step of a tall, wheeled observing ladder.

For the Lick 36-inch, the difference in eyepiece height was far greater than reachable by any observing ladder. Telescope engineer Sir Howard Grubb in Dublin, Ireland, proposed making a large section of the observing floor movable up and down like an elevator, which could be raised and lowered as an observer needed. A central rectangular hole cut out of the floor center would clear the pier without touching.

To his disappointment, Grubb was not chosen to build the rising-floor system; the Lick trustees chose the more local Union Iron Works company from San Francisco. Using hydraulic power supplied by rainwater captured in a 30,000-gallon mountaintop reservoir, the completed circular elevating floor measured 61 feet in diameter and weighed 25 tons. Its range of travel was 16 feet. (Water power also rotated the massive, 100-ton 75-foot dome.)[20]

The rising observing floor system proved to be so successful that it was subsequently used in the Yerkes Observatory for the 40-inch refractor. Warner & Swasey built not only the mount and 62-foot-long steel tube, but also the mammoth 90-foot dome and the rising floor (75 feet in diameter with a 23-foot range of travel).[21]

ENGINEERING AESTHETICS

The physical beauty of the early refractors was a high priority of at least some makers, including Fraunhofer. Of the original Dorpat refractor of 1824, director Struve wrote that the "tube itself is 13 feet long, constructed of deal [soft pine resistant to both humidity and insects], in the strongest and safest manner, and overlaid with mahogany, so worked that it appears like a tube of highly-polished copper." [22]

When the instrument was finally assembled and installed, Struve recounted:

> I stood astonished before this beautiful instrument, undetermined which to admire most, the beauty and elegance of the workmanship in its most minute parts, the propriety of its construction, the ingenious mechanism for moving it, or the incomparable optical power of the telescope, and the precision with which objects are defined.[23]

Two decades later, on this side of the Atlantic, the tube of the Cincinnati Observatory's 11-inch Merz mounted in 1845 was made of wood, as were the Detroit Observatory's 12-inch Fitz for the University of Michigan, Ann Arbor, in 1857 and the Harvard College Observatory's 15-inch Merz. The Dearborn Observatory's 18½-inch refractor (with both optical and mechanical parts by Alvan Clark) at its first location in Chicago in 1866 also had a wooden tube, used until 1911.[24]

WORK IN PROGRESS

Additional significant design modifications were made to both the optics and mechanics of later 19th century refractors as well as throughout the 20th century. For example, third lenses were fashioned for retrofitting a visual refractor to focus bluer "actinic" rays for photographic use (at a shorter focal length). Connectors were added to the eye end and adjustable counterweights to the sky end of a telescope tube to allow the installation and removal of massive spectroscopes and spectrographs. Electricity was introduced to illuminate eyepiece crosshairs (replacing the fumes and flammability of kerosene lamps), to power a clock drive instead of falling weights, and to slew a telescope, rotate its dome, and raise or lower an observing floor.

Together, Fraunhofer's fundamental design plus others' important modifications evolved into the German-mounted refracting telescopes used today. Moreover, the engineering advances laid foundations for the building of the even larger giant record-setting ground-based reflecting telescopes of the 20th and 21st centuries.

Gratitude is expressed to John W. Briggs (Astronomical Lyceum, Magdalena, New Mexico), Bart Fried, Kenneth Launie, Horace H. Smith, and the late Paolo Brenni — all members of the 35-year old international Antique Telescope Society — for helpful suggestions and illustrations. Thanks also go to engineer Dan Sweeny for insights about materials.

Selected References listed on page 39.

Figure 9 (above): The 57-foot length of the segmented steel tube for the Lick Observatory 36-inch refractor was accommodated by making most of the circular floor rise and lower like an elevator. This engraving shows the floor at its lowest position for observing objects high in the sky. At the floor's highest position (for observing objects at low elevation), the floor could rise to the mezzanine level (where two figures stand). Source: Library of Congress.

Figure 5 (middle, p.8): Lewis M. Rutherfurd's 6-inch equatorial refractor with optics by Henry Fitz, installed in 1848, was mounted by Gregg and Rupp on a brick pier. Note that it differed from the Dorpat refractor not only in having no full-length inclined beam, but also in having only three legs instead of four. Moreover, Fraunhofer's short straight cross-braces were also replaced with a continuous curved piece of wood echoed by the supporting bricks. Source: Hiram Mattison, *A High-School Astronomy...*, (New York: Mason Bros., 1859), p. 226.

Figure 10: The Dearborn Observatory telescope, installed in 1866 at its first site in Chicago, was the largest refractor in the U.S. to have a wooden tube. The wooden tube was also used until 1911 at its second site on the campus of Northwestern University in Evanston. At that time, the objective lens was given a new steel tube and mount by Warner & Swasey. The wooden tube and its original brass mount by Alvan Clark & Sons have been preserved and are on display in the Adler Planetarium and Astronomical Museum in Chicago. Photo credit: Trudy E. Bell, June 2025.

WHAT INSPIRED FRAUNHOFER?

This article is strictly on influence of Fraunhofer's pioneering German equatorial mount for the Dorpat refractor on follow-on astronomical refractors in 19th century America. For those interested in European predecessors to Fraunhofer's design, on YouTube there is an excellent 84-minute Harvard-Smithsonian colloquium presentation by Dartmouth historian Richard Kremer recorded in 2016 (*https://www.youtube.com/watch?v=103DoEMYepI*).

Finding evidence for what exactly inspired Fraunhofer's innovative design for the mount and clock drive is difficult, Kremer found, because artisans rarely wrote down such things, much less published their writings, in part because they regarded such information as competitive trade secrets. The same is also true, I found, for many subsequent alterations discussed in this article. Often illustrations were more eloquent than any accompanying text — a picture is indeed worth a thousand words.

— T. E. B.

TRUDY E. BELL, M.A. (from New York Univ.) has been researching 19th century U.S. observatories, telescopes, telescope makers, and philanthropists since grad school. She has been an editor for *Scientific American*, senior editor for *IEEE Spectrum*, and senior writer for the Univ. of California High-Performance AstroComputing Center (UC-HiPACC). Trudy is a contributing editor for *Sky & Telescope* (published by the American Astronomical Society) and for the *Journal of the Antique Telescope Society*. This is her 36th feature article for *The Bent*. She can be reached at *t.e.bell@ieee.org*.

TBP FELLOWS

Fellowships have been awarded to 31 members for a year of graduate study in 2026-27.

Nelanne Bolima MD Δ '24
Zimmerman No. 15 | Biomedical sci's

Yuxuan (Lily) Chen CA Σ '26
Hennis No. 7 | Control eng'g

Trevor S. Dady AR B '24
Hanley No. 15 | Aero & astro eng'g

Rena P. Feng NJ Δ '26
Swalin No. 10 | Computer architecture

Mrigayu Ghosh TX A '26
Spencer No. 71 | Biomedical eng'g

Jeffrey T. Guiette CO E '26
Forge No. 14 | Computational electromag.

Vara Qi Gunananthan MD A '26
Fife No. 259 | Materials sci. & eng'g

Nathan J. Hansen UT A '23
Fife No. 260 | Computer eng'g

Alyssa M. Hicks WA A '26
Fife No. 261 | Chemical eng'g

Urwa Irfan IL B '22
Anderson No. 27 | Building science

Anjal M. Jain CT A '26
Anderson No. 28 | Advanced comp. sci.

Anika M. Jena CA Σ '26
Dodson No. 13 | Chemical eng'g

Sarp C. Kayabas MD A '26
Fife No. 262 | Chem. & biomol. eng'g

Ayden J. Kemp AL A '25
Centennial No. 41 | Aerospace eng'g

Kyle E. Kirwin NC Z '26
King No. 65 | Mechanical eng'g

Sophia J. Klymchuk NY I '26
Stark No. 49 | Mechanical eng'g

Vicky Lizardi-Lobb NM B '26
Stark No. 50 | Nuclear eng'g

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Fife No. 263 | Naval arch. & Marine eng'g

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Fife No. 264 | Bioengineering

Andres A. Moreno NM B '26
Fife No. 265 | Mechanical eng'g

Tran B. Ngo FL A '20
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Paul J. Nguyen AL E '26
Tau Beta Pi No. 855 | Chemical eng'g

Evrim E. Ozcan RI A '24
Tau Beta Pi No. 856 | Medicine

Khaleb L. Pafford NE A '25
Sigma Tau No. 52 | Aerospace eng'g

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Brandt No. 5 | Electrical eng'g

Chathusha Punchi Wedikkara IN A '26
Tau Beta Pi No. 857 | Mechanical eng'g

Rachel E. Schenck MI A '25
Nagel No. 29 | Materials sci. & eng'g

Araj Shah DC A '25
Tau Beta Pi No. 858 | Computer science

Brian N. Wang NJ B '25
Tau Beta Pi No. 859 | Materials sci. & eng'g

Yameng (Moe) Zhang RI A '26
Williams No. 47 | Electrical eng'g

Hu (Oliver) Zhao AL A '21
Matthews No. 29 | Civil eng'g

The **Anderson Fellowships** are named for Mabel E. and Marshall Anderson, *MI Γ '32*, who was TBΠ Fellow No. 19 and left a bequest to the Society.

The **Brandt Fellowship** is made possible thanks to a gift from Larry D. Brandt, *OR A '67*.

The **Centennial Fellowship** honors the Society's most outstanding fellow and commemorates Tau Beta Pi's 100th anniversary.

The **Dodson Fellowship** is named for the late Charles R. Dodson, *MD B '30*, who made a gift to the Association.

The **James Fife Fellowships** are presented in memory of the father of the late William Fife, *CA A 1921*.

The **Forge Fellowship** is named for Charles O. Forge, *CA Γ '56*, who left a bequest.

The **Hanley Fellowship** is awarded in honor of Mary A. and Edward P. Hanley, *IL B '42*, TBΠ Fellow No. 84, who left a bequest.

The **Hennis Fellowship** is awarded thanks to a generous gift from the late Lee A. Hennis, *CA Δ '65*, to continue mentoring young engineers.

The **Harold M. King Fellowship** honors the 1954-58 president of TBΠ, Harold M. King, *MA A 1910*, and is given to that recipient whose participation in his/her technical society is judged worthy of special mention.

The **Matthews Fellowship** is awarded in honor of R.C. "Red" Matthews, *IL A 1902*, who served as Secretary and Secretary-Treasurer from 1905-47 and as Secretary-Treasurer Emeritus from 1947-78.

The Fellowship Board has announced the selection of 31 engineering students from 453 applicants for graduate fellowships. More than $9,520,000 in stipends will have been given by the Society when this 93rd group of fellows completes its graduate work. These awards bring the total to 1,892 fellowships since the program began in 1929. The Association is grateful to volunteer members for their role in the selection process; they are recognized at ***www.tbp.org/?Fellows***.

Nelanne A. Bolima

Zimmerman Fellow No. 15

Nelanne earned a B.S. in chemical eng'g from the University of Maryland, Baltimore County (UMBC), where she was a Meyerhoff, LSAMP, and U-RISE Scholar. At UMBC, she conducted research in biomaterials and biological systems while mentoring students and contributing to initiatives that promoted academic success and professional development. Following graduation, Nelanne completed a research-focused gap year as a PRIME-PREP Scholar at Duke Univ. where she gained advanced training in genomics and epigenetic regulation. Now, she's pursuing a Ph.D. in biomedical sciences through the NIH Oxford–Cambridge Scholars Program, conducting research jointly with Dr. Tisdale at the National Heart, Lung, and Blood Institute & Dr. de la Roche in the dept. of biochemistry at the Univ. of Cambridge. Her research focuses on engineering safer antibody–drug conjugate strategies for hematopoietic stem cell conditioning and leukemia therapy, integrating biochemical design with translational hematology. Nelanne aspires to lead academic research advancing genetic therapies while mentoring the next generation.

Yuxuan "Lily" Chen

Hennis Fellow No. 7

Lily is a B.S./M.S. student in electrical and computer engineering at UC Santa Barbara, with a focus in controls and machine learning. Her research develops data-driven models and practical planning & control algorithms for autonomous industrial systems, translating real-world telemetry into intelligent decision-making for more energy-efficient and cost-effective industrial operations. Her work includes a paper accepted to the 2026 American Control Conference. Outside academics, Lily served as CA Sigma Chapter president and solar team lead for Engineers Without Borders where she led engineering service projects and received the UCSB Outstanding Community Volunteer of the Year Award. She also enjoyed working as a campus ambassador, giving tours to more than 2,000 prospective students. Lily contributed to data pipelines and observability tools for industrial autonomy systems and shipped safety-critical C++ logic for production vehicles through two summer internships. She is driven by a commitment to the real-world performance of intelligent systems.

Trevor S. Dady

Hanley Fellow No. 15

Trevor graduated *summa cum laude* from the University of Arkansas at Little Rock with a B.S. in mechanical engineering and minor in mathematics. He's now graduating with an M.S. in mechanical eng'g following the presentation of his novel research involving design, testing, and analysis of thrust enhancing structures for UAVs. Trevor, a TBP Scholar and ASME/ANS Barry Sloane Scholarship Awardee, served one term as AR Beta Chapter treasurer and two terms as president. He also took part in UA Little Rock's ASME organization, aerospace/rocketry club, and Esports club. Trevor conducted additional fluid-focused research investigating more efficient designs for a hydraulic ram pump system and worked part-time as an Energy Analyst I at ENFRA, acted as the Head of Engineering at Bayner (a marine technology startup), and served as an instructor for mechanical eng'g labs at his alma mater. Trevor plans to pursue his Ph.D. in aeronautical & astronautical engineering at Purdue University with a focus on propulsion and computational engineering.

The **Nagel Fellowship** is given in honor of Robert H. Nagel, P.E., *NY Δ '39*, for his service as Editor of *The Bent* and Secretary-Treasurer from 1942-82 and as Secretary-Treasurer Emeritus in 1982-97.

The **Sigma Tau Fellowship**, perpetuates the name of Sigma Tau, a national engineering honor society founded at the University of Nebraska in 1904 and merged with Tau Beta Pi in 1974. It also commemorates Sigma Tau's former national president and secretary-treasurer, Clarel B. Mapes.

The **Charles H. Spencer Fellowship** is named for Tau Beta Pi's president from 1936-47, Charles H. Spencer, *IL B 1913*, it is awarded to a recipient whose contributions to his/her collegiate chapter are judged worthy of commendation.

The **Donald A. Stark Fellowships** are supported by a gift from a charitable trust named for the man who contributed much to progress in the fluid-power industry.

The **Swalin Fellowship** is named in honor of Helen M. and Richard A. Swalin, Ph.D., *MN A '52*, who left a bequest.

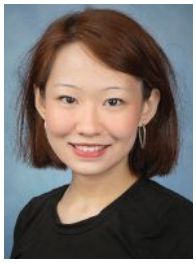
The **Tau Beta Pi Fellowships** are supported by matching gifts from companies as part of the annual alumni giving program.

The **Edward H. Williams Jr. Fellowship** honors the founder of Tau Beta Pi. It is given to a recipient who plans to earn a doctoral degree and become a professional engineering teacher, as was Dr. Williams, *PA A 1875*.

The **Zimmerman Fellowship** is named for Marlin U. Zimmerman Jr., *MD A '44*, who left a bequest in 2011.

Rena P. Feng

Swalin Fellow No. 10



Rena is graduating from Princeton University with a B.S.E. in electrical & computer eng'g, with minors in computer science, optimization & quantitative decision science, and Portuguese. Through internships spanning energy markets, power electronics, and chip design, she has adapted to and devised solutions for a diverse range of technical problems. Her research experiences include designing microcontroller-LEGO spectroscopy tools for the curriculum of an exploratory chemistry class, developing a framework to identify hardware security vulnerabilities, and benchmarking quantum computers. An avid proponent of STEM education, Rena was a leader in Science Olympiad for the past 11 years, both as a competitor and tournament organizer. She is also a rock and metal radio DJ for WPRB 103.3 FM and enjoys learning languages while serving as a volunteer translator for nonprofits. She will pursue a Ph.D. in computer architecture as an NSF Graduate Research Fellow at Carnegie Mellon Univ.

Vara Qi Gunananthan

Fife Fellow No. 259

Vara Qi, an international Malaysian student, is graduating from the Johns Hopkins University with a B.S. in materials science and engineering and a double major in applied mathematics and statistics. She served as MD Alpha Chapter president, and leads a student design team aimed at inventing a novel sutureless mitral valve prosthesis. Vara Qi has conducted research in reinforcement learning for soft-matter systems, high-strength aluminum alloys, and neuromorphic computing at Lawrence Livermore National Lab. She will be pursuing a Ph.D. in materials science and engineering at Stanford University, with a research focus on bioprinting and soft robots.

Mrigayu Ghosh

Spencer Fellow No. 71

Mrigayu is a University of Texas at Austin senior pursuing dual B.S. degrees in biomedical engineering (honors) and biochemistry, with a French studies minor. His research focuses on stem cell and vascular mechanobiology, and he works in Dr. Aaron Baker's lab. He has also completed research internships at institutions including Universität Heidelberg, where he studied photomechanical stimulation of stem cells. Beyond the lab, Mrigayu is committed to mentorship and leadership. He has served as a teaching assistant, mentoring nearly 150 students per semester, held multiple leadership roles in the TX Alpha Chapter, including president, and serves as the pre-graduate school coordinator for BMES. He will pursue a Ph.D. in biomedical eng'g through the Georgia Tech and Emory Univ. joint program in Dr. Jo's lab as an NIH T32 Cardiovascular Biomechanics Fellow, focusing on vascular mechanobiology and mechanosensitive gene targets in vascular disease.

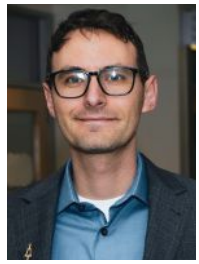
Nathan J. Hansen

Fife Fellow No. 260

Nate is a 3rd year Ph.D. candidate in the Sanchez Research Lab at the Univ. of Utah and a member of the Utah Alpha Chapter. He's passionate about applying cutting-edge technology to improve human health through interdisciplinary collaboration. Through his clinical research studies, he has gone beyond the soldering station and lab bench to develop device protocols and work with patients. He is driven to create thoughtful, human-centered technology. As the BioHive student chapter president, Nate directs and hosts career development and networking events for students and companies. He leads a team of student scientists and engineers who are committed to building a collaborative community in Utah's biotech industry. Outside of the lab, you'll find Nate learning to crochet from his very patient wife, reading a book, playing the piano, or observing wildlife in Utah's Wasatch Mountains. After completing his Ph.D., Nate will develop AI-driven health technologies in industry, mentor students through industry-campus relations, and build cross-functional communities where bright minds accelerate growth.

Jeffrey T. Guiette

Forge Fellow No. 14



Jeffrey graduated from the University of Colorado Denver with a B.S. in electrical eng'g and began pursuing an M.S. in EE with a focus on electromagnetics, RF engineering, and antenna design. He's worked in the Magnetic Materials Lab under Stephen Gedney for 3+ years, where he designs experiments, measures, and models the magnetic hysteretic and magnetoelastic behavior of ferromagnetic materials under varying axial and torsional stresses, temperature, and applied magnetic fields. His work includes experimental characterization using search coils & data acquisition systems to analyze material response during testing. His master's research applies machine learning and optimization methods to model these complex non-linear phenomena, strengthening his interest in computational electromagnetics and applied research. Prior to returning to school, Jeffrey spent several years as a sous chef, and plans to pursue a career in electromagnetics with a goal of contributing to advancements in fusion energy systems.

Alyssa M. Hicks

Fife Fellow No. 261

Alyssa is graduating from the University of Washington (UW) with an honors B.S. in chemical engineering and a minor in data science. At UW, she conducted research with Dr. David Bergsman on vapor phase infiltration of polymeric membranes to improve energy-efficient chemical separations. She served as secretary of the UW Chapter of the American Institute of Chemical Engineers, vice president of the ChemE Brew Club, and a ChemE Peer Learning Fellow. During her undergraduate studies, Alyssa interned at H2 PowerTech, contributing to fuel cell system research and development, and at Micron Technology in semiconductor chemical management and sustainability. After graduation, she'll begin her Ph.D. at the University of Minnesota in the department of chemical engineering and materials science as an NSF Graduate Research Fellow and Wei-Shou Hu Fellow, where she aims to develop sustainable materials and technologies to address global challenges.

Urwa Irfan

Anderson Fellow No. 27

Urwa graduated *summa cum laude* from the Illinois Institute of Technology in 2022 with a B.S. in architectural engineering. At Illinois Tech, she was a research assistant with the Built Environment Research Group studying building mechanical system energy performance. Urwa then joined the architecture & engineering firm SmithGroup, designing mechanical systems for a variety of projects from workplace renovations to central utility plants across the country. She's now pursuing her M.S. in building science, technology, and sustainability at UC Berkeley. Her research at the Center for the Built Environment includes contributing to the Berkeley Decarb Tool, an open-source web tool that helps design engineers evaluate the energy and carbon performance of HVAC systems and equipment. Urwa served as an officer for the TBP Chicago and SF Bay Area Alumni Chapters. She's an active member of ASHRAE and will be student chapter president for the upcoming year.

Anjal M. Jain

Anderson Fellow No. 28

Anjal is a graduating senior at Yale University studying biomedical engineering and music. Her work sits at the intersection of healthcare, technology, and innovation, with a focus on advancing personalized medicine and delivering tailored treatments at scale. For her senior thesis, she is developing machine learning models to predict Medicare Advantage Star Rating thresholds, aiming to inform more effective healthcare investment decisions. Anjal has also conducted computational ophthalmology research at Stanford Univ., UCLA, USC, and Yale, applying AI-driven methods to improve early disease detection. She's a recipient of the 2025 Women of Innovation Award and serves as CT Alpha Chapter vice president and treasurer. In the future, Anjal aims to build data-driven platforms that deliver personalized therapies for genetic vision loss. She is involved in music through the Yale Glee Club and Dhvani with a music thesis exploring dialogue across traditions.

Anika M. Jena

Dodson Fellow No. 13

Anika graduated from the University of California, Santa Barbara (UCSB), with a B.S. in chemical eng'g. She is a Congressional Barry Goldwater Scholar. As an undergrad researcher at the Fygenson Lab at UCSB Physics, Anika engineered DNA-based condensates and nanotubes to self-assemble into novel and valuable molecular architectures. Previously at the UCSB Takatori Lab in chemical eng'g, she developed biocompatible membrane-actin composite materials with tunable mechanical properties. An English minor and a classical pianist, Anika is pursuing a Ph.D. in chemical engineering at Stanford University as a Graduate Fellow, the highest honor for an incoming doctoral student. At Stanford, Anika will conduct research developing and probing advanced functional polymeric materials for applications in health, sustainability, and human advancement. Her professional aspiration is to develop materials and fabrication methods at nano and micron scales to elevate humanity.

Sarp C. Kayabas

Fife Fellow No. 262

Sarp will be graduating from Johns Hopkins University (JHU) with a B.S. in chemical and biomolecular engineering with a specialization in bioengineering. He is passionate about biomaterials, and his undergraduate research in Prof. Hai-Quan Mao's group focused on using machine-learning for optimizing the formulation and purification of lipid nanoparticles for nucleic acid drug delivery. Sarp was awarded the Vredenburg Travel Fund in his junior year to support a research internship in Prof. Esther Amstad's Soft Materials Lab at EPFL in Lausanne. During his time in Switzerland, he worked on the synthesis and characterization of sustainable high-performance textile fibers derived from cellulose and presented a research poster at the 2025 Bioinspired Materials conference. Sarp is continuing his studies through the JHU Institute of Nanobiotechnology's B.S./MSE program. As part of his master's studies, he will be completing a 6-month cell line development co-op at AbbVie's Bioresearch Center in Worcester, MA, with the intent to work in the pharmaceutical industry afterward.

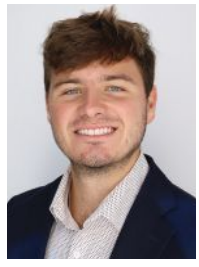
Ayden J. Kemp

Centennial Fellow No. 41

Ayden graduated from Auburn University with B.S. degrees in biosystems eng'g (2024) and aerospace engineering (2025). Continuing his studies at Auburn, he's presently a doctoral candidate in biosystems eng'g and is also completing an M.S. in aerospace eng'g. As an undergrad, Ayden worked under the mentorship of Dr. Adhikari on developing sustainable aviation fuels from biomass. Now, his graduate research with Dr. Khodaei aims to create computational modeling tools for predicting the unique combustion characteristics of biofuels. He's served in several positions with the AL Alpha Chapter, including service chair, professional development chair, and presently as an advisor. Ayden has completed several internships and co-ops focused on human spaceflight and in particular, environmental control and life support systems engineering. He plans to develop advanced biological life support systems that will enable humanity to travel to Mars and beyond. Ayden is an active member of his Church of Jesus Christ of Latter-day Saints congregation and enjoys serving in his community.

Kyle E. Kirwin

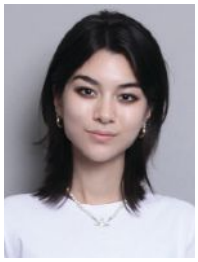
King Fellow No. 65



Kyle graduated *summa cum laude* from East Carolina University (ECU) with a B.S. in engineering and concentrations in mechanical and biomedical eng'g. He will continue his studies at the University of Pennsylvania, pursuing a master's degree in mechanical eng'g and applied mechanics. His research began in the ECU's Acoustics and Vibrations Lab studying long-range atmospheric acoustics. He has presented at regional/national conferences, including the Acoustical Society of America. This work led to his selection as a DoD SMART Scholar, affiliated with the Naval Surface Warfare Center Philadelphia Division, where he will focus on machine acoustics. Beyond research, he served as president of ECU club soccer and on the Club Sports Student Executive Council. He was also a lead ECU engineering outreach coordinator, a tutor, member of a Greek organization, and led service efforts with the Food Bank of Eastern North Carolina. He looks forward to advancing his expertise in acoustics and defense applications.

Sophia J. Klymchuk

Stark Fellow No. 49



Sophia graduated *summa cum laude* from The Cooper Union for the Advancement of Science and Art with a bachelor of engineering in mechanical eng'g. At Cooper Union, she worked on human-robot interaction projects, and her capstone research focused on sensor fusion for robust localization. She also completed a summer research stay at the University of Burgos in Spain, where she characterized the thermophysical properties of hydrofluoroether mixtures. Throughout her undergraduate career, Sophia served as a tutor and teaching assistant for the math department. She also served as NY Iota Chapter president, and is a TBP Scholar. This fall, Sophia will begin her Ph.D. in mechanical engineering at Columbia University where she will work on sensing problems for space and field robotics applications. Sophia ultimately hopes to pursue a career in academia. In her free time, she enjoys cooking and rock climbing with friends.

Abigail L. Moeller

Fife Fellow No. 264

Abigail graduated *magna cum laude* from the University of Mississippi as a Stamps Scholar with a biomedical engineering B.S. and a B.A. in Chinese, with a manufacturing minor. She spent three years researching cytoskeletal crosstalk in the UM Molecular Biophysics & Engineering Lab and has represented Ole Miss in poster presentations regionally and nationally, including at the Biophysical Society Annual Meeting. A committed leader, Abigail served as BMES chapter president and vice president of the Biomedical Think-Tank, where she supported prototype development for a wearable hand assistive device. She also served as laboratory coordinator for the D3B Center, a biomedical diagnostics and research hub in north Mississippi. This summer, she will intern at Lifelet Medical, a startup in Galway, Ireland, contributing to developing a synthetic polymer leaflet material designed to outperform current biological heart valve replacements. Upon her return, Abigail will pursue a master's in bioengineering at Rice Univ. in the Global Medical Innovation program, with the goal of developing accessible medical technologies for communities worldwide.

Vicky Lizardi-Lobb

Stark Fellow No. 50

Vicky is a senior studying mechanical engineering at the University of New Mexico (UNM), earning her B.S. in May 2026. She will begin graduate studies in nuclear eng'g at UNM this fall. Vicky began her academic journey at Fairfield University, earning a B.S. in political science. Her interest in engineering led her to Central New Mexico Community College (CNM), where she earned an associate degree in engineering and mathematics before transferring to UNM. Vicky works at Los Alamos National Lab in the fusion fuel cycle group. She currently serves as NM Beta Chapter vice president, Pi Tau Sigma chapter VP, and returns each summer to the STEM Core program at CNM to speak with students about engineering pathways. A first-generation college student, Vicky is the first in her family to pursue graduate education. As a Latina and a mother, she is committed to increasing access and representation in engineering. She plans to pursue a Ph.D. to advance hydrogen storage technologies for fusion energy systems.

Andres A. Moreno

Fife Fellow No. 265

Originally from Mancos, Colorado, Andres is graduating *summa cum laude* from the University of New Mexico (UNM) with a B.S. in mechanical engineering and a minor in mathematics. At UNM, he has participated in several extracurricular activities such as rugby, with the American Society of Mechanical Engineering, and an origami club. Andres has conducted research in multiple areas, including perovskite solar cells through the El Puente Research Fellowship program and autonomy and control technologies at the University of Texas at Austin. He's currently an intern at Sandia National Labs, where he studies component failure under extreme shock environments. In the fall, Andres will pursue his M.S. in mechanical eng'g at Georgia Institute of Technology and, intends to develop a thesis through his work at Sandia. After graduation, he aspires to enter the aerospace industry to focus on the design and development of advanced propulsion systems.

Cole H. Malinchock

Fife Fellow No. 263

Cole will be graduating *summa cum laude* from North Carolina State University with a B.S. in mechanical eng'g and minors in computer programming and environmental science. As a Park Scholar, he's conducted research across aerial, ground, and medical robotics. Under Dr. Gregory Buckner, Cole served as software developer on a Florida Fish and Wildlife Conservation Commission drone project, building navigation systems for autonomously eradicating invasive plant species. He also led development of a halo gravity traction device for pediatric scoliosis, earning 1st place at the BMES Medtronic Undergraduate Design Competition and clinical trials at UNC Children's Hospital. A two-time IEEE first-author, including a visual cue-based localization paper, and four-time REU recipient, he also served as cycling club president and Second Chance Initiative treasurer, a prison education nonprofit. An NSF Graduate Research Fellow, Cole will pursue a Ph.D. in naval architecture & marine eng'g at the Univ. of Michigan.

Tran B. Ngo

Fife Fellow No. 266

Tran graduated with a B.S. in biomedical engineering at the University of Florida (UF). After graduation, she conducted immunology research at the National Institutes of Health and received various recognitions, including the 2021 NIH Director's Award and 2023 NIBIB Award for Scientific Achievements. Tran returned to UF for her M.D.-Ph.D. training at the intersection of biomedical eng'g, immunology, and surgery. Her research focuses on ischemia-reperfusion injury, with the goal of developing immunomodulatory therapies that modulate immune responses to improve outcomes in organ transplantation and acute injury. Outside of school, she serves as UF Equal Access Clinic executive director, a student-run network of free clinics delivering care to underserved communities. Her work expands access to specialty care, strengthens clinic infrastructure, and builds sustainable models of community-based healthcare delivery. Tran will pursue a career as a surgeon–scientist, integrating clinical practice with research.

Paul J. Nguyen

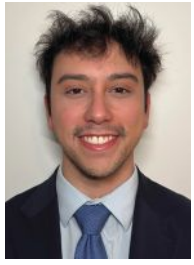
Tau Beta Pi Fellow No. 855

Paul is graduating in chemical engineering at the University of South Alabama (USA) and currently serves as AL Epsilon Chapter treasurer. In 2023 and 2024, Paul completed NSF REUs at Princeton Univ. in the Joseph Lab studying computational biophysics. Last summer, he completed the Fulbright Canada-Mitacs Globalink Research Internship, researching with the Moo Lab at Carleton Univ. in biomechanics simulations. His current senior research in the Rabideau Lab at USA focuses on machine learning for compound property predictions. Paul is a 2024 Goldwater Scholarship recipient, an inductee for the USA Senior Jaguar Medallion Society with a special award in research, and a three-time USA Academic All-Star for earning national recognitions. Paul is an active pianist with a minor in music and won 1st place in the Gulf Coast Steinway Society Competition in 2023, performing at Carnegie Hall (NY). Paul will attend the University of Pennsylvania to pursue his Ph.D. in chemical eng'g with a focus on computational polymer physics.

Diego A. Puerta

Brandt Fellow No. 5

Diego earned a B.S. in electrical engineering from Arizona State University (ASU) where he was the Outstanding Graduate for his major. Diego has worked as an undergrad researcher in power electronics at ASU since May 2024 and completed a validation engineering internship at Texas Instruments in the summer of 2025. He will return this summer as an analog integrated circuit design eng'g intern. In addition, Diego is a National Science Foundation graduate research fellow and a 2025-26 TBP scholar. This September, he will begin his Ph.D. in electrical engineering and computer science at the Massachusetts Institute of Technology where he will conduct research in high-frequency to very-high-frequency power electronics. Diego's long-term professional goal is to become a leading researcher in power electronics and direct a world-class research group to deliver necessary innovations in renewable energy, data center power delivery, and biomedical devices.



Evrim E. Ozcan

Tau Beta Pi Fellow No. 856

Evrim graduated *magna cum laude* with honors and an Sc.B. in biomedical engineering from Brown University, earning induction into Sigma Xi. Before Brown, he developed a non-invasive method to measure oxidative stress from sweat at the University of Maryland, earning recognition as a Regeneron STS Scholar. At Brown, his research spanned biomedical eng'g and neurosurgery, including an honors thesis on a cranial access system for hemorrhage evacuation, a drug delivery device (under patent pursuit), avian flight mechanics, and neurosurgical outcomes research. Senior year, he co-founded Paracelsus Health to commercialize his device innovations. He then spent a year at Boston Children's Hospital, coordinating a device trial, RCT, and more. Now a medical student at Penn's Perelman School of Medicine, he performs plastic surgery research spanning microtia, hernia and neurectomy outcomes, and AI-driven surgical prediction. His work has been recognized through the Rothberg Catalyzer Grant, Halpin Prize, and additional honors. Evrim hopes to become a surgeon.

Chathusha Punchi V. Wedikkara

Tau Beta Pi Fellow No.857

A Ph.D. candidate in mechanical engineering at Purdue University, Chathusha researches computational modeling of novel renewable energy systems under Dr. Aaron Morris. He develops modeling frameworks to predict thermal performance of concentrated solar power systems utilizing fluidized silica beds in collaboration with the National Renewable Energy Lab. His work advances simulation techniques for multiphase heat transfer in these systems. Originally from Sri Lanka, Chathusha earned his B.S. in mechanical eng'g from the Univ. of Moratuwa, where he was a three-time collegiate rowing champion, vice-captain of varsity crew, and awarded most outstanding graduate. At Purdue, he served on the Graduate Student Senate as an ME senator in fall 2025, advocating for graduate student needs. He is currently completing a graduate internship at Tesla, applying his thermal modeling expertise to battery-pack abuse functional safety for electric vehicles and energy storage systems. Chathusha aspires to join industry as a full-time researcher developing technologies to combat climate change.

Khaleb L. Pafford

Sigma Tau Fellow No. 52

Khaleb graduated with highest distinction from the University of Nebraska-Lincoln with a B.S. in mechanical engineering with computer science and mathematics minors. He served as Nebraska Alpha Chapter vice president, aerospace club president, and has held leadership roles on the Design Build Fly, Rocket Propulsion Group, and Rocketry engineering design teams. As an undergraduate, he conducted research at Midwest Roadside Safety Facility, evaluating inertial characteristics and sales trends of battery electric vehicles. Over the past year, he interned at Drone Amplified, designing hardware and payload modifications for unmanned aerial vehicles. Khaleb will pursue a Ph.D. in aerospace eng'g at the Georgia Institute of Technology as an NSF Graduate Research Fellow. His primary research interests include wear mechanisms in electric propulsion systems and alternative propellants for electric propulsion.

Rachel E. Schenck

Nagel Fellow No. 29

Rachel is a materials science & engineering Ph.D. student in the High Strain Rate Lab at Georgia Tech. Her research focus is energy dispersion of functionally-graded metals using time-resolved characterization techniques. Rachel is active with the GA Alpha Chapter, a Science Olympiad supervisor, and a club water polo player at GT. She graduated from Michigan State University with a B.S. in materials science & eng'g and mechanical engineering in 2025. During this time, she served as MI Alpha Chapter vice president for 2.5 years, treasurer and secretary of the Materials Science and Engineering Society, mechanical co-director of the Solar Car Team, and mentor for Women in Engineering. Throughout her time as an undergrad, Rachel conducted catalyst simulation research under Dr. Mendoza, sustainable lignin-based foam and adhesive replacements under Dr. Nejad, and industry research during four internships at Gentex, 3M, Williams International, and Wipro Pari. Her achievements include co-authored publications, conference presentations, being a GT Presidential Fellow, Alumni Distinguished Scholar, and an NSF GRFP Fellow.

Araj Shah

Tau Beta Pi Fellow No. 858

Araj is completing his computer science and mathematics degree at Howard University, and this fall he'll begin a master of science in computer science and engineering at the University of Michigan. His studies have centered on machine learning, systems, and applied mathematics, and he's been fortunate to explore those interests through research and software eng'g internships at Google. Outside the classroom, Araj has enjoyed serving as a teaching assistant in computer science and mathematics, tutoring students, and being involved in organizations such as TBP, NSBE, and Howard's math and robotics communities. He values these spaces because they have taught him that knowledge carries its greatest force when it is shared, and that one of the most meaningful things we can do is help widen the circle of who feels they belong in technical spaces. After graduation, he hopes to build trustworthy AI and software systems that are both technically rigorous and humane. Araj carries deep gratitude for his family, mentors, and the Howard community, whose belief in him has made this path possible.

Brian N. Wang

Tau Beta Pi Fellow No. 859

Brian graduated *summa cum laude* from Rutgers University in three years with a B.S. in materials science & engineering. He's served as NJ Beta Chapter secretary, supporting outreach/community initiatives, and vice president of Material Advantage. Brian has conducted a wide range of materials systems and processes research. Under Dr. Haber, he synthesized and characterized ultra-high temperature ceramics for hypersonic applications. Under Dr. Riman, Brian led an undergrad team developing early-stage procedures for a novel metallization process for rare-earth chlorides. He also completed an internship at Picatinny Arsenal, analyzing inert weapon components and coatings, strengthening his interest in defense & aerospace materials. Brian is currently pursuing an M.S. in materials science & engineering under Dr. Goel and works on optimizing high-performance aluminoborosilicate glasses with superior hardness, crack resistance, and manufacturability for next-generation transparent armor and display protection. Brian recently returned to hypersonic materials research, investigating coatings for hypersonic flight.

Yameng "Moe" Zhang

Williams Fellow No. 47

Moe is graduating from Brown University with honors in engineering physics. During her undergraduate studies, she conducted research in quantum optics under Prof. Jimmy Xu where she investigated quantum imaging with undetected photons, a technique based on induced coherence to form images using light that never directly interacts with the object. Her work holds significant promise for imaging at otherwise inaccessible wavelengths, with applications spanning biological imaging, remote sensing, and quantum-enhanced sensing technologies. Moe will pursue a Ph.D. in electrical engineering at Stanford University as a Stanford Graduate Fellow. Her research interests lie at the intersection of photonics and sustainability where she aims to approach fundamental questions from first principles and translate them into technologies that address pressing environmental and energy challenges. Outside of academics, she is an avid runner, synchronized swimmer, and enthusiastic reader. In the future, she aspires to become a professor, combining her passion for research, teaching, and lifelong learning.

Hu "Oliver" Zhao

Matthews Fellow No. 29

Oliver is a Ph.D. student in civil and environmental engineering at Texas A&M University, researching urban resilience in Dr. Ali Mostafavi's Urban Resilience.AI Lab. He previously studied at Beijing University of Civil Engineering and Architecture, earned his B.Eng. *magna cum laude* as an honors scholar from Auburn University, and completed his M.S. at UCLA. Oliver served as TX Delta Chapter president and as a 2024 TBP Convention voting delegate. He authored the June 2025 cover feature for *The Bulletin* and writes the recurring column "Exploring Life & Engineering with Hu" in *The Bent*. He's held officer roles in Chi Epsilon, Engineers Without Borders, TAMU graduate student consulting club, and Auburn's Student Government Association, to name a few. He has received multiple prestigious awards, including Auburn Honors College Eagle of Excellence award and Department of Civil & Environmental Engineering Excellence Fellowship. A World Economic Forum Global Shaper alumnus and Clinton Global Initiative University Fellow, he intends to pursue a career in management consulting.

EXPLORING LIFE & ENGINEERING WITH HU

THE ELEGANT MODEL AND THE UGLY ROAD – WHAT A FAILED SPREADSHEET ON AUSTRALIA'S EAST COAST TAUGHT ME ABOUT ENGINEERING REALITY

By: ***Hu "Oliver" Zhao****, Alabama Alpha '21*, a Ph.D. student in engineering resilience at Texas A&M University.

Before we left for Australia on a cycling trip, my father and I built a spreadsheet. It was a thing of beauty. Google Maps supplied the distances, we divided by a confident daily target of 200 kilometers, and the math returned a crisp itinerary, Sydney to Cairns in roughly two weeks with rest days built in. The route was flat — eastern Australia is not the Himalayas — and we'd already survived the Sichuan–Tibet Highway, where passes exceed 5,000 m. By comparison, this was supposed to be a vacation.

On day four, we checked our odometer and we'd covered fewer than 200 km in total. Not per day. Total. Our elegant model had been gutted by a reality for which it never accounted. The spreadsheet assumed roads while Google's cycling mode gave us winding park paths through coastal wetlands, wooden boardwalks that rattled under our tires, and detours through national forests with gradients the elevation profile had smoothed into nothing. The spreadsheet also assumed predictable stops. Australian traffic lights obeyed a logic we never decoded — red phases so long we once dismounted and sat on the curb.

The spreadsheet assumed we were the only variables. It did not model the kangaroo warning signs that made us slow to a crawl at dusk, the afternoon headwinds off the Tasman Sea, or the fact that my bicycle's crank arm stripped its threads on day six, turning a mechanical component into a supply-chain crisis in a country where the nearest compatible part required a detour to a suburb of Brisbane.

At fifteen, this was my first encounter with what engineers call model risk — the danger that lives not in the system you're analyzing, but in the assumptions baked into your analysis. Our spreadsheet was not wrong in its arithmetic, but in its ontology. It modeled a road as we were riding a landscape.

Once I learned to see this pattern, I found it everywhere in our cycling years. On the Sichuan–Tibet Highway, the online guide said cyclists gathered at the Wuhou Shrine in Chengdu for a group photo before departure. We arrived at dawn. The square was empty. The guide was describing a tradition from five years earlier. On Taiwan's highest paved road, an electronic sign at a mountain lodge read "No Vacancy." A café worker told us the sign always said that and when we walked in, they had rooms.

Each failure had the same architecture — a model built on published data without the texture of the ground. None of them lied, but all were, in practice, useless because they captured the system at one moment and projected it forward as permanent truth. The road had changed. The tradition moved. The sign was never updated. Reality is not a snapshot. It's a process, and any model that treats it otherwise will, at some point, strand you on a boardwalk wondering where your daily 200 km went.

What saved us was not a better model, it was the willingness to abandon the model entirely and respond to what was actually in front of us. My father was the master of this. In Australia, when the gap between plan and reality became undeniable, he did not recalculate. He looked at the map, found the nearest train station, and said, "We ride to Broadmeadow, take the train to Casino, and pick up the path there." There was no anguish or attachment to the original design. The plan failed and a new one took its place within minutes. I watched him do this across five cycling journeys: reroute around a washed-out bridge in Sichuan, flag down a cargo truck in Tibet when a mountain became impassable, turn around on a fog-blinded summit in Taiwan with the simple words "We go back." Each time, the pattern was the same: acknowledge the failure; discard the invalidated plan; decide with whatever available information; and move.

He never called this engineering and I'm not sure he would recognize the term "adaptive management." But watching him operate under uncertainty for 10,000 km taught me more about real-world systems than any course I've taken since.

I'm studying urban resilience and my current research examines how hundreds of households in Harris Co., TX, responded to Hurricane Beryl's prolonged power outages — a dataset of families making decisions under extreme uncertainty with incomplete details. The parallels to a cyclist on an unfamiliar road are not metaphorical, they're structural. In both cases survival depends less on the quality of the original plan and more on the speed and creativity of the human response when it fails. The variable I keep returning to in my research is not infrastructure capacity or income, it's adaptive behavior.

My previous column was about switching from violin to viola and learning to backfill the unseen gaps in a system. My cycling years taught me something adjacent: the gap between the plan and the world is not a defect to be eliminated, it's a permanent feature of every complex system. The engineer's job is not to close it — that is impossible — but to build the capacity to cross it, again and again, with whatever you have left when the spreadsheet runs out.

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 259 active collegiate student chapters.

Newly Received Gifts & Pledges

Charlie S. McNeil, P.E., *CO Α '71*
COLORADO ALPHA — $20,000
Colorado School of Mines

George "Ed" Williamson II, *FL Β '67*
ALABAMA ALPHA — $10,000
Auburn University

FLORIDA BETA — $10,000
University of Miami

Kenneth P. Gibbs, Ph.D., *MO Γ '76*
KENTUCKY ALPHA — $5,000
University of Kentucky

NEW YORK BETA — $5,000
Syracuse University

VIRGINIA BETA — $5,000
Virginia Polytechnic Inst. & State Univ.

Pam and Ed D'Avignon, *NY Β '88*
NEW YORK BETA — $10,650
Syracuse University

Albert W. Alsop, Ph.D., *TX Λ '80*
TEXAS LAMBDA — $10,000
Texas A&M University-Kingsville

Charles E. Cancilla, *CA Ζ '59*
CALIFORNIA ZETA — $8,000
Santa Clara University

Richard S. Fleisher, *NY Β '72*
NEW YORK BETA — $8,000
Syracuse University

Anonymous, *MA Β '67*
NEW MEXICO GAMMA — $8,000
New Mexico Inst. of Mining & Technology

Johan J. Bemelen, *CO Β '66*
COLORADO BETA — $5,000
University of Colorado Boulder

Thomas M. Endo, *UT Α '62*
UTAH ALPHA — $5,000
University of Utah

Larry A. Marcus, *VA Β '72*
VIRGINIA BETA — $5,000
Virginia Polytechnic Inst. & State Univ.

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

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 ΤΒΠ. 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.

Endowed Chapters (36) with $100,000 or more in cash & pledges:

ARIZONA ALPHA
Univ. of Arizona — $105,000

CALIFORNIA DELTA
Univ. of Southern California — $100,000

CALIFORNIA EPSILON
Univ. of California, LA — $100,000

CALIFORNIA UPSILON
CA State Univ., Sacramento — $100,000

COLORADO ZETA
U.S. Air Force Academy — $100,000

FLORIDA GAMMA
Univ. of South Florida — $105,000

FLORIDA ZETA
Florida Inst. of Tech. — $104,000

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

MASSACHUSETTS BETA
MIT — $103,000

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. — $125,000

MISSOURI BETA
Missouri Univ. of S&T — $125,000

MISSOURI GAMMA
Washington Univ. — $100,000

NEW JERSEY ALPHA
Stevens Institute of Tech. — $105,228

NEW JERSEY DELTA
Princeton Univ. — $100,000

NEW YORK BETA
Syracuse Univ. — $102,357

NEW YORK GAMMA
Rensselaer Polytechnic Inst. — $110,000

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
SD Mines — $204,675

TENNESSEE ALPHA
Univ. of Tennessee — $105,000

TEXAS ALPHA
Univ. of Texas at Austin — $200,000

TEXAS BETA
Texas Tech Univ. — $100,113

VIRGINIA ALPHA
Univ. of Virginia — $115,000

WEST VIRGINIA BETA
West Virginia Tech. — $108,000

WYOMING ALPHA
Univ. of Wyoming — $100,000

The goal of the Chapter Endowment 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.

ALABAMA ALPHA
$15,000

ALABAMA GAMMA
$40,000

ALABAMA DELTA
$5,000

ALABAMA EPSILON
$5,000

ARIZONA BETA
$10,000

ARKANSAS ALPHA
$5,000

CALIFORNIA ALPHA
$50,000

CALIFORNIA BETA
$50,084

CALIFORNIA GAMMA
$72,000

CALIFORNIA ZETA
$82,000

CALIFORNIA ETA
$35,000

CALIFORNIA THETA
$5,000

CALIFORNIA LAMBDA
$5,000

CALIFORNIA MU
$5,000

CALIFORNIA NU
$5,000

CALIFORNIA SIGMA
$10,000

CALIFORNIA TAU
$5,000

CALIFORNIA PSI
$40,000

COLORADO ALPHA
$90,000

COLORADO BETA
$25,000

CONNECTICUT BETA
$5,000

DELAWARE ALPHA
$10,000

D.C. ALPHA
$5,000

FLORIDA ALPHA
$15,000

FLORIDA BETA
$10,000

FLORIDA EPSILON
$14,659

GEORGIA ALPHA
$60,886

ILLINOIS BETA
$5,000

ILLINOIS GAMMA
$30,857

INDIANA ALPHA
$50,000

INDIANA BETA
$10,000

INDIANA DELTA
$25,000

INDIANA EPSILON
$30,000

IOWA BETA
$35,000

KANSAS BETA
$5,000

KENTUCKY ALPHA
$40,000

LOUISIANA BETA
$10,000

LOUISIANA GAMMA
$5,508

LOUISIANA EPSILON
$15,000

MARYLAND ALPHA
$12,500

MARYLAND GAMMA
$10,000

MARYLAND EPSILON
$5,000

MASSACHUSETTS EPSILON $5,000

MASSACHUSETTS THETA $10,000

MICHIGAN ALPHA
$50,000

MICHIGAN ETA
$5,075

MICHIGAN IOTA
$8,040

MICHIGAN LAMBDA
$10,000

MINNESOTA ALPHA
$45,000

MONTANA ALPHA
$5,000

NEBRASKA ALPHA
$75,000

NEW HAMPSHIRE BETA $10,200

NEW MEXICO BETA
$20,000

NEW MEXICO GAMMA
$8,000

NEW YORK ETA
$5,000

NEW YORK THETA
$20,000

NEW YORK KAPPA
$27,571

NEW YORK MU
$15,000

NEW YORK NU
$5,000

NEW YORK RHO
$5,725

NORTH CAROLINA EPSILON $5,000

OHIO DELTA
$35,000

OHIO IOTA
$5,000

OHIO MU
$10,000

OKLAHOMA GAMMA
$5,000

OREGON ALPHA
$10,000

PENNSYLVANIA BETA $45,301

PENNSYLVANIA GAMMA $5,000

PENNSYLVANIA DELTA
$5,000

PENNSYLVANIA ZETA
$10,000

PENNSYLVANIA ETA
$10,000

PENNSYLVANIA THETA
$50,000

PENNSYLVANIA MU
$5,000

PENNSYLVANIA LAMBDA $30,000

PUERTO RICO ALPHA
$15,000

RHODE ISLAND ALPHA
$20,000

RHODE ISLAND BETA
$20,000

TENNESSEE BETA
$10,000

TEXAS GAMMA
$5,000

TEXAS DELTA
$30,000

TEXAS EPSILON
$50,389

TEXAS ZETA
$15,000

TEXAS ETA
$15,000

TEXAS THETA
$5,000

TEXAS IOTA
$5,000

TEXAS KAPPA
$5,000

TEXAS LAMBDA
$10,000

TEXAS NU
$40,031

UTAH ALPHA
$5,000

VERMONT ALPHA
$10,000

VERMONT BETA
$30,000

VIRGINIA BETA
$90,069

VIRGINIA EPSILON
$30,000

WASHINGTON ALPHA $20,000

WISCONSIN ALPHA $53,120

WISCONSIN BETA $5,000

WISCONSIN GAMMA $5,000

WISCONSIN EPSILON $5,000

ANY CHAPTER
$55,000

CURRENT CHAPTER ENDOWMENT INITIATIVE CHALLENGE MATCHES AND CONTACT INFORMATION CAN BE FOUND ON PAGE 23.

Alumni Spotlight

Alexander C. Gaudreau, *FL E '23*

I was born in the beautiful state of Florida, but consider Houston, Texas, my home. I earned a B.S. in mechanical engineering from Florida Atlantic University (FAU) in Boca Raton. After being inducted into Tau Beta Pi my senior year, I was mentored by some truly incredible engineers who encouraged me to pursue a master's degree in mechanical engineering, with a concentration in aerospace. I completed my graduate studies in 2025. My research simulated failure scenarios for dual-engine tilt-rotor aircraft to improve safety. The work modeled a possible solution to dangerous failure scenarios, aiming to contribute to safer tilt-rotor aircraft.

After graduate school, I returned to the great state of Texas, where I have been active with the Texas Gulf Coast Alumni Chapter. Currently, I serve as chapter secretary and collaborate with members to help increase involvement and interaction. I enjoy meeting diverse engineers, whether at scheduled events, initiations, Bent monument polishings, or professional development events. My cohort is very helpful, and each member has shared tips on the importance of strategic career building while maintaining the highest professional standards.

In 2025, I began working as a healthcare simulation technician, repairing and troubleshooting a high-fidelity patient simulator lineup used by medical professionals. I was trained and exposed to real-world engineering principles through the repair and testing of complex systems that mimic human physiology. Learning from field engineers offered unique perspectives on serviceability and how to complete repairs. I have enjoyed traveling across America and seeing unique parts of the country, which has given me a profound new perspective on life. While currently working in biomedical engineering, I aim to join Boeing in the future with the goal of using my passion for aviation to make the field of aerospace engineering safer.

Lastly, it was such an honor and privilege to represent the Texas Gulf Coast Alumni Chapter as a voting delegate at the 2025 ΤΒΠ Convention in Albuquerque, New Mexico. It was an incredible event, full of amazing energy.

GET TO KNOW ALEXANDER:

- **Avid trail bike rider who stays active through running and swimming;**
- **Loves all things mechanical, but especially appreciates the beauty of cars; and**
- **Enjoys cooking (including appetizers such as guacamole) and plays the piano**

Chapter Endowment Initiative Challenge Matches

There are currently five open challenge matches where alumni have stepped forward to incentivize giving from alumni. The minimum amount accepted for a match is $5,000.

Daniel M. Brandt, *IN D '74*, launched a challenge match of $20,000 toward the endowment of the Indiana Delta Chapter at Valparaiso University. Four gifts of $5,000 are needed to complete this challenge.

Tau Bate, **James B. Planeaux, Ph.D.,** *IN G '82*, initiated a challenge match of $20,000 toward the endowment of the Minnesota Alpha Chapter at the University of Minnesota Twin-Cities. Four gifts of $5,000 are needed to complete this challenge. The current total raised for MN Alpha is $45,000.

Tau Bate, **Charlie S. McNeil, P.E.,** *CO A '71*, established a challenge match of $20,000 toward the endowment of the Colorado Alpha Chapter at the Colorado School of Mines. Four gifts of $5,000 are needed to complete this challenge. A total of $90,000 has been raised for the CO Alpha Chapter so far. With the completion of this challenge, they will exceed our goal.

Tau Bate, **Robert H. Tolson,** *VA B '58*, launched a challenge match of $25,000 toward the endowment of the Virginia Beta Chapter at Virginia Tech. To date, three matches have been received — two more are needed to complete this challenge. The VA Beta Chapter is currently at $90,069. With the completion of this challenge, they will exceed our goal.

THE CHAPTER ENDOWMENT INITIATIVE:

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

Tau Bate, **Robert "Dudley" White,** *VA A '76*, initiated a challenge match of $20,000 toward the endowment of the Virginia Epsilon Chapter at Virginia Commonwealth University. Two gifts have been received and two more gifts of $5,000 are needed to complete this challenge. The total raised for VA Epsilon is currently $30,000.

BRAIN TICKLERS

Results From Winter

Perfect Scores

Bannister, Kenneth A.	PA	B	'82
Gerken, Gary M.	CA	H	'11
Gibbs, Kenneth P.	MO	Γ	'76
Golemme, Steven S.	IL	A	'20
Goodrich, Robert W.	CA	B	'81
Griggs Jr., James L.	OH	A	'56
Kimsey, David B.	AL	A	'71
Kuhn, Walter A.	OH	A	'81
*Lesieutre, George A.	MA	B	'81
Milton, David W.	MI	Γ	'78
Riedesel, Jeremy M.	OH	B	'96
*Roediger, Robert R.	MO	Γ	'71
Schwam, Susan E.	WA	A	'88
Schwam, Freely	Member spouse		
Slegel, Timothy J.	PA	A	'80
Strong, Michael D.	PA	A	'84
Summerfield, Steven L.	MO	Γ	'85
*Wilkinson, Timothy S.	WA	A	'84

Other

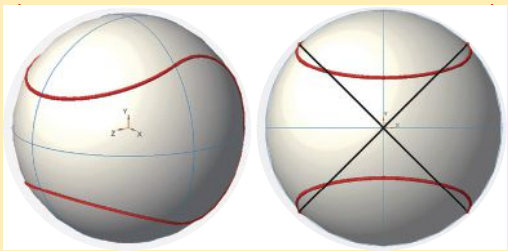
Allen, Judy M.	Member spouse		
Bertrand, Richard M.	WI	B	'73
Braña-Mulero, Francisco	PR	A	'74
Capelli, Ronald B.	MI	Γ	'73
Couillard, J. Gregory	IL	A	'89
Cross, Harry L.	MI	Γ	'65
Curcio, Jeanne M.	KS	Γ	'92
Dickson, Charles T.	GA	A	'84
Dyer III, William H.	WV	A	'65
Eid, Ronald J.	CA	Λ	'77
Field, Gregory T.	NY	Γ	'78
Gimpel, Robert J.	OK	A	'73
Grewal, Kalwant S.	TX	H	'73
Grewal, Rashi	NJ	Γ	'09
Jones, Richard D.	PA	A	'62
Jordan, R. Jeffrey	OK	Γ	'00
Kreucher, John E.	MI	B	'84
Marks, Lawrence B.	NY	I	'81
Prager, John	Non-member		
Matusz, Robert J.	MI	Γ	'82
Morera, Daniel A.	FL	A	'89
*Norris, Thomas G.	OK	A	'56
Norris Jr., Thomas G.	PA	Γ	'79
Parks, Christopher J.	NY	Γ	'82
Pendleton III, Winston K.	MI	Γ	'62
Rabinovitch, Kevin L.	IN	A	'98
Rabinovitch, Noah	Member son		
Roggli, Victor L.	TX	Γ	'73
Rothe, Zane T.	WI	Δ	'26
Rowe, Steven A.	ME	A	'81
Serakos, Demetrios	MI	Γ	'78
Shiley, Matthew T.	PA	K	'26
Skowronski, Victor J.	NJ	A	'71
Spring, Gary S.	MA	Z	'82
Spring, Mitchell G.	Member son		
Tellechea, Gabriel	TX	A	'87
Tereck, Charles D.	OH	B	'82
Tessier, Thomas M.	MA	A	'90
Tso, Robert	CA	E	'80
Wallbridge, Peter (*age 11*)	Non-member		
Wechsler, Lawrence D.	NY	E	'55

*Denotes correct bonus solution

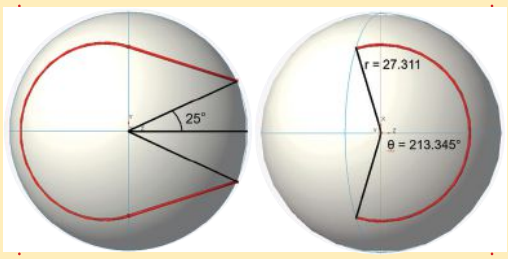
See Winter Review on p. 45.

Spring Answers

1: The total length of the baseball seam is **406.779 mm**. By picking a coordinate system at the center of the ball, one can find that the 4 tangent points that form the beginning and end of each arc lie at *X* and *Y* coordinates of 37cos(45), 37sin(45), with the 4 points having positive and negative values as appropriate.



The midpoints of the arcs, where the dumbbell subtends an angle of 50° has *Z* and *Y* coordinates of 37cos(25), ±37sin(25) on one side of the ball, and similar *Z* and *X* coordinates on the other side of the ball.



Choose 3 points that form one of the arcs:

	X	*Y*	*Z*
Start	26.163	26.163	0
Middle	0	15.637	33.533
End	-26.163	26.163	0

Rotate the points about the X-axis by an angle θ so that all the *Y* coordinates are equal. The rotation does not change the value of the *X* coordinate. The *Y* and *Z* coordinates transform as follows:

$Y' = Y\cos\theta + Z\sin\theta$

$Z' = -Y\sin\theta + Z\cos\theta$

To find θ, set up the equality $26.163\cos\theta + 0\sin\theta = 15.637\cos\theta + 33.533\sin\theta$

Rearrange the equation to $33.533\sin\theta = (26.163 - 15.637)\cos\theta$ and further to $\tan\theta = (10.526/33.533)$. Taking the arctan of both sides we find $\theta = 17.427°$.

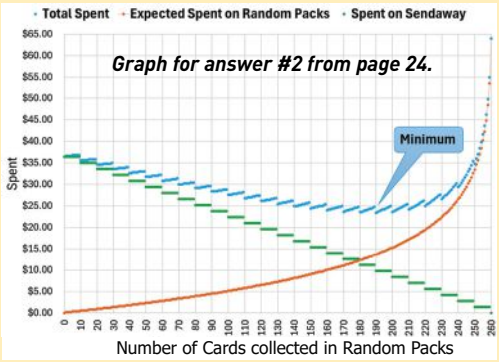
Applying the transformation, we find that:

	X	*Y*	*Z*
Start	26.163	24.962	-7.835
Middle	0	24.962	27.311
End	-26.163	24.962	-7.835

Since the *Y* coordinates are equal, all points lie on the same *X*-*Z* plane and we may now consider only the *X* and *Z* coordinates. We can confirm that $\text{sqrt}(26.163^2 + 7.835^2) = 27.311$ and thus (0,0) is the center of the arc formed by the 3 points.

We can also find that the points form a 213.345° arc, and compute the arc length to be 101.695 and then multiply by 4 to get the total seam length.

2: This is an example of the Coupon Collector's problem. The probability of collecting the i^{th} new card may be computed, along with the expected number of "draws" to collect that card. **The optimum time to send away is after collecting 190 cards in random packs.** It is expected that 68 random packs will have been bought at that point, and the total amount spent will be $23.40. If one were to try to collect the entire set through random packs alone, it is expected that 320 packs would have to be bought for $64.00. It is *possible* (though extremely unlikely) to get the entire set in the first 52 random packs that you buy, but the odds of doing so are approximately 1 in 2.04×10^{111}. You have a better chance of winning the jackpot in the Powerball® 13 times in a row.



3: The probability of the string of letters containing either IAGO or LEAR is **1/7800**. It is impossible to spell both IAGO and LEAR, since both words contain an A. The probability of the string containing one of the words at a specific position is 22!/26!, or 1/358,800. There are 23 possible positions a 4-letter word can appear, and there are two different words, so the overall probability is 46/358,800, which can be simplified.

4: The optimum arrangement of the chemical complex with the given constraints is:

K G D F
C H I E
A B J L

This arrangement has a total pipe length of 17.656. Of the 16 pipes, 12 pipes have a length of 1, and 4 of the pipes have a length of 1.414 (Square root of 2). If one were to make the assumption that plants A and I should be as far away from the neighborhood as possible, then the best possible arrangement is:

K D F E or **K D F E**
C G H L or **C G H L**
A B I J **A B J I**

This arrangement has a total pipe length of 18.064. 13 of the pipes are length 1, two pipes are length 1.414, and 1 pipe is length 2.236 (√5). **This is a reasonable assumption, and all 3 of these solutions are counted as correct.** There are 10 other possible configurations that have a total pipelength of 18.064, but the other 10 have either A and/or I in the 2nd row. The only true restriction on the layout is forbidding A and I from being adjacent to the neighborhood.

Placing A and K next to the raw materials, I and J next to the steam, and L next to the effluent treatment are helpful in finding an optimal solution, but not required. In fact, if one ignores the neighborhood restriction, an exhaustive search of all permutations yields that the absolute best possible arrangement is:

A D F E
C G I L
B K H J

Which has a total pipe length of 17.414, and we notice that plant K is not adjacent to the raw materials.

5: √(ATOM) can be **36** or **82**, which correspond to the elements krypton and lead.

ATOM must be 4 digits. On the low end, √1000 = 31.62 and on the high end √9999 = 99.99. Thus, the integers between 32 and 99, inclusive, can be squared and the digits converted to A + TO + M to check for a match. As for something interesting, Kryptonite is Superman's well-known weakness and lead can shield Superman from Kryptonite's radiation, but it also blocks his X-ray vision. (This pop culture reference was not part of the grade!)

BONUS:

Fred received **5,184 pieces of mail.** The envelope stuffing problem is an exercise in combinatorics. The foldings of ps and qr result in "N" shaped sheets, whereas the foldings pr, rp, qs, and sq all result in "V" shaped sheets. A combination of "NN" sheets have 10 interleavings and there are 4 ways to get an NN combination. There are 16 ways to get an "NV" combination of sheets. Half of those have 10 interleavings, while the other half have 9 interleavings. There are also 16 ways to get a "VV" combination of sheets. Eight of those combinations have the "V" pointed the same direction, and they have 8 interleavings. Four of the combinations of the "V" pointed in opposite directions with the extra fold on the same side, and those can be interleaved 8 ways.

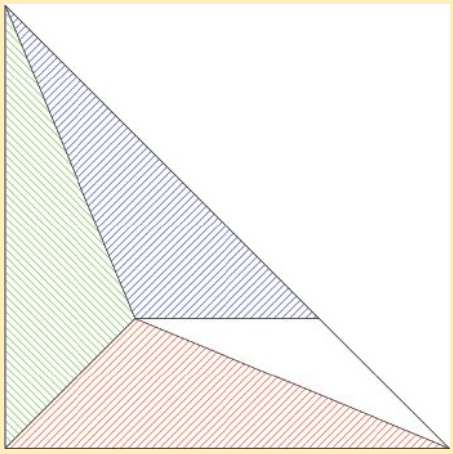
Four of the combinations have the "V" pointed in opposite directions, with the extra fold on opposite sides, and those can be interleaved 9 ways.

Folding	# of combos	# of interleavings	Arrangements
NN	4	10	40
NV	8	10	80
NV	8	9	72
VV, V's same	8	8	64
VV, V's opposite	4	8	32
VV, V's opposite	4	9	36
		Total:	324

Thus there are 324 possible ways to fold and interleave two sheets with a given orientation. Since there are 16 possible ways two sheets can be oriented (4 possible orientations for each sheet), then there are 5,184 possible distinguishable arrangements.

DOUBLE BONUS:

An isosceles right triangle is a 45-45-90 triangle. The best possible coverage with 3 congruent tiles is as follows:



The resulting coverage is 87.87%. The shape of the tile is a triangle with angles of 22.5°, 45°, and 112.5°.

New Summer Problems on page 27.

NEST
NEW ENGINEERING SOLUTIONS FOR TOMORROW

SCALING CHAPTER EXCELLENCE THROUGH ENGINEERING IN ACTION

Visit *www.tbp-nest.org/* to register as a mentor for the 2026 cycle.

THE CHALLENGE

From Recognition to Mastery

For many members, induction into Tau Beta Pi marks a defining milestone — an affirmation of achievement and a launch point into a promising career. The question before us is how to sustain that energy beyond induction and transform it into an enduring expression of excellence within our chapters.

NEST (New Engineering Solutions for Tomorrow) is our strategic initiative to advance chapter engagement through structured alumni participation and intentional engineering leadership development. As an annual competition — whose challenge is selected by vote at Convention — NEST creates a living, evolving platform for innovation, collaboration, and professional growth.

We are calling on our alumni to expand their engagement within NEST by serving as active mentors to our chapters — contributing as institutional memory, technical advisors, and professional exemplars who reinforce the standards and values that define Tau Beta Pi.

MENTORSHIP WITH MEANING

Alumni support of NEST EGG Projects

NEST centers on Engineered Gadgets for Good (EGGs) — tangible, proof-of-concept solutions addressing real-world problems. Each EGG is intentionally multidisciplinary, requiring chapters to mobilize their full membership and integrate diverse technical perspectives into a cohesive engineering deliverable.

Rather than isolating projects within a single discipline, NEST compels cross-functional collaboration — mirroring modern engineering environments where mechanical, electrical, software, systems, and business considerations intersect. This structure ensures members gain practical experience operating within multidisciplinary teams, developing the communication, integration, and systems-level thinking required in their professional careers.

Alumni engagement is critical to this model. We rely on alumni to provide technical mentorship, leadership coaching, and project execution guidance. Their experience in industry and organizational leadership helps teams navigate design trade studies, risk management, scope control, stakeholder communication, and delivery milestones — reinforcing the foundational pillars of successful engineering programs.

ROLES FOR ALUMNI

Project Mentor: Provide structured, life cycle-based mentorship to NEST teams from concept through prototype validation. Alumni guide students in engineering decision-making, scope control, trade studies, risk management, documentation standards, and milestone discipline — bridging the gap between design and industry-level execution rigor.

Technical Consultant: Offer targeted "desk-side" design reviews to evaluate architecture, integration risk, feasibility, manufacturability, and technical assumptions. Alumni apply tools-of-the-trade and industry experience to help teams refine technical direction and strengthen proof-of-concept credibility.

Strategic Judge: Serve as subject matter experts at the annual Convention, assessing EGG prototypes for technical viability, scalability, societal impact, and execution maturity. This role ensures consistent evaluation standards while providing alumni visibility into emerging engineering talent.

Alumni Advisor: Support chapter sustainability by providing professional perspective, institutional memory, and network access. Alumni advisors reinforce governance best practices, leadership development, and long-term planning — helping chapters translate short-term competition success into durable organizational strength.

CONCLUSION: REINVEST IN THE EXCELLENCE YOU EARNED

NEST is more than a competition — it is a scalable framework for chapter advancement and sustained excellence. By combining multidisciplinary, real-world engineering challenges with intentional alumni engagement, NEST transforms induction from a singular achievement into the beginning of an active, developmental journey. Engineered Gadgets for Good provide the platform. Alumni mentorship provides the continuity and rigor that elevate student potential into demonstrated capability. As chapters adopt this model, they deepen member engagement, strengthen leadership continuity, and build bridges between academia and industry. Through NEST, Tau Beta Pi moves beyond simply recognizing engineering excellence to actively cultivating it — year after year.

NEW Summer Problems *Continued from page 25.*

1: Summer Solstice

Today is the summer solstice. I'm floating around my backyard pool in Albuquerque at latitude 35° N, cooling off sipping a margarita. I notice that the shadow of my flagpole falls directly to the east. What is the local solar time, to the nearest minute? Use sun declination of 23.5° N. *Local solar time* means using a clock that reads noon when the sun is directly south.

— **James L. Griggs,** *OH A '56*

2: Bicycle Poker

A bicycle club of fewer than 50 members, that also enjoys cards, has devised a way to indulge its two interests simultaneously. They play a game called "Poker Run." The game starts at one corner of a 5 mile square. At the start, each rider draws a card from a normal 52-card deck. Then, they ride around the square, and at each corner, including when they get back to the starting point, each rider draws a card from a fresh 52 card deck, making a total of 5 cards for each rider. The player with the highest poker hand wins. Of course, since each card is drawn from a fresh deck, some hands are possible which are not available in a regular poker game, such as 5 of a kind. What is the exact probability of a full house flush, that is, 3 cards of one denomination and 2 of another denomination, all in the same suit?

— **Eugene R. Highfield,** *OH H '64*

3: Center of Gravity

An open-top cylindrical vessel is made from a thin material with mass per unit area, X. The container has a diameter, D, and height, H. The vessel contains a fluid that has a mass per unit volume Y.

For an idealized soft drink can, D = 66 mm, H = 122 mm, X = .00054 g/mm^2 and Y = .001 g/mm^3. To what height must the container be filled to result in the lowest center of gravity for the system? Express your answer to 4 significant digits.

— **Zane T. Rothe,** *WI Δ '26*

4: Elevators

In an apartment building there are seven elevators, each stopping at no more than six floors. For every pair of floors in the building, at least one of the elevators stops at both floors, so it is possible to go from any one floor to any other without changing elevators. What is the maximum number of floors in the building?

— *Which Way Did the Bicycle Go?* by Konhauser, Vellmen and Wagon

5: Acute Triangles

A thin rod is broken into three pieces; the two break points are chosen at random. What is the probability that an acute-angled triangle can be formed by the three pieces? Express your answer to five significant digits, or better yet, in closed form.

— *Challenging Mathematical Problems with Elementary Solutions* by Yaglom & Yaglom

BONUS: No Springs, Honest Weight

a) Alan hides his one gold coin in a box with 9 identical fakes made of gold-plated metal. Unfortunately, the coins become mixed up, and Alan needs to find the real one. The coins are visually identical, but the fake coins (all with the same weight) differ in weight from the true coin. Using a double pan balance scale, what is the expected value of the number of measurements that Alan will make to find the real coin? Assume Alan uses an optimal procedure to minimize this value, and he doesn't know whether the fake coins are heavier or lighter than the real one.

b) Next year Alan replaces one fake coin with a real gold coin but, oh no! They are mixed up again. Now what expected number of measurements must Alan make to find the 2 true coins among the 8 fakes? Assume that Alan has by now learned that his fake coins are lighter than true coins.

— **Walter A. Kuhn,** *OH A '81*

COMPUTER BONUS: The Art of Floating Point

What is the smallest integer of the form $m \times 2^n$ (with $512 \leqslant m \leqslant 1023$ and $n > 0$) that when converted and rounded to a number of the form $i \times 10^j$ (with $1000 \leqslant i \leqslant 9999$ and $j > 0$) and then converted and rounded back to the original form is not the same number? That is, what is the smallest 10-bit binary floating-point number that fails the round trip conversion to 4-digit decimal floating-point format and back to 10-bit binary floating-point? One such number is 512×2^{6399}, but it is not the smallest. The error in rounding m and i may not exceed 0.5.

— **Donald E. Knuth,** *OH A '60*, **Fred J. Tydeman,** *CA Δ '73*

Email your answers (plain text only) to any or all of the Summer 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 and the Computer Bonus is not graded. Where possible, exact answers are preferable to approximations. The cutoff date for entries to the Summer column is the appearance of the Fall *Bent* in mid-September (the digital distribution is several days earlier). We welcome any 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.R. Stribling, *CA A '92;*
K.D. Berthold, *TX B '04;* and
the columnist for this issue,

— **J.C. Rasbold,** *OH A '83*

See page 3 for a full erratum related to the Winter Bonus solutions published in the Spring 2026 issue.

IN THE COLLEGES

Tau Bates having an impact at institutions of higher learning.

John E. Ball Ph.D.

Mississippi Alpha '91

John is Mississippi State University's 2026 Southeastern Conference Faculty Achievement Award winner. A professor & chair of teaching excellence, he's an MSU Grisham Master Teacher and Alumni Association Graduate Teaching Excellence awards recipient. His research focuses on machine learning and wearable technology. John is an MSU Athlete Engineering Institute founding member.

Raheem A. Beyah Ph.D.

North Carolina Epsilon '98

Raheem has been selected as provost and executive vice president for Academic Affairs at Georgia Tech where he's been serving as college of engineering dean since 2021. Raheem is recognized as a leading expert in network security and privacy, known for his mentorship and collaborative leadership, and was named an IEEE Fellow in 2024. His Ph.D. in ECE is from Georgia Tech.

Col. Thomas R. Dion P.E. (*ret.*)

South Carolina Gamma '68

Thomas was recently inducted into The Citadel School of Engineering's Academy of Engineers. An emeritus professor of civil eng'g, he retired after 38 years of teaching, authored two internationally published textbooks, has been issued patents, and was elected town of Summerville Commissioner of Public Works. Thomas joined TBP as an eminent engineer, and was promoted to Colonel in 1996.

SPOTLIGHT: Funding for Ole Miss Research "Star Trek Cloaking" — NASA has awarded **Elliott Hutchcraft, Ph.D.,** *MS B '95,* associate professor of electrical & computer engineering at the Univ. of Mississippi funding for a project aimed at reducing interference in wireless communications systems. The grant is part of NASA's Established Program to Stimulate Competitive Research. Dr. Hutchcraft is working to find ways to reduce interference caused when antennas for different communication systems are too close together. "Communication systems are ubiquitous in our lives and operate at different frequencies. You have to put a cloak on each antenna, and the idea is that each antenna operates the same as an uncloaked version of the antenna, but in complete isolation."

Kiewit Partner Program Extends at CU Boulder — With a generous pledge of $2.5 million from Kiewit Corporation, the Design-Build Scholars Program will continue through 2032. Through mentorship, site tours, internships, professional development and community networking, the program expands opportunities for students and strengthens a partnership of industry and academic collaboration. CU Boulder Dean, College of Engineering and Applied Science, **Keith R. Molenaar, Ph.D.,** *CO B '90,* said, "Kiewit Corporation's continuing investment will empower our students with unmatched opportunities to innovate, lead, and shape the future of engineering and construction technology." In addition, Kiewit plans to increase scholarship funding to $8,000 annually for each program scholar.

Warren E. Dixon Ph.D.

Florida Alpha '00

Warren will be the next dean of the Virginia Tech College of Engineering, beginning July 10. He currently serves as interim dean of the University of Florida College of Engineering and as a distinguished professor of mechanical & aerospace eng'g. An expert in machine learning, Warren is widely recognized for integrating control theory with AI and previously worked at ORNL.

Meghan Ferrall-Fairbanks

Ph.D. *Florida Alpha '12*

Meghan was recognized in this year's "40 Gators Under 40." She is an assistant professor in biomedical engineering at the University of Florida and has established herself as an expert in computational systems biology, with a focus on understanding tumor heterogeneity and evolution. Her innovative cancer research approaches have the potential to improve treatment outcomes.

Christian M. Hubicki Ph.D.

Pennsylvania Eta '07

Christian returned to CBS's "Survivor" for its 50th season, after appearing on season 37 in 2018. A robotic scientist and associate professor at the FAMU-FSU College of Engineering, he is known for designing robots that run and walk on two legs. Christian was a fan favorite his first time around and is competing with 23 other contestants for a $1 million prize. The show's theme this year is "In the Hands of the Fans."

Kyle J. Lampe Ph.D.

Missouri Beta '03

Kyle was inducted into the Missouri S&T Academy of Chemical and Biochemical Engineers in April. An associate professor of chemical eng'g at the University of Virginia, his group investigates biomaterials for tissue eng'g, regenerative medicine, and drug delivery within the central nervous system. Kyle was also recently named to ASEE's "20 Under 40" list of faculty for mentoring, etc.

Edgar J. Lobaton Ph.D.

Washington Gamma '04

Edgar was selected as a member of the inaugural cohort of NSF NAIRR AI Education Fellows by the Computing Research Assoc. The fellowship runs for a year, includes a stipend, and visibility as a leader in AI education. An ECE professor at North Carolina State Univ., his research focuses on the integration of AI and physical & probabilistic modeling applied to cyber-physical systems.

Jennifer M. Munson Ph.D.

Louisiana Beta '06

Jennifer was named a senior member of the National Academy of Inventors. She is a professor and director of the Cancer Research Center at Virginia Tech's Fralin Biomedical Research Institute. Her patented innovations apply fluid dynamics, tissue eng'g, biomedical imaging, and computational modeling to develop diagnostic and therapeutic tools for cancer and other diseases.

FACILITIES: Spaceflight Lab at the University of Iowa — On the heels of a project that brought the largest grant in its history (TRACERS — two satellites launched into Earth's orbit to study magnetic sphere interaction and solar wind from the Sun), the University of Iowa (UI) has opened Spaceflight Laboratories to continue propelling space science forward. Construction finished in April and students are already utilizing the new instruments for testing on the 7th floor of Van Allen Hall (named for **James Van Allen, Ph.D.,** *IA B 1935*). The labs also operate as service centers, to allow IU to keep on additional staff and other projects. A prototyping room houses a third TRACER spacecraft with renovations and equipment purchases supported by UI, NASA, and the Roy J. Carver Charitable Trust.

Texas A&M University Semiconductor Facility — In April, university leaders and state officials broke ground on a semiconductor research & development facility in Bryan, TX. The construction is expected to be complete in early 2028 on the roughly 80,000-square-foot space, dubbed the "Texas A&M Semiconductor Institute," for research, training, and collaboration. The project site will also have a sealed and enclosed clean room in one location for full-scale production, labs for advanced technology, R&D, and workforce development. The labs will focus on process and tooling development, metrology, packaging, radio frequency, photonics, testing, and evaluation design. According to TAMU's board of regents, there will also be support spaces for hazardous materials handling and storage.

Jim Pfaendtner Ph.D.

Washington Alpha '01

Jim was announced as executive vice chancellor and provost at North Carolina State University where he's served as dean of engineering since 2023. A recognized leader and scholar in eng'g education and research, he's a recipient of the AIChE Computational Molecular Science Impact Award (2022). Jim will be NC State's chief academic officer focused on expanding access to a quality education and mental health resources.

Thihal K. Ponnaiyan Ph.D.

Ohio Zeta '16

Thihal received the University of Toledo's 2025-26 Mid-American Conference Outstanding Faculty Award for Student Success, recognizing the development of students inside and outside the classroom. A senior lecturer and undergraduate director in the department of chemical engineering, he is known for his innovative teaching and deep commitment to his students.

Renee D. Rogge Ph.D.

Louisiana Beta '96

Renee was selected to participate as a visiting scholar in the Stanford Mussallem Center for Biodesign's Global Faculty Training program in 2027. The program prepares academic leaders to design, launch, and sustain high-impact health technology innovation programs at their home institutions. She is Rose-Hulman Institute of Technology's dean of faculty and a biomedical engineering professor.

District Doings

A few images and short summaries from the 2026 District Conferences.

Additional highlights can be found in *The Bulletin*.

Tau Bates at the District 2 Conference which took place at the Holiday Inn Downtown & Binghamton University Center.

APRIL 3-4, 2026:

District 2

The New York Tau Chapter at Binghamton University hosted 60 collegiate students, 21 host volunteers, the Engineering Dean, 9 alumni, and 7 Association Officials for the District 2 Conference.

Activities included chapter operations and professional development workshops, a Convention orientation session, an alumni career panel, and social and networking opportunities.

Leaders from 21 chapters in New Jersey and New York arrived Saturday and were welcomed by Conference Chair, **Rohan Bajwa,** *NY T '26*. District Directors led the chapter operations workshop, supported by Executive Councillor/Treasurer **Henry Houh, Ph.D.,** *MA B '89*, focusing on reports to Headquarters and the various key activities that chapters participate in throughout the year, such as elections, initiations, Convention, and officer transitions. Saturday concluded with chapter presentations on a variety of project ideas.

Sunday started with breakfast, followed by two Engineering Futures professional development sessions, a career panel, and ended with closing remarks.

The team of District 2 Directors urged all present to take the information they learned back to reinvigorate their chapters and grow membership.

APRIL 11-12, 2026:

District 8

This year's Conference was held on the Marquette University campus, hosted by the Wisconsin Beta Chapter. There were 44 total attendees, including members from 11 collegiate chapters, 3 alumni chapters, and Executive Councillor **Ronald Hickling,** *CA E '80*. The Membership Process Role Playing session was a highlight, with attendees assigned roles such as chapter president, corresponding secretary, TBP HQ staff, and Association website responsibilities. Everyone walked through each step of the membership process from requesting the eligibility list, to initiation, and finally to the Report of Final Action. It was a learning experience for all involved.

The rain didn't stop the group from getting a quick photo with the Bent monument.

MARCH 6-7, 2026:

District 12 (W)

This year, District 12 split into East and West Conferences in an effort to reduce travel for attendees.

The West Conference took place in Salt Lake City, UT, hosted by the Utah Alpha Chapter. Highlights included an alumni panel and Executive Councillor **David Cowan Jr., P.E.,** *FL E '14*, sharing important updates on the state of the Association.

Credit for above image: Zachary P. Dean, MT Alpha Chapter president.

MARCH 6-7, 2026:

District 12 (E)

District 12 Director **Rob Streeter, Ph.D., P.E.,** *WY A '11*, organized the East Conference at the Univ. of Wyoming.

Alexander Nichols, WY Alpha Chapter president and host, said, "It was wonderful reconnecting with familiar faces and meeting new members of the TBII community. Events like this are a great reminder of the strong network of engineers dedicated to excellence and service."

Credit for image left: Alexander J. Nichols, WY Alpha Chapter president.

Credit for above image: Austin Wanlass, CA Alpha Chapter president.

District 15

On February 28, the California Eta Chapter at San Jose State hosted the District 15 Conference. The conference included a simulation exercise on chapter reporting, a presentation by Executive Councillor **Sue Holl, Ph.D.,** *CA L '76*, an alumni panel (including a brief presentation about quantum computing), a District Interactive Chapter Exchange session, and an engaging discussion about the Engineering Futures Program.

Association and chapter leaders are already excited about next year's conference to be hosted by the California Alpha Delta Chapter on the campus of the University of California, Santa Cruz.

CHAPTER ETERNAL

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

The condensed style of these notices is necessary due to 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

Smith, Floyd S., *'48*, January 8, 2010.
Price Jr., William H., *'51*, December 23, 2011.
Zwenig, Eugene A., *'52*, January 9, 2006.
Gray, Gary Walter, *'79*, January 5, 2026.
Huner, Jeffrey Thomas, *'91*, Nov. 20, 2024.

BETA AL Β

Deimling, Paul L., *'51*, January 1, 1982.

ARIZONA

ALPHA AZ Α

Schwartz, Roland James, *'52*, May 13, 1990.
Wright, Walter Ray, *'53*, February 7, 1997.
Nguyen, Tochua N., *'84*, January 13, 2012.

BETA AZ Β

Happ, William W., *'45*, December 19, 1998.

ARKANSAS

ALPHA AR Α

Kitchel, Dwain L., *'60*, February 19, 2026.

CALIFORNIA

ALPHA CA Α

Jones, John H., *'41*, September 11, 2013.
Pooler, Ralph E., *'48*, August 16, 2016.
Bragg, Robert Henry, *'49*, October 2, 2017.
Evans, William H., *'49*, October 12, 2011.
Hartke, Dexter Carl, *'50*, August 13, 1987.
Meikle, David W., *'50*, August 28, 2006.
Selogie, Louis A., *'51*, February 19, 2001.
Burgess, William J., *'54*, January 1, 1984.
Griffin, Charles W., *'56*, December 17, 2008.
Brown Jr., Earle Orvest, *'57*, Oct. 27, 2022.
Miller, Alan Robert, *'58*, July 1, 2021.
McCown, Donald Philip, *'62*, Nov. 3, 2025.

BETA CA Β

Marshall III, J. Howard, *'57*, no details.

GAMMA CA Γ

Prescott, Phil James, *'36*, Feb. 6, 2016. ***Cent***.
Gustin, Joseph Thomas, *'50*, June 5, 2008.
Witherly, T. Dexter, *'55*, November 29, 1991.
Lehmer, Gerald Dwight, *'56*, Dec. 23, 2025.

DELTA CA Δ

Dill, Douglas G., *'41*, January 10, 1957.
Hoffman, Robert J., *'41*, August 31, 2016.
Haas, John B., *'52*, July 22, 1991.
Kornfeld, Fritz, *'52*, August 23, 2011.
Ortman, Paul H., *'52*, December 30, 2011.
Zeise, Carl H., *'52*, March 24, 1998.
Smith, Victor H., *'54*, January 29, 2010.
Strauss, Max W., *'56*, August 10, 2006.
Osborn, Ned D., *'58*, June 27, 2013.
Slafer, Loren Ian, *'68*, June 17, 2023.
Guthrie, William W., *'77*, January 27, 2013.

EPSILON CA Ε

Fuller, John S., *'51*, June 20, 1956.
Boris, Alan Steadman, *'61*, March 23, 2024.

ETA CA Η

Munson Jr., Alden V., *'65*, August 29, 2025.
Harris, John, *'78*, December 1, 2025.
Holt, Harry F., *'04*, April 10, 2026.

THETA CA Θ

Maithel, Vinay K., *'74*, no details.

MU CA Μ

Stefanko, Peter F., *'76*, no details.

NU CA Ν

Moir, James A., *'74*, May 11, 2025.
Mueller, Steven D., *'84*, August 12, 2025.

COLORADO

BETA CO Β

Steinkamp, David M., *'75*, no details.

GAMMA CO Γ

Linck Jr., Frederick John, *'52*, Feb. 25, 2020.

DELAWARE

ALPHA DE Α

Moore, Fred Walter, *'48*, Dec. 1, 2011. ***Cent***.
Elliott, Edward Hall, *'50*, January 22, 1979.
Parthemore, Keith Gordon, *'51*, Feb. 25, 1991.
Gray, Robert Donald, *'57*, Sept. 10, 2005.

DISTRICT OF COLUMBIA

ALPHA DC Α

Dolphin, Leonard David, *'78*, no details.

FLORIDA

ALPHA FL Α

Soderstrom, Kenneth G., *'58*, Feb. 21, 2021.
Kelly, James P., *'67*, August 17, 2023.
Roberts, Richard F. L., *'67*, February 3, 2024.

GAMMA FL Γ

Stewart, Wayland Earl, *'75*, Feb. 10, 2023.

DELTA FL Δ

Scherer, Lee Richard, *'42*, May 7, 2011.
Klele, Anthony George, *'93*, March 23, 2018.

GEORGIA

ALPHA GA Α

Pope, William Merritt, *'39*, Nov. 13, 2001.
Sirkin, Leon S., *'50*, April 9, 2026.
Williams, Carlton Eugene, *'55*, Jan. 21, 2000.
Negro, James Eugene, *'68*, Dec. 10, 2025.

IDAHO

ALPHA ID Α

Fields, Walter D., *'84*, January 1, 2024.

ILLINOIS

ALPHA IL Α

Zupic, Carl P., *'50*, December 10, 2025.
Kraft, Donald Edward, *'52*, October 22, 2025.
Zartman, Charles Robert, *'59*, Nov. 12, 2025.
Lipinski, Paul Richard, *'60*, October 29, 2025.
Foxworthy, Paul Thomas, *'85*, Jan. 2, 2026.

BETA IL Β

Caldwell, Samuel Craig, *'49*, June 14, 2008.

ZETA IL Ζ

Beyda, Scott Newman, *'02*, no details.

INDIANA

ALPHA IN Α

Kinnen, Edwin, *'49*, November 28, 2025. ***Cent***.
Pinson, Claud Carrol, *'51*, January 1, 1980.
Graham, James Gordon, *'55*, Oct. 16, 2024.
Apple, Richard Kay, *'56*, February 9, 2026.
Hendrich, William R., *'62*, January 15, 2026.
Gardner, Thomas Richard, *'63*, April 6, 2026.

BETA IN Β

Bethge, Charles Edward, *'49*, Dec. 3, 1999.
Bakos, Stephen F., *'75*, April 27, 2011.

DELTA IN Δ

Eggerding, Daniel A., *'74*, December 4, 2023.

IOWA

ALPHA IA Α

Hunter, George Dwight, *'50*, July 30, 2010.
Luethje, Donald H., *'55*, December 29, 2025.
Bentz, John Hoge, *'71*, January 11, 2025.

BETA IA Β

Hansen, Carl W., *'48*, July 20, 2006.
Taylor, Donald L., *'50*, July 25, 2010.
Hunter, James A., *'65*, November 14, 2025.

CA H

California Eta '65

Alden V. Munson Jr.

August 29, 2025

Alden served as Deputy Director for Acquisitions — Office of the Director of National Intelligence, developed a fully automatic electronic intelligence system, and was awarded the National Intelligence Distinguished Service Medal (2009).

MA B

Massachusetts Beta '66

Alan R. Whitney, Ph.D.

September 28, 2025

A key contributor to the accomplishments of Haystack Observatory, he led the development of innovative technologies to advance the powerful radio science technique VLBI. Ascended to the rank of MIT Principal Research Scientist.

MI G

Michigan Gamma '49

Robert J. Vlasic

May 8, 2022

Assumed leadership of Vlasic Foods Co. in 1963 as a small, local Michigan pickle producer. By 1978, the business had grown to $100 million and ranked #1 in the nation, when it was sold to Campbell Soup Co. He served as a director of Campbell Soup Co. and retired as chair in 1996.

MI D

Michigan Delta '58

Glynn S. Lunney

March 19, 2021

A NASA engineer from its creation in 1958. He was flight director during the Gemini and Apollo programs, including the Apollo 11 lunar ascent and the pivotal hours of Apollo 13. "A true hero of the space age," he later served as manager of the Space Shuttle program.

KANSAS

ALPHA KS Α
Cronemeyer, Donald C., *'45*, Nov. 9, 2025.
Moon, Marion Francis, *'56*, March 22, 2021.
GAMMA KS Γ
Vogel, Dale E., *'77*, August 16, 2025.

KENTUCKY

ALPHA KY Α
Blythe, Kenneth, *'48*, Dec. 23, 2025. ***Cent***.
McDonald, Richard L., *'62*, no details.

LOUISIANA

ALPHA LA Α
Martin, William Fredrick, *'49*, Nov. 24, 1996.
Christensen, Marvin Michael, *'61*, no details.
Huye, Richard W., *'61*, April 6, 2026.
Domino, Joseph Frank, *'70*, January 19, 2026.
BETA LA Β
Wiederecht, Donald A., *'52*, Feb. 20, 2026.
GAMMA LA Γ
Wyche III, James Egbert, *'59*, Feb. 27, 2026.

MAINE

ALPHA ME Α
Larson, Reginald E., *'55*, no details.
Hamilton, Wayne Andrew, *'58*, Feb. 15, 2025.
Simerl, James Henry, *'70*, February 11, 2026.

MARYLAND

ALPHA MD Α
May, Davis Shaw, *'60*, September 4, 2023.
Ver Valen, Henry Clay, *'73*, February 2, 2026.
BETA MD Β
Abert, Charles, *'52*, September 30, 1996.
Frandsen, Niels Peter, *'55*, January 1, 2021.
Cleveland, James Leonard, *'59*, Dec. 9, 2021.
Meininger, Richard Carl, *'62*, Jan. 28, 2026.

MASSACHUSETTS

ALPHA MA Α
Turek, Robert Frederick, *'52*, April 9, 2026.
Nowick, Henry Walter, *'56*, March 8, 2026.
Adams, Crosby Lyman, *'57*, Feb. 26, 2026.
BETA MA Β
Pieper, Edward Thomas, *'49*, August 1, 2005.
Woolworth, Robert S., *'51*, August 11, 2024.
McIntosh Jr., Samuel C., *'58*, January 5, 2025.
Hwang, Charles C., *'64*, January 8, 2025.
Whitney, Alan Robert, *'66*, Sept. 28, 2025.
Runnerstrom, Eric, '77, January 3, 2024.

MICHIGAN

ALPHA MI Α
Leet, Gerald D., *'41*, December 11, 2017.
Hoover, Michael C., *'50*, September 27, 2023.
Studor, Richard R., *'51*, October 31, 2003.
BETA MI Β
Scott, William Robert, *'48*, Nov. 8, 2026. ***Cent***.
Sturgul, John Roman, *'61*, January 23, 2026.
GAMMA MI Γ
Alvord, Herbert H., *'42*, May 8, 2018.
Vlasic, Robert Joseph, *'49*, May 8, 2022.
Kelly, William James, *'54*, Aug. 16, 2022. ***Cent***.
Winer, Ward O., *'58*, May 25, 2025.
DELTA MI Δ
Rutherford, Charles R., *'53*, May 11, 2024.
Lunney, Glynn Stephen, *'58*, March 19, 2021.
EPSILON MI Ε
Eusebio, Arnold A., *'56*, April 9, 2021.
Weigel, Arkadius W., *'62*, February 6, 2026.
Yochimovitz, Benjamin S., *'62*, May 1, 1982.
ZETA MI Ζ
Davis, Wiley Cam, *'63*, February 19, 2026.
Rumsey, Stephen Charles, *'75*, Feb. 2, 2026.
Whitaker, Sean Michael, *'83*, no details.
ETA MI Η
Weichselbaum, Helga M., *'80*, no details.

MINNESOTA

ALPHA MN Α
Fabyanske, Marvin T., *'68*, August 15, 2023.

MISSISSIPPI

ALPHA MS Α
Dodd, William R., *'56*, February 4, 2026.

MISSOURI

ALPHA MO Α
Knight, Aubrey Arthur, *'53*, Dec. 20, 1985.
Melton, Darrell Everett, *'56*, Nov. 15, 2023.
BETA MO Β
Remington, Charles R., *'49*, Nov. 28, 2013.
Kuhne Jr., John Monahan, *'57*, Oct. 28, 2024.
Burch, Robert Dean, *'66*, February 27, 2025.
Luce, Timothy A., *'68*, no details.
GAMMA MO Γ
Murray, Sydney Moore, *'49*, Dec. 24, 2002.
Maltby, George Edward, *'52*, Dec. 13, 1981.
Mueller, Robert S., *'59*, Jan. 11, 2022. ***Cent***.
Klamerus, Leo J., *'60*, September 4, 2025.

MONTANA

ALPHA MT Α
Springer, Reginald Lynn, *'84*, Aug. 28, 2025.
Barnes, Robert Carl, *'92*, Oct. 15, 2025. ***Cent***.

NEVADA

ALPHA NV Α
Day, Jorgi M., *'92*, May 1, 2025.

NEW JERSEY

BETA NJ Β
Norcross Jr., Joseph S., *'50*, July 11, 2007.
Dola, Steven, *'55*, January 17, 2025.
GAMMA NJ Γ
Miller, Henry F., *'50*, no details.
DELTA NJ Δ
Gearhart, James Thomas, *'39*, June 25, 2016.

NEW YORK

ALPHA NY Α
Angiulli, John Michael, *'67*, Nov. 5, 2025.
BETA NY Β
Stannard, Edward A., *'50*, Dec. 26 2011.
Hall, Kenneth A., *'64*, no details.
GAMMA NY Γ
Van Buren, Myron Edward, *'49*, Feb. 4, 2010.
Clifford, James Dexter, *'54*, Feb. 21, 2026.
Walton, Paul Bartholomew, *'87*, Jan. 14, 2009.
DELTA NY Δ
McIntire, Larry V., *'66*, January 23, 2026.
EPSILON NY Ε
Febesh, Melvin, *'47*, no details.
Bernstein, Joseph Herman, *'50*, May 31, 2025.
ZETA NY Ζ
Loeb, Marvin, *'50*, September 12, 2008.
Kobe, Francis Xavier, *'51*, Nov. 1, 2015. ***Cent***.
ETA NY Η
Shakun, Melvin F., *'50*, February 9, 2026.
Del Mazo, Jorge R., *'69*, May 23, 2022.
THETA NY Θ
Hammam, M. Shawky, *'43*, January 28, 2008.
Lester, John Welch, *'52*, November 14, 2025.
IOTA NY Ι
Weiner, Seymour Louis, *'50*, Sept. 18, 2008.
Ianuzzi, Anthony Pete, *'56*, April 11, 1998.
Schneider, Allyn W., *'66*, no details.
LAMBDA NY Λ
Sanders, Fred, *'42*, November 17, 2011.
MU NY Μ
Check, Frank Thomas, *'66*, no details.
XI NY Ξ
McGuire, Eugene Joseph, *'59*, Feb. 16, 2026.
Cestaro, Ronald Gerald, *'61*, March 12, 2025.
Cole, Randolph Paul, *'68*, March 13, 2026.
PI NY Π
Brunette, Michael E., *'74*, Sept. 25, 2025.

NORTH CAROLINA

ALPHA NC Α
Holcombe, Harold Milton, *'49*, Aug. 24, 1991.
Lowe, James Elmore, *'68*, March 11, 2024.
Maness Jr., Paul F., *'73*, March 8, 2026.
Morris III, Arthur Sherman, *'91*, no details.
GAMMA NC Γ
Stovall Jr., John Reed, *'43*, Dec. 23, 2011.
Parker, James Bruce, *'50*, Dec. 15, 1982.
DELTA NC Δ
Byrd, Richard Gray, *'84*, January 10, 2025.

NORTH DAKOTA

ALPHA ND Α
Bakken, Stewart E., *'46*, February 2, 2009.
Anderson, Ernest G., *'47*, February 22, 1990.
Felde, Philip E., *'51*, July 11, 2024.

OHIO

ALPHA OH Α
Reilly, James Arthur, *'39*, May 23, 2020. ***Cent***.
Herke Jr., Frederick P., *'54*, August 1, 2015.
Eiber, Robert James, *'55*, June 11, 2025.
BETA OH Β
Mulvey Jr., John Xavier, *'49*, January 6, 1985.
Constantine, Nicholas J., '52, Oct. 12, 2001.
GAMMA OH Γ
Abele, Richard D'Arey, *'51*, February 7, 2026.
Taylor, Rhoderic Ferrell, *'51*, Feb. 17, 2011.
Lewellen, William Harold, *'54*, Feb. 17, 2013.

CHAPTER ETERNAL

Continued from page 33

DELTA OH Δ
Davidson, Lee Alexander, *'65*, Feb. 21, 2026.
Urik, Bethany Jo, *'92*, July 9, 2025.
EPSILON OH E
Carlson, Reuben Carroll, *'49*, Sept. 3, 1979.
ZETA OH Z
Davey, John Todd, *'43*, October 16, 1982.
Coyle, William J., *'91*, February 21, 2023.
ETA OH H
Morrow Jr., Robert B., *'63*, March 5, 2026.
Heil, Michael Lloyd, *'86*, February 9, 2026.
THETA OH Θ
Kelly, John Bernard, *'67*, February 21, 2026.

OKLAHOMA

GAMMA OK Γ
Kelley, Howard Lindon, *'49*, July 15, 2012.
Riddle, William Garner, *'45*, April 30, 1983.

OREGON

ALPHA OR A
Bassler Jr., Elmer Arthur, *'58*, Sept. 19, 2023.
Terry, S. Wayne, *'63*, July 15, 2010.

PENNSYLVANIA

BETA PA B
Trolier, Joseph Beck, *'51*, December 14, 2025.
Toman, Andrew Harold, *'58*, Nov. 11, 2024.
Piroga, Jeffery, '79, January 25, 2026.
EPSILON PA E
Johnson, Floyd Charles, *'49*, Feb. 22, 2024.
Royer, James J., *'69*, March 7, 2026.
ZETA PA Z
Bartels, Harry Charles, *'48*, no details.
Lipski, Edward George, *'48*, Aug. 20, 1987.
McCarrick, Alan Donald, *'79*, Dec. 24, 2024.
ETA PA H
Herman, George Jacob, *'48*, Dec. 25, 1974.
Gorgas, Stanley Michael, *'49*, Sept. 3, 2007.
THETA PA Θ
Threston, Joseph T., *'57*, March 4, 2026.
Toth, David Louis, *'85*, January 18, 2026.

RHODE ISLAND

BETA RI B
Sabetti, Carlo, *'61*, July 17, 2020.

SOUTH CAROLINA

ALPHA SC A
Cappelmann Jr., Fred John, *'49*, May 10, 1987.
Snider, Eric H., *'75*, January 27, 2026.
GAMMA SC Γ
Edgar III, Charles E., *'58*, August 26, 2025.

TENNESSEE

ALPHA TN A
Brewer, James Herbert, *'58*, Dec. 22, 2021.
Slaughter, Joseph Tipton, *'65*, March 8, 2026.
Hunsicker, Barry Lane, *'66*, Feb. 15, 2026.
Bounds Jr., Beryl Leroy, *'78*, no details.
GAMMA TN Γ
Baese, Dale Edwin, *'75*, no details.
Brooks, Gary Lewis, *'79*, August 24, 2025.

TEXAS

ALPHA TX A
Norman, Thomas J., *'49*, March 22, 2025.
Cochran, Patrick Francis, *'50*, March 12, 2010.
Hammond, Ross William, *'51*, March 13, 2007.
Musslewhite, Howard E., *'51*, Jan. 1, 2003.
Herring, David M., *'55*, January 29, 2026.
Moore, Jack P., *'58*, November 12, 2025.
BETA TX B
Ankerstar, Robert Harry, *'51*, Dec. 26, 1990.
McCullough, Paddy N., *'57*, February 7, 2026.
Nieswiadomy, Benedict L., *'57*, Sept. 19, 2025.
GAMMA TX Γ
Money, Lloyd Jean, *'42*, no details.
Sick Jr., William Norman, *'58*, Dec. 8, 2023.
Smith III, Fred Lewis, *'62*, February 25, 2026.
DELTA TX Δ
Grasshoff, Lynn Howard, *'41*, Nov. 4, 2006.
Cavall, Joseph J., *'49*, March 29, 2011.
Thorn, Donald C., *'51*, no details.
Parker Jr., Lonzie Albert, *'55*, March 9, 2026.
Folzenlogen, Paul D., *'60*, April 6, 2026.
Fraser, James E., *'62*, January 16, 2026.
McSwain, C. V., *'62*, April 7, 2026.
Moore, John Mark, *'66*, October 6, 2024.
Hassinger, David A., *'84*, January 21, 2013.
EPSILON TX E
McNeese, Billy Rex, *'63*, February 9, 2024.
ZETA TX Z
Oler, Mina G., *'72*, June 7, 2025.

UTAH

ALPHA UT A
Stephenson, Robert E., *'41*, August 17, 2013.
Anderson, George Wayne, *'53*, July 12, 2019.
Winkler, Dean Earl, *'58*, no details.
BETA UT B
Anderson, Gary L., *'78*, November 25, 2024.

VIRGINIA

ALPHA VA A
Tipton, Bryan Curtis, *'86*, February 6, 2026.
BETA VA B
Hillenburg, Gregory, *'61*, no details.
Ellis, Marvin D., *'78*, no details.
DELTA VA Δ
Loth Jr., Albert L., *'48*, February 5, 2026.

WASHINGTON

ALPHA WA A
Peden, Harold J., *'47*, August 22, 2025.
Eck, Irene C., *'48*, January 7, 1996.
BETA WA B
Christensen, William R., *'69*, Feb. 27, 2024.

WEST VIRGINIA

ALPHA WV A
Wilson, Richard Hayden, *'58*, Feb. 9, 2026.

WISCONSIN

ALPHA WI A
Franchino, Charles J., *'58*, March 27, 2026.
Stahl, Bernhard, *'63*, January 28, 2026.
Cuppan, Bruce Craig, *'64*, Dec. 21, 2024.
GAMMA WI Γ
Becker, Roger John, *'72*, December 1, 2025.

WYOMING

ALPHA WY A
Pearce, Kathleen L., *'86*, June 28, 2024.

ASSOCIATION PROGRAM SPOTLIGHT: ENGINEERING FUTURES

Katy L. Colbry, Ph.D., *MI A '99*, Director of Engineering Futures

Almost 40 years ago, the Executive Council established a vision for the Engineering Futures (EF) Program: "In order to promote excellence in the engineering community, Tau Beta Pi seeks to provide exemplary leadership and training opportunities to inspire each member." Volunteer facilitators conducted thousands of trainings hosted by collegiate chapters, focusing on interpersonal communication skills, teamwork & meeting management, and creative problem solving.

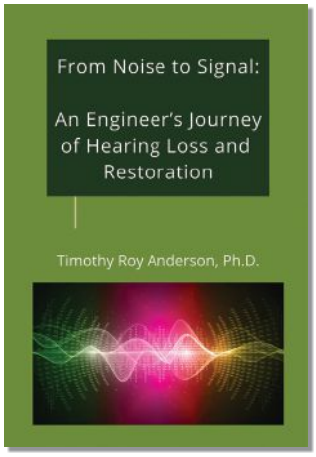
In 2017, TBP partnered with Michigan State University to develop new training materials with funding from the National Science Foundation. Called "CyberAmbassadors," this open-source curriculum offers training in communications, teamwork, and leadership skills for STEM students and practitioners. After participating in the development and testing of this new curriculum, TBP adopted it as the core of the EF program.

As of April, there have been about 250 EF sessions using these new materials, serving 5,300+ participants. In addition, Tau Beta Pi is acknowledged as a host for all trainings that use the CyberAmbassadors materials, which reached 23,000+ participants globally in 2026.

Our modern vision is for Engineering Futures to be the source of professional development for engineers, and by partnering with the CyberAmbassadors project, TBP has positioned itself as a global leader in professional skills training for students and practitioners across STEM. Within the Association, chapters can request EF sessions for their members – and as a service for other students, faculty, and community partners. Sessions are facilitated by trained TBP volunteers, who have the opportunity to build their own facilitation and leadership skills as part of a network of 200 individuals trained to use the CyberAmbassadors curriculum.

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!



Timothy R. Anderson, Ph.D.
Oregon Beta '90

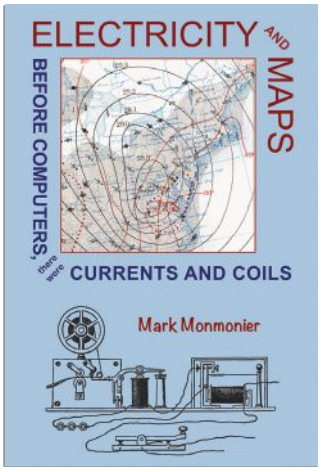
From Noise to Signal: An Engineer's Journey of Hearing Loss and Restoration

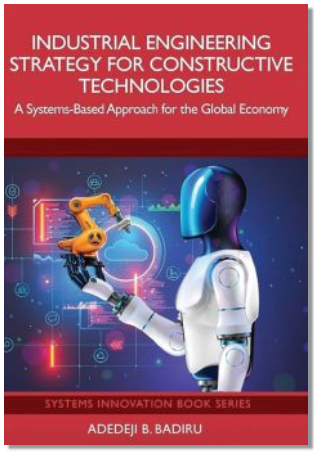
Tim shares his journey of single-sided-deafness and how he navigated recovery and career. The idea is to help others, and their families, dealing with hearing loss. More than 30 million American adults have some degree of hearing loss, yet many feel like this is only for older people. Unilateral or single-sided hearing loss is becoming more common with new treatment options. Tim is currently an ISE visiting professor at GaTech.

Mark Monmonier, Ph.D.
Maryland Alpha '64

Electricity and Maps: Before Computers, There Were Currents and Coils

Dr. Monmonier, Distinguished Professor Emeritus of Geography at Syracuse Univ., has authored 20+ books. Here, he examines the often-overlooked roles in map-making of long-distance telegraph lines and electric power. By focusing on the era before digital computers and GIS, the book offers a broad, surprisingly intriguing take on the history of modern cartography and the map's responsibilities in emergency management.





Adedeji B. Badiru, Ph.D., P.E.
Tennessee Gamma '79

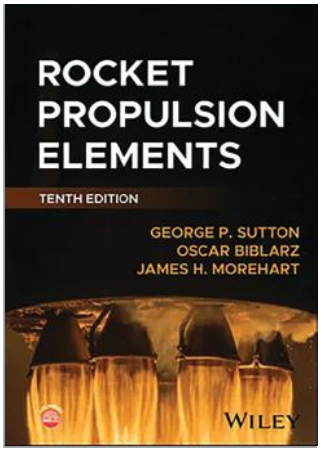
Industrial Engineering Strategy for Constructive Technologies: A Systems-Based Approach for the Global Economy

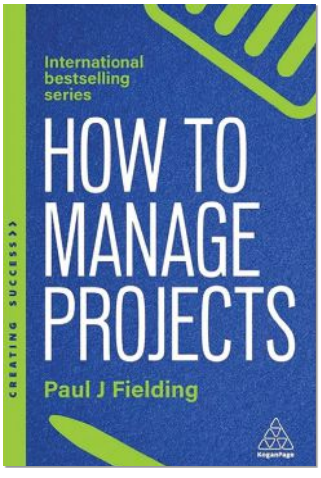
An essential read for students, instructors, and those in industry, the book focuses on managing digital engineering using a systems methodology to ensure that all the parts and pieces fit together. Dr. Badiru, Dean Emeritus, AFIT Graduate School of Eng'g & Mgmt., addresses the role of AI, cognizant of technological encroachment concerns, and highlights the sustainability of operations.

James H. Morehart, Ph.D.
Maryland Beta '86

Rocket Propulsion Elements, 10th Edition

As the longest continuously published aerospace textbook, it's ideal for both students and aerospace professionals. This updated edition to the definitive text on rocket propulsion, co-authored by Dr. Morehart, provides a thorough introduction to rocket propulsion and explores the latest advances in the field, such as improvements in materials, systems design, chemical propellants, additive manufacturing, rocket-stage recovery/reuse, and new launch vehicles.





Paul J. Fielding, Ph.D.
New York Gamma '83

How to Manage Projects - (Creating Success) 3rd Edition

While many try to find solutions in gimmicks or panacea ideas, this book focuses on timeless project management principles. Paul distills these principles into tactical, actionable, and practical guidance with real-life examples. This updated edition features exercises, templates, and proven tips. Paul earned his Ph.D. in electrical eng'g from RPI and has received international awards for his work as a business consultant.

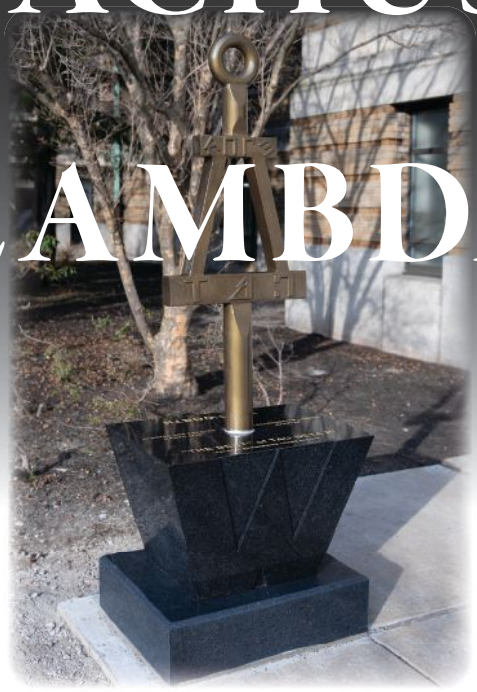
Online Content for You

Looking for something from a previous issue or want to share content with a colleague/friend?

You can find previous features from the magazine back to 1979 on our website. One month after each *Bent* is published, the features, Caption Contest, and Brain Ticklers from that issue are posted in PDF format at: ***www.tbp.org/?Features***

You can reach out to us at ***tbp.media@tbp.org*** with any other requests.

MASSACHUSETTS LAMBDA



MASSACHUSETTS LAMBDA

was welcomed as a Tau Beta Pi Chapter on March 28, 2026. District 1 Directors Michael C. Munsey, *MA Δ '89,* Lauren J. Swett, P.E., *ME A '04*, and Scott M. Trocchia, Ph.D., *DC Γ '11,* joined President Thomas A. Pinkham IV, *MA E '88,* and Executive Director Curtis D. Gomulinski, *MI E '01*, in traveling to Boston, MA, to formally install the Society's 265th collegiate chapter.

The 2025 Convention granted a charter to the Wentworth Engineering Honor Society, the local honor society at Wentworth Institute of Technology, which was represented in Albuquerque, NM, by local society president Ethan D. Rajkumar and Chief Advisor Marisha J. Rawlins, Ph.D., *FL Z '07*. Rajkumar, *MA Λ '26*, had the honor of becoming the first member of his chapter during the Model Initiation at Convention.

INITIATION AND INSTALLATION

Watson Auditorium in Wentworth Hall was the site of the first initiation of members on the Wentworth campus. The initiation team consisted of the five Association Officials listed above and also included: TBP Secretary Henry H. Houh, Ph.D., *MA B '89*; Advisor Cristina Cosma, Ph.D., P.E., *FL A '03*; Advisor Anuja G. Kamat, Ph.D., P.E., *AZ A '04*; Joseph M. Martel-Foley, Ph.D.; Advisor Marisha Rawlins, Ph.D.; Ethan Rajkumar; and Chaitanya Ruhatiya, Ph.D., *MA A '23*. Sixteen undergraduates, seven alumni, and one eminent engineer were initiated into membership in Tau Beta Pi.

After the initiation ceremony concluded, Mr. Pinkham constituted the new members as the newest chapter during the formal installation ceremony. The ceremony included the reading and presentation of the charter and formal election and installation of the chapter's charter officers and advisors. Together with the student initiated at Convention, they comprise the charter members of the MA Lambda Chapter.

BANQUET

Following the initiation ceremony, participants headed to the front of Wentworth Hall for photos and then returned to Watson Auditorium for the installation banquet. President Rajkumar served as master-of-ceremonies, and thanked everyone who was present including the new members, faculty, staff, and guests. He congratulated his fellow new members of MA Lambda on setting a new standard for excellence in engineering at Wentworth and expressed his enthusiasm for the impact they will be able to make at their school.

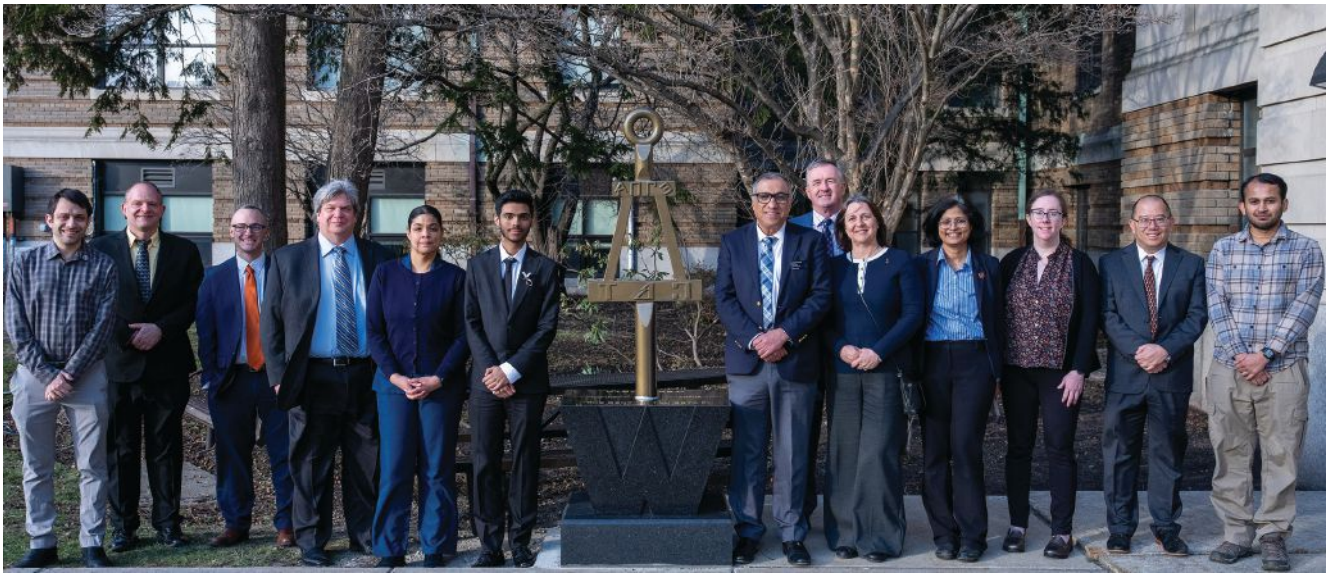
Dean Khabari noted the chapter's establishment as a significant achievement for the university and how it underscores Wentworth's long-standing commitment to rigorous, project-based, and impactful engineering education, rooted not just in technical skill but also in responsibility to society. Vice Provost Martel-Foley congratulated and welcomed the new Tau Bates and challenged them to ensure that their work consistently serves the public good and that the communities affected by their engineering are stronger because they are part of them.

President Pinkham, Executive Director Gomulinski, and D1 Director Swett congratulated the new members and encouraged them to remain active in the Association while students and as alumni, as membership in Tau Beta Pi is for life.

The evening concluded with the presentation of certificates to the new members by Provost Sophia Maggelakis and Vice Provost Martel-Foley.

First Officers (left to right)**:** Joseph Martel-Foley, Marisha Rawlins, Ethan Rajkumar, Ryan Dunbar, Nicole Mejia, Nicole Viloria, Kyle Leger, Anuja Kamat, and Cristina Cosma.

Charter Presentation (left to right) Curtis Gomulinski, Tom Pinkham, Ethan Rajkumar, and Ali Khabari.



Initiation Team (left to right)
Scott Trocchia, Curtis Gomulinski, Joseph Martel-Foley, Michael Munsey, Marisha Rawlins, Ethan Rajkumar, Ali Khabari, Tom Pinkham, Cristina Cosma, Anuja Kamat, Lauren Swett, Henry Houh, and Chaitanya Ruhatiya.

All Tau Bates in attendance for the Massachusetts Lambda installation at the Wentworth Institute of Technology.

π, PIE, AND TAU BETA PI

SOUTHEAST MICHIGAN'S INTER-CHAPTER PI DAY

By: Maryam Yassine, MI Epsilon '26, and Michael Ustes, MI Iota '23

By the time teams were racing across campus for the scavenger hunt, arguing over clues, second-guessing engineering trivia answers, and aiming to make the best engineering-related creations, it was clear that the 2026 Inter-Chapter Pi Day was shaping up to accomplish its goal before lunch began – bringing people together.

PLANNING

Things really started two months earlier with a kickoff meeting organized by District 7 Director **Michael Ustes**. Continuing what has become a proud tradition in Southeast Michigan, he gathered the leaders of the Michigan Gamma, Epsilon, Eta, and Iota Chapters to set up the 4th annual Inter-Chapter Pi Day event.

A proposal from Michigan Epsilon to host the event was readily accepted by all those present. Not only were we first-time hosts, but the chapter is also celebrating its 75th anniversary.

From there, MI Epsilon took the lead with collaborative support from other local chapters, including the Ann Arbor Area Alumni (AAAAC) and the South-eastern Michigan Alumni (SEMIAC) Chapters.

On March 13th, one day before the event, a group of MI Epsilon members went out to paint the Wayne State spirit rock in preparation (**image on p. 1**). Simple enough! Well, up until the wind picked up and the paint started going everywhere. It was freezing and messy, but also fun!

TAU BETA PI DAY

The day kicked off with a scavenger hunt that sent mixed teams across Wayne State University's campus. Participants crafted Bents and worked through a mix of engineering-themed challenges and location-based questions. Some teams finished on time, others didn't.

A staple of SE Michigan Inter-Chapter Pi Day – the human Bent.

Either way, it was equal parts teamwork and friendly rivalry, with everyone trying to outscore their opponents. After all, we are quite the competitive bunch here in Tau Beta Pi.

After working up an appetite, everyone regrouped for lunch followed by a few presentations with updates and announcements from SEMIAC's **Alex Boucher,** *MI E '23*, AAAAC's **Drew Boughton,** *MI G '23*, and Michael Ustes.

The day provided an opportunity to slow down and get a glimpse into the broader TBP community, along with opportunities to stay involved beyond graduation.

Fully replenished, the competition picked back up with trivia, led by Michigan Iota. Questions ranged from TBP history to math and even chapter-specific facts. Teams stuck together from the scavenger hunt, so alliances held strong while rivalries grew. The room quickly filled with laughter, plus the occasional very confident and very wrong answers, which added invaluable entertainment.

And then, of course, pie — lots of it! A variety of desserts, including pies and baked goods, were provided by our generous alumni, wrapping up the main event.

AFTER THE FUN

Between custom trophies and other participation items (provided by Drew Boughton), no one left empty-handed.

The turnout was below expectation, but allowed for a more interactive atmosphere. Even with the day's packed schedule, many attendees stuck around for a post-event social, trading competition for board games, snacks, and a chance to hang out with new and old friends alike. It was the perfect way to continue the celebration and strengthen connections made earlier in the day.

IN CONCLUSION

Michigan Epsilon is grateful and humbled to have had the opportunity to host this year, especially during our 75th anniversary. It was truly an honor and a pleasure to collaborate with our sister collegiate and alumni chapters to make this happen, and to see everything come together in the end.

All in all, the 2026 Inter-Chapter Pi Day was a mix of collaboration, a bit of chaos, fun competition, and spending time with new connections. The weekend was a reminder that the best of Tau Beta Pi is equal parts what we do and who we do it with, as well as the people that make up our special organization. And if this year was any indication, the tradition will only keep growing!

... Evolution of Giant Telescopes ... Continued from page 11.

Selected references:

1. There are several variations of the English mount (through-axis, cross-axis, etc.). See, for example, Owen Gingerich, "What Is an English Mounting?" *Sky and Telescope* 34(4): 293–295, 1967 and Peter D. Hingley, "The Shuckburghs of Shuckburgh, Isaac Fletcher, and the history of the English Mounting," *The Antiquarian Astronomer*, issue 7, March 2013.

2. Trudy E. Bell, "Eclipse Expeditions that 'Discovered' the Sun," *Sky & Telescope*, April 2024, pp. 28–33.

3. [W. Struve] "An Account of the arrival and erection of Fraunhofer's large Refracting Telescope at the Observatory of the Imperial University at Dorpat. Communicated in a Letter from Professor Struve to Francis Baily," *Memoirs of the Royal Astronomical Society* 2(1826): pp. 93–100.

4. J. Robert Waaland, "Fraunhofer and the Great Dorpat Refractor," *American Journal of Physics* 35: 344–350, April 1, 1967. See also Paolo Brenni, "The Fraunhofer's [sic] Refractor of Tartu (Dorpstat) and its Restoration," *Bulletin of the Scientific Instrument Society*, No. 113 (June 2012): pp. 2–8.

5. James Caplan, "Following the Stars: Clockwork for Telescopes in the Nineteenth Century," *From Earth-Bound to Satellites: Telescopes, Skills and Networks* (Brill, 2011): pp. 155–176.

6. Pedro Ré, "Joseph von Fraunhofer (1787–1826) and the Great Dorpat Refractor,", first article in his 2025 online book *History of the Telescope*. *https://pedroreastrophotography.com/history_telescope_PRe_2025_LAST.pdf* , pp. 5, 6.

7. Davor Krajnović, "'That Star is Not on the Map': The German Side of the Discovery," Chapter 6, William Sheehan, et al., editors, *Neptune: From Grand Discovery to a World Revealed* (Springer, 2021); p. 206.

8. James Lequeux, "The great nineteenth century refractors," *Experimental Astronomy* 25(2009), p. 43 (paper runs pp. 43–61).

9. Elias Loomis, *Recent Progress of Astronomy; Especially in the United States*, (New York: Harper & Brothers, first edition, 1850), p. 167.

10. [Rev. C. Pritchard] Wilhelm Struve [obituary], *Astronomical Register* 3(28): 103 (footnote), April 1865 [article runs pp. 89–104; reprint of an obituary printed earlier in *Monthly Notices of the Royal Astronomical Society*].

11. C. H. Davis, *Instruments and Publications of the United States Naval Observatory* ...1845–1876 (Washington, D.C.: Secretary of the Navy [1876]), pp. 19–20.

12. Campbell, John, "On a method of constructing an Observatory on a Dwelling-house," *American Journal of Science* series 2, vol. 16: p. 68 (article runs pp. 62–69), July 1853.

13. "Manufacture of Telescopes," *The Independent*, April 15, 1852, page 1. Thanks to Horace H. Smith for this reference.

14. Edward Jay Pershey, *The Early Telescope Work of Warner and Swasey* (dissertation, 1981), p. 123.

15. Pershey (reference 14, pp.124-125, 132; Trudy E. Bell, "Money and Glory," [brief history of Warner & Swasey], *The Bent*, Tau Beta Pi, Winter 2006, pp. 13–20.

16. Donald E. Osterbrock, John R. Gustafson, and W. J. Shiloh Unruh, *Eye on the Sky: Lick Observatory's First Century* (Berkeley: University of California Press, 1988); Pershey, reference 14; Bell, "Money and Glory," reference 15.

17. Edward S. Holden, *Hand-Book of the Lick Observatory* (San Francisco: The Bancroft Co., 1888), p. 41.

18. G. W. Hough, "The Rotation of Domes." *The Sidereal Messenger* 2(5): 133–138, August 1883. See also Trudy E. Bell, "Inventions and Insecurity: George Washington Hough," *Griffith Observer* June 2013, pp. 2–16.

19. Hough, reference 18, p. 135.

20. *Publications of the Lick Observatory*, vol 1 (1887), p. 61; Holden, reference 17, p. 34.

21. Measurements and construction details are given in George E. Hale, "The Yerkes Observatory of the University of Chicago IV," the last in a four-part series of articles published in *The Astronomical Journal* vol. V, nos. 3, 4, 5, and vol. VI. No. 1, March–June, 1897.

22. [W. Struve], reference 3, page 95.

23. [W. Struve], reference 3, pages 93-94.

24. Whitesell, p. 59; W&A: pp. 87-89; Ian R. Bartky, "Chicago's Dearborn Observatory: a study in survival," *Journal of Astronomical History and Heritage*, 3(2): pp. 93–114. December 2000.

NORTH CAROLINA THETA

NORTH CAROLINA THETA

was welcomed as a Tau Beta Pi Chapter on April 18, 2026. District Directors Joseph P. Blackford, DEN, *DC Γ '95,* and Tricia E. Gomulinski, *SD A '98,* joined Executive Councillor Marla A. Peterson, *AZ A '83,* and Executive Director Curtis D. Gomulinski, *MI E '01*, in traveling to Buies Creek, NC, to formally install the Society's 266th collegiate chapter.

The 2025 Convention granted a charter to Tau Beta Eta, the local honor society at Campbell University, which was represented in Albuquerque, NM, by local society president Sarah F. B. Cribb, and chief advisor Alison K. Polasik, Ph.D., *AZ B '02*. Cribb, *NC Θ '26*, had the honor of becoming the first member of her chapter during the Model Initiation at Convention.

INITIATION AND INSTALLATION

The Lundy-Fetterman Building was the site of the first initiation of members on the Campbell University campus. The initiation team consisted of the four Association Officials listed above and also included: Advisor and Executive Councillor Jenna P. Carpenter, Ph.D., *IN A '83*; Advisor Kim R. Fowler, Ph.D., *MO B '78*; Advisor Alison Polasik; Advisor Anastasia M. Rynearson, Ph.D., *IN A '16*; Sarah Cribb; Theodore M. Gaither, *NC E '90*; and Xena A. Gray, *OK A '26*. Twelve undergraduates, ten alumni, and one eminent engineer were initiated into membership in Tau Beta Pi.

After the initiation ceremony concluded, participants headed to Room 132 of Carrie Rich Hall for the installation of the chapter. Ms. Peterson constituted the new members as the newest chapter during the formal installation ceremony. The ceremony included the reading and presentation of the charter and formal election and installation of the chapter's charter officers and advisors. The members initiated earlier along with the student initiated at the Convention and an additional alumnus initiated at the South Carolina Alpha Chapter comprise the charter members of the NC Theta Chapter.

Following the installation ceremony, the new Tau Bates and their guests, members of the faculty and administration, and the Association Officials were treated to a dessert reception in the lobby of Carrie Rich Hall.

During the reception, Carl F. Bonner, *NC Θ '85*, who was initiated as an eminent engineer shared words of wisdom with the new members. Dean Carpenter, President Cribb, and Chief Advisor Polasik congratulated the new members on their academic achievements and their work in establishing the chapter. Councillor Peterson, District 4 Director Blackford, and Executive Director Gomulinski welcomed the new members to the Association and into District 4. Dean Carpenter and Chief Advisor Polasik presented membership certificates to the new members, and Advisor Rynearson presented graduating members with TBP honor cords.

NEW OFFICER TRAINING

Following the ceremonies, Councillor Peterson, Executive Director Gomulinski, and District Directors Blackford and Gomulinski conducted a training session to prepare them for their new roles as NC Theta Chapter officers. The Association Officials covered the key elements of running a collegiate chapter and answered questions about operations. The new officers were excited about the future of Tau Beta Pi on the Campbell University campus.

First Officers (left to right)**:** Kim Fowler, Jenna Carpenter, Ethan Roberts, Sarah Cribb, Alison Polasik, Anastasia Rynearson, Dantzler Bonner, Matthew Rogers, and Jay Mitchell.

Charter Presentation (left to right) Curtis Gomulinski, Marla Peterson, Sarah Cribb, and Jenna Carpenter.

Initiation Team (left to right)
Back row: Kim Fowler, Curtis Gomulinski, Tricia Gomulinski, and Theodore Gaither.

Front row: Jenna Carpenter, J. P. Blackford, Marla Peterson, Sarah Cribb, Alison Polasik, Anastasia Rynearson, and Xena Gray.

All Tau Bates in attendance for the North Carolina Theta installation at Campbell University.

ASSOCIATION BRIEFS

TAU BETA PI DAY 2026 RECAP

Once again, Tau Bates across the world celebrated ΤΒΠ *Pi Day* by hosting local events, wearing merchandise, and sharing pictures on social media. We are grateful to everyone who committed their time and energy to promote the Association.

A special thanks to the 75 donors who helped raise $10,035 as part of our ΤΒΠ *Pi Day* Giving Campaign in support of member programs. Check out a few of the images below and visit our website to watch the 2026 recap video at: *www.tbp.org/pi-day.cfm*

Left: The Virginia Gamma Chapter held a post-Spring Break *Pi Day* fundraiser on Kaufman Mall with shaving cream as part of the fun. More images can be found on Instagram @oduengineering.

Below: Pikes Peak Alumni Chapter members gathered for pizza pies and good company at Walter's 303 in Colorado Springs, CO. Image credit: Sandy Dawson, *CO D '23*.

Left: Members of the Minnesota Alpha Chapter celebrated Pi Day early with pie and community service — packing care kits for the Minnesota non-profit Sharing & Caring Hands. Image enhancements, credit: Renea Lewis.

ALUMNI ACTIVITY:

INDIANAPOLIS (IN) ALUMNI CHAPTER

The annual Purdue University, IUPUI, and Indy AC networking event took place in March hosted by IN Zeta Chapter president Alison R. McClow, *IN Z '26*, and Chief Advisor Ken Yoshida, Ph.D., *CA E '89*.

After the event, a social gathering was held at Guggman Haus Brewing Co. See the image below for those in attendance, and thank you to everyone who participated and helped make meaningful connections!

Thanks to Steve Meyer, *MO B '84*, for sharing details & images on this activity. To learn more about upcoming Indy AC activities, contact: *tbpindy@gmail.com*

FRESHMEN STEM SCHOLARSHIPS

Every year, six incoming college freshmen are awarded a TBP – SAE International Engineering Scholarship of $1,500 to pursue an engineering degree from an ABET-accredited program.

Analyce Grabowski (Newport, NY) chemical engineering at University of Notre Dame (IN)

Daksh Jhanjee (Suwanee, GA) aerospace engineering at Georgia Institute of Technology

Devansh Joshi (Cypress, TX) electrical & computer engineering at University of Texas at Austin

Hannah Guffrey (Columbus, OH) electrical & computer engineering at Rice University (TX)

Kaylee Duda (Rochester, NY) mechanical engineering at Purdue University (IN)

Sydney McCurry (Burnsville, NC) aerospace engineering at North Carolina State University

STAY CONNECTED

Follow us on social media and tag us in your Tau Beta Pi related images and videos at **#taubetapi**.

INSTAGRAM:
instagram.com/taubetapiofficial/

YOUTUBE:
youtube.com/c/TheTauBetaPiAssociationInc/

FACEBOOK:
facebook.com/TauBetaPiHQ/

BLUESKY:
bsky.app/profile/taubetapi.bsky.social

LINKEDIN:
linkedin.com/groups/101390/

X:
twitter.com/TauBetaPi

TAU BETA PI HEADQUARTERS NEWS

Updates from the Association in Knoxville, Tennessee

MEET OUR NEW STAFF MEMBERS:

JCristy Sexton brings 20+ years of administrative expertise to her role as a service specialist with the Member & Chapter team. Her connection to the field began with her father, a chemical engineer, and was furthered by her own three-year tenure at a civil engineering firm.

Her background, combined with experience in manufacturing logistics at DENSO and legal administration, allows JCristy to support the engineering community with unique insight and precision.

Outside of work, JCristy is an avid bowler, a Words with Friends enthusiast, and enjoys relaxing with her lap cat.

Kimberly Smolter has joined ΤΒΠ HQ as a service specialist with the Member & Chapter team. She earned a B.S. degree in organizational management from Tusculum University, and is currently completing an MBA through the University of Wisconsin-Whitewater.

Her expertise in project leadership provides a strategic framework for managing complex operations. Kim has an extensive background in organizational management, having served as president and VP of Programs for the East TN chapter of the Project Management Institute.

In her free time, she enjoys composing classical music, wood-working, bowling, and traveling. Above all, Kim treasures spending quality time with family.

Sean Turrill was born and raised in Athens, Ohio. He graduated from Ohio University, majoring in marketing & business analytics, and was involved with tutoring, the Global Consulting Program, and the Information Systems and Analytics Professionals (ISAP).

Sean relocated to East Tennessee in January 2025 and is now a service specialist with the Member & Chapter team. Previously, he worked at Fifth Third Bank in a variety of leadership positions, such as project manager for the Loan & Card servicing department.

He enjoys watching the Philadelphia Phillies, Cincinnati Bengals, listening to comedy podcasts, and going to concerts.

Here's the rest of the current ΤΒΠ Headquarters staff:

- Erin Andrews, Development & Fundraising Coordinator;
- Roxanne Bachert, Finance Coordinator;
- Matt Brissette, Systems Programmer;
- Mike Brown, Director of Finance & Operations;
- Kelly Caro, Member & Chapter Services Manager;
- Andrea Dake, Executive Assistant;
- Bill Dickson, IT Manager;
- Curt Gomulinski, *MI E '01*, Executive Director;
- Ryan Hubbuck, Full Stack Developer (AL);
- Sherry Jennings-King, *TN A '93*, Director of Development & Communications (MN);
- Dylan Lane, Marketing & Communications Coordinator and Editor, *The Bent*; and
- Renea Lewis, Marketing & Communications Specialist and Editor of *The Bulletin*.

Join us for the 2026 Convention in Tucson, AZ!

- **October 8 - 10 at The Westin La Paloma Resort & Spa**
- **Hosted by the Arizona Alpha (at U of A) and Tucson Alumni Chapters**
- **Registration Opens July 1st!**

For more information, visit: *www.tbp.org/convention.cfm* or contact *tbp.convention@tbp.org*.

This image was generated using Google Gemini.

Check out Convention Sponsorship opportunities at:

www.tbp.org/sponsorships.cfm

Questions? Contact Erin Andrews at: *e.andrews@tbp.org*

Brain Tickler Winter Review

The cryptarithm (problem #4) proved to be the easiest problem — all submitted answers were correct. The hardest regular problem was Montmort's (#5) with only two thirds of the submissions correct. Don't feel bad, Montmort himself got this incorrect in his 1708 book!

The bonus problem was devilish, so much so that the published solution had a mistake that required an erratum, **available on page 3**.

10K gold starts at $2,500.
14K gold starts at $3,000.

Sterling silver starts at $500.

NEW JEWELRY: WEAR WITH PRIDE

The Association is proud to introduce the new Signet Rings, featuring the iconic Bent symbol engraved for lasting detail and distinction.

Crafted to reflect the honor and tradition of Tau Beta Pi, this ring is much more than an accessory — it's a worthy symbol of your achievement, dedication, and lifelong connection to the engineering community. Get yours at: *tau-beta-pi.myshopify.com*

Wear your ring as a testament to your membership and the values it represents.

This ring is a special-order item. Pricing may vary due to fluctuations in gold market rates. These are made to order and are shipped in 3 weeks.

In addition, engraving is available; if interested, enter your preferred details in the notes or reach out to *j.sexton@tbp.org* for assistance.

ALUMNI NOTES

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

ALABAMA ALPHA '79

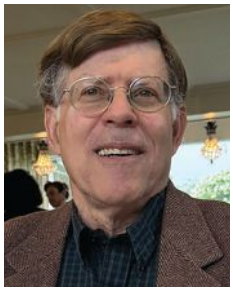
Jeffrey I. Stone

Jeff has been named to the Alabama Construction Hall of Fame, inducted by the AL Associated General Contractors. He spent his career with Brasfield & Gorrie, holding multiple senior leadership roles and guiding industrial & commercial projects throughout Alabama. He helped create Auburn Eng'g Young Alumni Council.

ALABAMA ALPHA '10

Emily (Wood) Traylor

Emily was recently elevated to VP, Chief Information Security Officer at Fullstream, a payments technology company. A third-generation Auburn engineer, Emily and her husband have created three scholarships to honor family legacies. With a B.S. in wireless eng'g, she's already on her third leadership position with Fullstream.



CALIFORNIA EPSILON '76

Clifford M. Krowne Ph.D.

Cliff has been the Chief Scientific Officer for Ashlawn Energy, LLC, since 2021. He's authored 15 journal articles, conference papers, and web lectures in the area of electrochemistry (2023-26). This year, Ashlawn received several contracts & grants, allowing them to set up a manufacturing plant outside of Rochester, NY.

CALIFORNIA IOTA '15

Melissa R. Snyder P.E.

Melissa was recently promoted to chief civil engineer & director of land development at KSI Engineering, Inc. She specializes in commercial and residential land development projects, is a licensed engineer in 11+ states, and earned her B.S. in civil eng'g from California State University, Los Angeles.

CALIFORNIA UPSILON '07

Brett M. Bourgeois P.E.

Brett has been hired as the new Lewisville city engineer (TX). Most recently, he served as the Denton city engineer (TX) and the deputy city engineer before that. His B.S. is in civil eng'g from California State University, Sacramento, he's finishing his master's in public administration at the University of North Texas, and is a certified project management professional (PMP).

CONNECTICUT BETA '97

Christine T. Brock

Christine recently left the Ohio EPA as a project and program manager to join the Ohio Secretary of State as the project management office manager within the IT Division. She has a B.S. in civil & environmental eng'g, was CT B Chapter president, and has a master's in water resources eng'g from Tufts University.

MISSOURI BETA '94

Christina Witt

Christina has been inducted into the Missouri S&T Academy of Chemical and Biochemical Engineers in recognition of professional achievement. She is a facility engineering manager for MilliporeSigma, has a B.S. in chemical engineering, and is a member of the International Society of Pharmaceutical Engineers.

OHIO ZETA '97

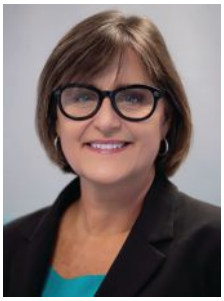
Lisa A. Matta

Lisa has been promoted to Chief Innovation Officer at Wi-Tronix, recognizing her product expertise and expanding role. A founding member, she's been instrumental in shaping the company's trajectory and has held key leadership roles, including VP of Product Management. Lisa is a D8 Director and Chicago Alumni Chapter president.

OHIO LAMBDA '10

Joshua A. Graham P.E.

Joshua is joining Tetra Tech as Vice President, Program and Construction Management Services, supporting the Critical Buildings & Infrastructure Operating Unit. In this role, he'll be leading and expanding Tetra Tech's PM/CM services for DoD and federal clients. He previously worked for HDR and the U.S. Air Force.



TENNESSEE GAMMA '88

Brenda Shackleford P.E.

Brenda has joined M2 Group, LLC, as a civil engineering manager. She brings 30+ years of specialized experience in commercial site development, having managed projects across 29 states from feasibility through construction. Brenda was cited for having a rare combination of technical depth and strategic vision.

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

Louis Witten holds the Spring issue while posing for a picture before his 105th birthday.

MARYLAND ALPHA

Louis Witten Ph.D.

On April 13, Dr. Witten turned 105! His son, Matt, reached out to share an image (left) and to let us know that not only is Louis still living, but he is thriving.

Dr. Witten is an American theoretical physicist whose research has centered on classical gravitation, including the discovery of certain exact electrovacuum solutions to the Einstein field equation.

He graduated from Johns Hopkins University (JHU) in 1941 with a degree in civil engineering. From 1942-46, he served in the U.S. Army Air Forces as a radar weather officer.

Next, Dr. Witten was a graduate student in physics at JHU, where he received a Ph.D. His dissertation, in statistical mechanics, was entitled "A Model of an Imperfect Gas."

After postdoctoral study at Princeton Univ., the Univ. of Maryland, and the Lincoln Laboratory (MIT), Dr. Witten joined RIAS, the research lab of the Martin Marietta Corporation. In 1968, he became a professor of physics at the University of Cincinnati where he remained until his retirement in 1991.

PENNSYLVANIA BETA

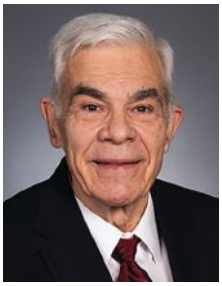
The Penn State College of Engineering recognized the 2026 Outstanding Engineering Alumni Award and Early Career Award in a ceremony on April 9.

Established in 1966, the Outstanding Engineering Alumni Award is the highest honor bestowed by the College of Engineering and recognizes graduates who have reached exceptional levels of professional achievement.

The Early Career Award recognizes alumni who have made significant professional accomplishments within the first decade after graduation.

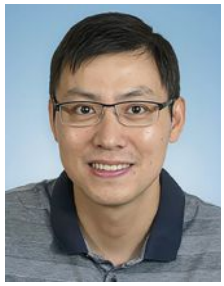
Three Tau Bates were selected as outstanding alumni and two as early career recipients. Click below to see the list of all 21 of this year's awardees:

https://www.engr.psu.edu/alumni/awards/oea/2026/recipients.aspx



Edward Liszka
PA BETA '65
Director Emeritus of the Applied Research Lab at Penn State
Alumni Award

Matthew Mench
TN ALPHA '00
Dean of engineering at the University of Tennessee
Alumni Award



Jisheng Wang
PA BETA '08
Vice president of engineering at Cisco Systems Inc.
Alumni Award

Nasser Al Azri
PA BETA '17
Process innovation engineer at the Lubrizol Corporation
Early Career Award

Jason Cornelius
PA BETA '17
Co-founder and CEO of Perseus Defense
Early Career Award

The above cartoon, submitted by **Ed Kulis, *NY G '75***, brings Alan Turing, René Descartes, and an uncanny robot café waitress into philosophical collision over coffee. The concept, dialogue, staging, and creative direction are attributed to ©2026 Ed Kulis, and the illustration was rendered with AI assistance. Ed says, "The introduction of AI into human culture is a very big thing. I use AI at work every day with Claude Code, and I've been interested in the Turing Test and the rational progression from Turing and Descartes to the logical inference of AI mind."

Member Change of Address

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

Send updated information to ***tbp.memberupdate@tbp.org.*** Please include your name, initiating chapter, year of graduation, and any preferred name changes.

BENEFITS OF MEMBERSHIP

More at: ***www.tbp.org/member-benefits.cfm***

CIVIL SERVICE: Automatic entry-level advancement of U.S. Government applicants to GS-7. More at: *https://www.tbp.org/?TBPGS-7*.

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

FARMERS: Members have access to group discounts on auto and home insurance.

HP: Partnership providing exclusive discounts on HP products.

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

PPI: Receive a 20% discount on PPI-published preparation materials for the FE/EIT and PE engineering licensing exams.

LINKEDIN: Join 39,400+ Tau Bates in our official group for professional networking and career discussions.

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

COLLEGIATE CHAPTERS

266 COLLEGIATE CHAPTERS
259 ACTIVE — 655,325 MEMBERS

7 Inactive chapters shown in ***BLUE***

Α = ALPHA
Β = BETA
Γ = GAMMA
Δ = DELTA
Ε = EPSILON
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 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
DELTA Fairfield University
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
LAMBDA Wentworth Institute of Tech.
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
THETA Campbell 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 Wisconsin-Milwaukee
DELTA Milwaukee School of Eng'g.
EPSILON Univ. of Wisconsin-Platteville
WY ALPHA University of Wyoming

ALUMNI CHAPTERS

82 ALUMNI CHAPTERS
52 ACTIVE

30 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

DISTRICT 7
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
Scissortail, OKC-Norman, OK
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
Wasatch Front, 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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Questions? Contact Erin Andrews: e.andrews@tbp.org

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