FALL 2023

The Bent

Of Tau Beta Pi

THE ENGINEERING HONOR SOCIETY

Hydrogen Industry Heating Up

Meet the 2023 Awardees and Scholars

The Bent

Tau Beta Pi

The Engineering Honor Society

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

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

On the COVER: Hydrogen is viewed by many in the energy sector as a promising pathway to an energy transition of net-zero emissions. The author identifies many of the sectors across which the hydrogen economy integration could take place in the future.

Artist: Dali Polivka

VISIT www.tbp.org

***The Bent* of Tau Beta Pi**® (ISSN 0005-884X) is published quarterly by The Tau Beta Pi Association, Inc., Room 508, Dougherty Engineering, The University of Tennessee, Knoxville, TN 37996-2215. Life subscriptions are: $95-Print, $45-Digital, and $10-Annual. Printed in U.S.A. Periodicals postage paid at Knoxville, TN, and at additional mailing offices.

SUBSCRIBERS AND POSTMASTER: Send address change, request for online subscription, and other correspondence to tbp@tbp.org or to *The Bent* of Tau Beta Pi, P.O. Box 2697, Knoxville, TN 37901-2697.

Volume 114, Number 4 | Circulation: 88,700 | Initiated Members: 632,624

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

FALL 2023

The Bent

FALL 2023 | VOLUME CXIV | No. 4

AWARDS:

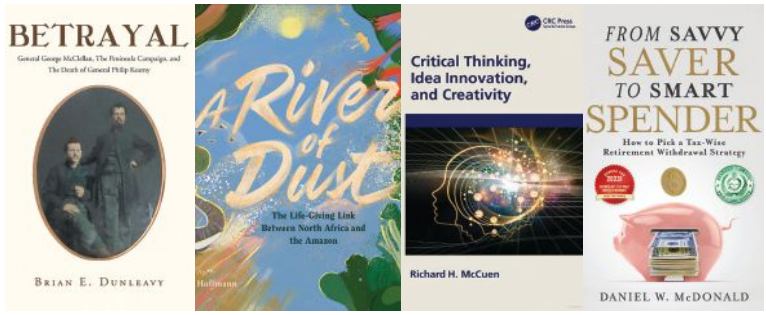
FEATURE:

REPORTS:

DEPARTMENTS:

12 Congratulations to the 2023 Association Award Winners!

41 The NM Alpha Chapter at NMSU proudly displaying their new Bent monument.



43 Spotlight on Tau Bate authors of books on a variety of subjects.

COUNCIL'S CORNER

Rachel K. Alexander, P.E., *CA Y '15*, ΤΒΠ 2023 President

RISING TOGETHER TO MEET THE CHALLENGES OF TOMORROW

The Eligibility Code of The Tau Beta Pi Association, adopted by the 1926 Convention, states "... *none can become worthy engineers without the welfare of associates, organizations, and the community at heart*." These engineers display a willingness to assist in worthy causes, true integrity when they act with honor, and the high standards of truth and justice. Our community includes people who are underrepresented in engineering, and those who experience barriers before they arrive on campus for an engineering program and as they move through the world.

In June 2020, ΤΒΠ released a letter about social injustice, stating that the Association is "committed to supporting those who have been dehumanized and engaging our members in discussing these issues, finding solutions, and being allies to those who have been marginalized." During the October 2020 virtual event, the "Unvention," an open forum discussion identified the opportunity for ΤΒΠ to evaluate its approach to Diversity, Equity, and Inclusion (DEI) issues. These events led to the formation of the ΤΒΠ DEI Committee, whose charter states its purpose to: **"eliminate barriers that limit access to and inclusion in opportunities, benefits, and resources for all current and potential future members of the Association."**

The committee will develop initiatives to increase initiation rates of underrepresented groups; assess barriers that prevent high-performing students from achieving the scholastic eligibility requirements; promote a welcoming environment; encourage diverse views and membership; and identify opportunities to engage underrepresented minority students in the engineering pipeline. These initiatives align with two of the Association's Strategic Plan Goals: increasing our overall median membership acceptance rates to 20 percent of those eligible for membership and working on the identity of ΤΒΠ. **Our DEI initiatives seek to increase our outreach and the acceptance of eligible candidates so that we can mark them as worthy engineers who act with honor and high standards.** We believe ΤΒΠ members regularly serve as role models for young engineers who will create the solutions that improve society. These young professionals will reflect the growing diversity of the world's population.

A constant theme when talking about DEI is one of representation. Young children are able to describe a doctor or firefighter by their clothing, tools, vehicles, and generalized idea of the profession. What does an engineer look like and what do they do? Do children see pictures and people in their communities that are engineers who are similar to them? Can they imagine themselves as an engineer? When we can imagine ourselves doing something, it opens a world of possibilities. Underrepresented minorities in engineering refers to women, people from disadvantaged socioeconomic backgrounds, people of color, first generation and non-traditional students, people with disabilities, and people of all gender identities and sexual orientations.

These members of our community need role models and to be included in the identity and definition of an engineer. This definition will help attract people to engineering because they can see themselves as one and understand the profession. Our DEI initiatives are intended to add seats to the table so that collaboration with all voices and perspectives can help us design better solutions for today and tomorrow, to provide role models for future engineers, to define what an engineer can be and what they do, and to improve our communities.

The problems that engineers are called upon to solve are increasingly complex and urgent. We need diversity of thought and perspectives to supplement our technical training. This diversity allows us to cover a larger solution space more expediently and thoroughly. Engineering design requires more than the application of mathematics, natural sciences, and problem solving. Engineers must take into account constraints such as accessibility, constructability, cost, codes, sustainability, and our communities. As engineers, we are constantly encouraged to explore, develop our skills, and expand our repertoire of tools to solve problems. Working on projects with people of diverse backgrounds and experiences will help us develop innovative solutions to address problems that affect more people in the world. Engineers are also part of our greater society, and we must participate in it. We must engage in solving the problems our communities face both inside and outside of engineering. Truly excellent engineers are both civically engaged and examples of civility.

This article was written by Association President **Rachel K. Alexander, P.E.,** with assistance from the Diversity, Equity, and Inclusion Committee Officers:

Lupita D. Montoya, Ph.D., *CA K '89*,
Josuan Hilerio Sanchez, *PR A '07*,
Tonya J. Whitehead, Ph.D., *MI E '07*

YOUR LETTERS

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

From the Editors: *We greatly appreciate the recent volume of reader letters and our goal is to promote a healthy discourse on these important topics. We believe each member has a unique voice that deserves to be heard and that listening to our diverse membership provides insights into the thoughts, concerns, and viewpoints we might not otherwise consider. However, we do recognize that emotions can run high and want to be sure that no one feels personally attacked. For these reasons, we have published a Letters Policy on page 45 and request our readers review it and consider these guidelines moving forward. Thank you.*

Reaching Out to All

After receiving my summer issue, I started by reading the letters, as I usually do. It made me sad to see the vitriol coming from other Tau Bates about some of the topics covered in the Spring issue. It is particularly disturbing to see someone refer to green energy and global warming as "distractions." Green energy is exactly the sort of thing that we *NEED* engineers to focus on to help mitigate the impact of the very real anthropogenic climate change that is already being experienced and which continues to get worse. They are *NOT* distractions, but core issues for which various engineering specialties are key to solving.

A number of letters mentioned DEI and seemed to be claiming that it was about assuring equality of outcomes rather than equity. That is just *NOT* the reality. DEI does not mean lowering standards or setting quotas. It *DOES* mean looking for inherent aspects of educational and other institutions that can result in fewer opportunities for some people, even with equal capabilities and achievements as others. There are many individuals who self-select out of being a part of some organizations because they don't think they would be welcome there. An organization looking to "reach out to all races, genders, and other diverse groups" means trying to convince otherwise qualified candidates underrepresented in that organization that they should consider becoming part of it. Labeling such efforts as "woke" is simplistic, pejorative, and just inconsistent with reality.

Lewis C. Chasalow, Ph.D., *PA A '78*

Reaching Diverse Candidates

I was a bit surprised to see the group of letters in the recent edition of the magazine complaining about articles focused on diversity and inclusion. The letters were a frustrating range of political pundit points, suggesting that a more diverse engineering field would somehow result in more inferior engineering. While I do have to give kudos to the editors for fairly publishing the critiques, it would have been within the editorial staff's right to have deleted the swath of complaints and refused to publish them in my opinion.

I was a bit bemused by all of this since I had no memory of reading the "controversial" articles at all in the issue prior; they had come and gone as a drop in the bucket compared to the issues and debates surrounding diversity and outreach I have experienced in my work and education life. Everything I saw in *The Bent* was pretty tame and measured from my recollection. The pitchforks and torches being brought out for the articles were unearned. STEM fields continue to lag behind with representing various portions of our population, and inclusion is not a discussion on "lowering standards" in my opinion but asking how we can reach out to those who meet our standards who might otherwise be dissuaded from joining the ranks of experienced engineers due to other disadvantages and factors in their life. With rising costs of college education, disparities in pre-secondary education quality, and the struggles of first-generation students, there are plenty of factors which prevent many talented and skilled people from becoming brilliant engineers and future society members.

While the Association and society have a duty to all alumni members, I believe this publication is at its best when focusing on the needs of undergraduate students, young professionals, and celebrating the achievements of people through their careers. Is this not ultimately a student led organization with alumni advisors to begin with? Should not the organization reflect the needs of the current engineering student population? Diversity and inclusion are currently subjects of great discussion in all areas of work and education. Tau Beta Pi should be commended for making an effort to address the matter.

Jacob W. Lyman, *UT A '24*

Different People in Engineering

Kudos to ΤΒΠ for publishing letters critical of the content of prior articles regarding DEI, equality, and social justice.

It takes a strong organization to reflect the differing views of its membership. The conversation prompted me to go to the website to review the articles themselves. The link to conversation on race and equity made it easy to locate DEI resources but not necessarily the articles that prompted the letters. I couldn't find them under Publications by issue. Please consider including these articles on the DEI page.**

My first impression of these particular letters to the editor was wow, just wow. Two seemed to be rooted in anger while the third had a more open approach that disagreed in an agreeable way. I would like to think that we all could agree on some common ground, such as ΤΒΠ is an organization that honors engineering excellence. Engineering is about developing technical solutions for problems. Technical problems occur in the world, inhabited by people who may be different from the engineers in some ways. Solutions also can have consequences that affect people. If we do not understand the people affected by our engineering solution, it may not be as excellent as it could be.

One component of understanding the people is for those people to be part of the solution and even part of the engineering team. For more people to become part of the engineering team, STEM experiences, training, resources, and role models are needed early in the education pipeline.

Part of becoming a member of ΤΒΠ is also exemplary character, the definition of which is left up to the individual chapters. I struggle to accept that an inability to truly consider another point of view is exemplary.

Susan E. Green, *MI Γ '78*

****Editor's Note:** These two articles are available on our website at *www.tbp.org/other/DEI.cfm* and on the page of previous features at *www.tbp.org/?Features* as well.

Letters continue on page 35.

WHO'S WHO IN TAU BETA PI

Recognizing Tau Bate accomplishments

W. Samuel Easterling Ph.D., P.E. *West Virginia Alpha '81*

was elected a Distinguished Member of the American Society of Civil Engineers. He is the Iowa State University Dean of Engineering since 2019, an accomplished educator and administrator, with primary research interests in the areas of composite and cold-formed steel structures. Samuel has received numerous awards for his research and professional service and serves as an advisor to the Iowa Alpha Chapter.

Theodore J. Heindel Ph.D.

Wisconsin Alpha '88

received the 2023 Freeman Scholar Award from the American Society of Mechanical Engineers "in recognition of exceptional contributions to the field of fluids engineering, particularly X-ray flow visualization." He is an Iowa State Univ. professor of thermal science and mechanical eng'g, director of ISU's Center for Multiphase Flow Research & Education, and past associate editor of ASME's *Journal of Fluids Engineering*.

Rao Mannepalli

Massachusetts Alpha '87

was elected as a Fellow of the Council of Vibration Specialists and the Astronautical Society of India. He also presented a keynote lecture – "Acoustics in Aerospace" at the 50th National Symposium on Acoustics and gave invited lectures at the International Conference on Vibrations and the 2023 AIAA Aviation Forum. Rao is chief scientist at Leidos and initiated into ΤΒΠ as an eminent engineer.

Krishna Pakala Ph.D.

Idaho Gamma '12

was chosen to receive the 2023 National Outstanding Teaching Award by the American Society for Engineering Education (ASEE). The award recognizes an engineering educator for excellence in outstanding classroom performance, contributions to the scholarship of teaching, and ASEE participation. Krishna is an associate professor of mechanical & biomedical engineering at Boise State University.

J. David Rogers Ph.D.

Missouri Beta '76

was awarded the Civil Engineering History and Heritage Award from the American Society of Civil Engineers. He was selected for "his 30 years as a recognized expert on the history of dam failures, his significant publications on civil eng'g history topics, and ASCE presentations." David is a geological engineering professor at Missouri University of Science & Technology and received an AEG presidential citation in 2006.

James G. Soules Ph.D., P.E., S.E.

Texas Beta '79

received the 2023 Walter P. Moore Jr. Award from the Structural Engineering Institute of the American Society of Civil Engineers for "contributions to and technical excellence in the development of structural engineering codes and standards." He is a senior principal structural engineer and the technical authority for earthquake & wind engineering for CB&I Storage Tank Solutions, LLC.

Billie F. Spencer Jr. Ph.D., P.E.

Missouri Beta '81

was elected by the American Society of Civil Engineers to its 2023 class of distinguished members. He was recognized "for pioneering new approaches to improve the performance of structures through modeling, monitoring, control, and optimization, as well as for his unwavering commitment to education/mentoring of students." He is a professor and endowed chair of civil engineering at the Univ. of Illinois at Urbana-Champaign.

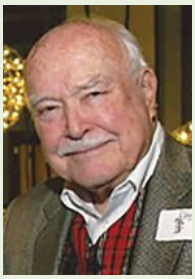
Nancy S. Timmerman P.E.

Illinois Gamma '72

was honored with an award in her name, the Nancy Timmerman Members' Choice Project of the Year Award, by the Institute of Noise Control Engineering (INCE-USA). The honor recognizes her "for being the first woman president, board certified, a fellow, and having served on the board of INCE." During her career, she worked in power plant noise control, sonar, and noise monitoring and abatement.

Stanley A. White Ph.D., P.E.

Indiana Alpha '57



was selected by Sigma Xi as a member of the 2023 Cohort of Fellows. There are less than 70 Sigma Xi Fellows to date; he will receive his award in November. Stanley was also recognized with the (U.S.) *President's Lifetime Achievement Award* for outstanding public service – "volunteering 4,000+ certified hours of 'floor duty' as a clinical volunteer in critical-cardiac nursing units at Providence Mission Hospital (CA) from 2010-19.

Executive Council CANDIDATES

The Executive Council is our board of directors consisting of nine members who are alumni and serve a three-year term. The Executive Council names its own officers: *Chair*, who is also President of the Association; *Vice Chair*, who is also Vice President; *Secretary, Treasurer*, and five *Councillors*.

In accord with the Constitution, three members of the Executive Council are elected to three-year terms by the Convention each year. The terms of Secretary Michael L. Peterson and Councillors George Youssef and Menna M. Youssef expire on December 31, 2023. Per Constitution Article X, Sec. 2(d), any voting delegate at the 2023 Convention may nominate an eligible member because the number of nominees is equal to the number of vacancies. In response to the call for candidates, the following individuals were nominated.

NOMINEES FOR 2024-26:

HENRY H. HOUH, Ph.D.

MASSACHUSETTS BETA '89

Nominated by the Greater Boston Area Alumni Chapter. Henry holds four degrees from the Massachusetts Institute of Technology: a B.S. in electrical engineering & computer science; a B.S. in physics; and master's and Ph.D. degrees in electrical engineering & computer science.

He currently works independently as a technology consultant and a technical expert witness, having previously assumed key roles in various venture-backed startups, including chief technologist and CTO. Recently, Henry founded several education-oriented companies, such as Einstein's Workshop, a hands-on STEM learning center for kids specializing in robotics, coding, and inventing, and BlocksCAD, which provides online educational 3D CAD tools for kids used globally in makerspaces and schools.

Henry holds eight U.S. patents and six international patents, has served on the board of the MIT Alumni Association, and is a board member of the Discovery Museum and the Reading Symphony Orchestra.

He plays the violin and viola and is a regular member of the Reading Symphony and MIT Summer Philharmonic Orchestra. Additionally, Henry was a producer/executive producer for the 10,000 Maniacs' 2013 & 2015 albums, and as a former member of the MIT Blackjack Team, appeared in the movie "21."

Residents of Lexington, MA, he and his wife **Lisa,** *MA A '91*, have three children and are now empty nesters.

RUSSELL W. PIERCE

WASHINGTON ALPHA '70

Nominated by the Tennessee Delta Chapter. Prior to retiring in 2006, Russ had a long and distinguished management career in the aerospace, telecommunications, and business management consulting industries.

For the past 32 years, Russ has served ΤΒΠ as an Association Official in multiple roles: currently as an Engineering Futures Facilitator and Chapter Advisor, and previously as Director of Engineering Futures, District Director, Executive Councillor, and Association Treasurer.

Born in London, England, Russ is a United States citizen, immigrating to the U.S.A. in 1961 and serving four years in the U.S. Air Force before earning B.S. (cum laude) and M.S. degrees in electrical engineering at the University of Washington. In addition to ΤΒΠ, Russ is a member of Eta Kappa Nu.

In May 1997, Russ earned an MBA from the Florida Institute of Technology and is a member of Delta Mu Delta, the business administration honor society. From 1999 until 2006, he served as an information technology director with AT&T Fixed Wireless Company and later as a managing partner in a boutique consulting company. Russ concurrently taught undergraduate and graduate level business classes for the Western Washington campus of the University of Phoenix.

Russ founded his own management consulting company, USBrit Consulting, in 2004, and lives in Puyallup, WA, with his wife, Pauli.

THOMAS A. PINKHAM IV

MASSACHUSETTS EPSILON '88

Nominated by the New York Nu Chapter. Tom earned a B.S. in electrical engineering from Northeastern University and attended IMD Business School in Lausanne, Switzerland, as part of an Executive Development program.

He has worked in global consumer product businesses of Eastman Kodak and its successor business, Kodak Moments, for 30+ years. Tom is currently the strategic accounts program manager, where he oversees product delivery and operations, supporting and retaining customers accounts for over $100M in annual revenue in Europe. Tom is a strategic thinker with operational acumen, identifying future potential opportunities and near-term plans that are executable by the organization within its current capabilities. He is often called upon to work cross-culturally, helping align all parts of the organization to collectively optimize their customer focus.

Tom has served as a ΤΒΠ District 2 Director (NY & NJ) since 1990; he loves to find, motivate, and develop chapter and Association leaders. As an Association Official, he has advised nearly every Convention committee as well as selection committees for Laureate, Distinguished Alumni, and Director of Alumni Affairs. Tom recently served as member and chair of the ICE Committee, refining and digitizing that top-rated session.

He lives in Rochester, NY, with his wife Jo Ellen and two college-aged sons. He has been active as a Council Committee member for Scouts BSA (formerly Boy Scouts), as well as for his son's large troop. Tom has also been a volunteer youth soccer coach. He enjoys boating and downhill skiing.

Hydrogen May Heat up the Engineering Job Market

BY KAT FRIEDRICH, ***WISCONSIN ALPHA '00***

Above image: Hydrogen supply system at DLR Cologne
Credit Wikimedia Commons: DLR

There's been plenty of enthusiasm recently about the nascent hydrogen economy in the United States. What should engineers know about employment in this emerging market?

"I'm really bullish," said Frank Wolak, president of the Fuel Cell & Hydrogen Energy Association (FCHEA). "My comment to anyone in the technical space is that this career path in energy, especially in clean energy and hydrogen, is a great reward. I would encourage anyone who looks at this pathway to see it as an opportunity to expand their own knowledge, make a difference, and also find very gratifying and financially rewarding activities."

When Wolak was in engineering school, he viewed energy from a nontraditional vantage point. He has since worked for oil and gas companies, fuel cell companies, energy efficiency companies, and other organizations before settling down at the FCHEA.

"I came of age in the aftermath of the oil crisis in the '70s and '80s," Wolak said. "I started out many years ago interested in the evolution of the subject of alternative energy. I'm really excited about the long-term prospects of hydrogen, both as an engineer as well as the head of the FCHEA. I think this is a very interesting place for younger engineers, for those who want to change their career paths and make a meaningful impact on decarbonization and employ their skills in a way that can be very gratifying and interesting."

Ashley Samuelson, vice president – STEM at the corporate recruiting company Airswift, said she sees this job market is growing throughout the United States. Hiring managers are looking for engineers with transferable skills, including soft skills and design abilities. They are interested in candidates who are adaptable, are willing to learn, and stay informed about the latest news in the field. The industry is looking for experience with "energy integration in chemical engineering, energy storage, safety and risk management, and project management."

"Airswift is seeing an uptick in the demand for jobs throughout emerging markets, and the hydrogen industry is definitely trending upwards," Samuelson said. "The expansion of these hydrogen projects and initiatives is creating so many job opportunities."

There is excitement surrounding clean energy initiatives, Samuelson added. Ordinarily, people pick industries and stay with them throughout their careers, but her company is seeing candidates moving into these emerging markets.

"The hydrogen industry is shown to be such a big piece of the puzzle within clean energy," Samuelson said. "If you take a look at the dollars behind the projects, there's already a handful of these projects in construction, with so many more that are in the conceptual phases and looking at the feasibility. So the dollars behind it are saying that this is going to continue to be a growing market."

"What we're seeing right now on the ground in Louisiana is a lot of transferability between our existing energy industry and the skillsets, the expertise, the knowledge that we gleaned from generations of doing oil and gas work, into the hydrogen economy," said Lacy McManus, executive director of future energy at Greater New Orleans, Inc.

Engineers from many different educational backgrounds can participate in the hydrogen economy, Wolak said. Civil engineers can help to design the architecture for hydrogen systems. Electrical engineers can work on the integration of new hydrogen infrastructure with the electric grid. Mechanical engineers can design process equipment.

"For example, if you're working in the chemical industry as a process engineer, you have very easy transferability into more of a pure hydrogen industry, whether it's fuel cells or hydrogen," Wolak said. "If you've got manufacturing engineering skills, those may be different components being built and different processes, but if you have good experience in those areas, they're transferable."

During a typical day on the job, Wolak said, an engineer working on hydrogen might collaborate with a team to improve a process, cut costs, or evaluate new materials. An electrical engineer might consider the interface with the electric grid, reference code or utility requirements, or design power control interfaces. Manufacturing engineers might look at ways to optimize product quality while reducing costs and working with supply chains. Engineers installing hydrogen equipment might design facilities, develop plans, or deliver equipment.

Wolak is not sure exactly how much new hiring is taking place, but said that one of his association's member companies has "gone from a handful of employees to several thousand." Electrolysis factories are being built by major players such as Cummins Inc. These factories typically have hundreds of jobs, some of which are in manufacturing. Startup companies such as Electric Hydrogen are also expanding their operations.

The job market has changed dramatically due to COVID, Wolak said. Right before the pandemic began, policymakers recognized in many countries that hydrogen was important for decarbonization. The pandemic put efforts on hold, but then when the public health situation improved, the industry accelerated.

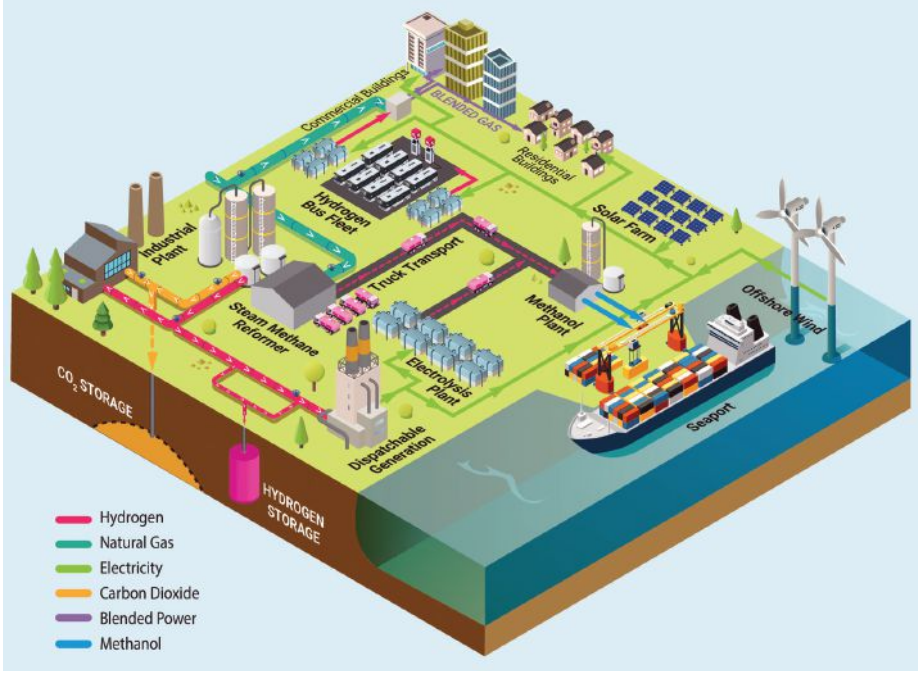
Although most hydrogen produced now is "gray" hydrogen, which is produced from steam reforming of natural gas,[1] the technologies that are leading to strong interest in this industry relate to "green" hydrogen, which is produced using renewable energy, or "blue" hydrogen, which is similar to gray hydrogen but is created with a carbon dioxide sequestration process.[2] According to Gizmodo, this sequestration process does not always work.[3]

According to a 2022 guide from the Society of Environmental Journalists,[4] some other "colors" of hydrogen include "turquoise," which is made starting with methane in a thermal plasma-electrolysis process;[5] "pink," which is made using nuclear power (and is sometimes called "purple" or "red"); "brown," which is made using gasification of brown coal;[6] and "black," which is made via gasification of black coal.[7]

Carbon Brief also noted that there is no agreed-upon color for biomass-fueled hydrogen production.[8] In addition, nuclear-powered hydrogen may be referred to as "pink," "purple," or "yellow." Online sources differ on what "yellow" hydrogen means, but it often is solar-produced green hydrogen.

Less than one percent of hydrogen that is industrially produced is green, according to the Society of Environmental Journalists.[9]

Hydrogen "is the main ingredient of stars, including 90 percent of our sun, and a thin mist of it is scattered through space — sometimes, in giant interstellar gas clouds," wrote Marco Alverá in his 2022 book "The Hydrogen Revolution: A Blueprint for the Future of Clean Energy."



Hydrogen Economy Integration Across Multiple Sectors and Production Pathways:

A regional hydrogen hub can provide pathways to decarbonize multiple sectors and use multiple production and transport pathways.

In this example, hydrogen is produced by a steam methane reformer that uses carbon capture and several electrolysis facilities. Hydrogen is transported by both pipe and truck and used in the industrial, electric power, mobility, buildings, and shipping sectors.

Electrolysis facilities use power from the bulk power supply as well as dedicated renewable resources.

Credit: The Energy Futures Initiative from "The Future of Clean Hydrogen in the United States: Views from Industry, Market Innovators, and Investors" report.

"Hydrogen's story goes back 13.7 billion years to a time when the universe was newborn and very hot... Hydrogen emerged from the primordial furnace in far larger quantities than any other element, and even today, it dominates the cosmos."[10]

Physically speaking, hydrogen is odorless, colorless, nontoxic, and highly flammable. Its energy content by weight is nearly three times that of gasoline, but it has a low energy density by volume if it is at a standard temperature and atmospheric pressure, according to a report by the UN Environment Programme.[11]

According to a 2022 article from *IEEE Spectrum*, the cost of gray hydrogen is around $2/kg in the United States. The U.S. Department of Energy has established a goal of lowering the cost of low-carbon hydrogen to this same price without incentives by 2026 and bringing it to $1/kg by 2031. Europe is rushing to develop hydrogen resources due to a fossil fuel crisis.[12]

"I see the gray hydrogen clearly declining," Wolak said. "It's mostly industrial. The growth in green hydrogen is certainly on the radar screen because I think, in some ways, it's the one that gets the most attention. If I look at the activity of engineers, there's much more of a potential to be involved in many green hydrogen projects than in pink or blue."

Wolak said jobs related to blue hydrogen will be concentrated around large carbon capture and storage projects. Roles related to pink hydrogen will be concentrated where nuclear plants are located.

Policy is driving growth of the hydrogen economy in the United States and internationally. Here, the Inflation Reduction Act (IRA) has created new incentives to produce green and blue hydrogen, according to Wood Mackenzie. It reintroduced a production tax credit known as the 45V. This allows qualifying production facilities to receive a 10-year tax credit for qualified hydrogen that is up to $3/kg.[13]

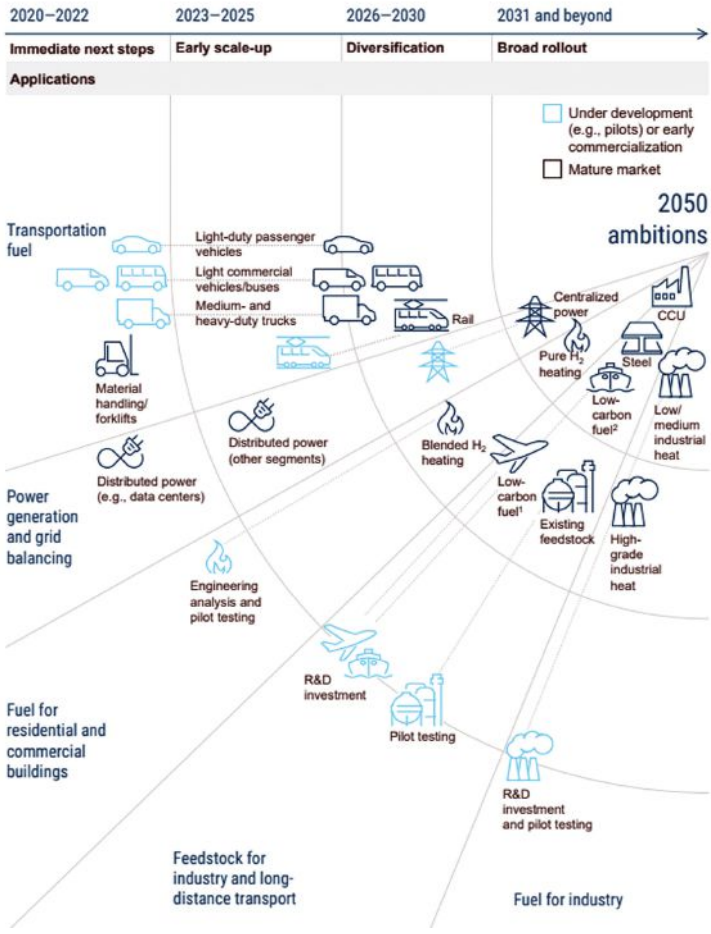
"The IRA's been absolutely catalytic and totally game-changing, building out the demand for green hydrogen and blue hydrogen as well," McManus said. "The shift we've seen in our landscape cannot be understated. Beyond the IRA, we're seeing market pressures as well. When you have those market pressures coupled with public policy like the IRA, you're starting to see a true paradigm shift."

"The U.S. DOE has had a longstanding role as the champion of the development of hydrogen," Wolak said. "The U.S. national labs have looked at hydrogen as a complement to the buildup of renewable resources to decarbonize. And what we're seeing today is the U.S. DOE taking all of that historical knowledge and presence and really being a driving force to help define how best to use hydrogen."

"We have an amazing set of tools in our national labs with engineers and technology specialists and scientists who have been looking at the best ways to employ hydrogen," Wolak said. "They're at the edge of looking at technical innovation, dealing with materials issues, supply, raw materials, advancements in fuel cells. I really see the DOE as coming of age in some ways, being able to unleash its resources around hydrogen and really take the leading role and define how the United States can employ hydrogen."

The DOE has put out a call for proposals to develop hydrogen hubs at various locations nationally, Wolak said. According to the Center for Strategic & International Studies, there were 22 prospective hubs being promoted as of July 2022, although the DOE had not announced the funding opportunity yet.[14]

According to a 2022 report by the Energy Futures Initiative, the Infrastructure Investment and Jobs Act earmarked $8 billion over five years to develop four regional hydrogen hubs. The hubs would include hydrogen from fossil fuels, nuclear power, and renewable energy. Hubs would also focus on the industrial and mobility markets, residential and commercial heating, and the electricity sector. The act also budgeted $1 billion for hydrogen



Hydrogen Applications Road Map from a report on the hydrogen economy by the Fuel Cell & Hydrogen Energy Association (FCHEA).

demonstration projects that would include power systems integration, large electrolysis facilities, and storage techniques.[15]

By the standards of this legislation, hydrogen is considered clean if under 2 kg of carbon dioxide are emitted for every kilogram of hydrogen produced, according to the Center for Strategic & International Studies. The hydrogen can be produced from a variety of sources. One of the goals is to establish "a network of clean hydrogen producers, potential clean hydrogen consumers, and connective infrastructure located in close proximity" for each hub. Initial responses recommended ten regional clusters: California, Appalachia, the Southwest, the Pacific Northwest, the Great Lakes, New England, the Central United States, Alaska, Hawaii, and the Gulf Coast.[16] Independent research from the Great Plains Institute suggested 14 regional clusters.[17] The DOE wrote in June 2022 that it would probably target six to ten proposals to advance.[18]

Proposals were submitted in the spring of 2023, said Mike Ciotti, VP of product at PDC Machines. "If you look at any of the Inflation Reduction Act... just the general scope of what we're trying to do with the overall economy to reduce the overall temperature of the planet, this is going to be a big deal for many years to come."

"There's a tremendous amount of concentration of knowledge in California right now because (almost) all of the (hydrogen) vehicles are there," Ciotti said. "This has to filter through the rest of the country. California has between 13,000 and 15,000 hydrogen fuel cell cars on the road. Outside of California, there are less than 200 (hydrogen) vehicles on the road."

Around one third of future hydrogen jobs will relate to fuel cells, according to an article from *Energy Monitor* that cited the Hydrogen Europe Roadmap.[19] A study by *Navigant* in 2019, mentioned in the same article, said that half of the jobs upstream would involve producing renewable energy.[20] Green hydrogen could create up to 1.5 million of these jobs in the EU by 2050.

The 2016 Toyota Mirai, introduced in 2014, was the first hydrogen fuel cell car sold commercially. The car itself emits only water. However, hydrogen has to be produced and distributed for these cars. As there are a few hydrogen fuel stations at the moment in the Netherlands, the possible use of this technology is still limited. Credit flickr user harry_nl

A 2020 road map report by the FCHEA predicted that by 2030, this sector could generate $140 billion per year in revenue in the United States, supporting 700,000 local jobs throughout its value chain. By 2050, growth could reach $750 billion per year in revenue, with 3.4 million cumulative jobs. This would result in hydrogen helping to meet 14% of U.S. final energy demand in 2050.[21]

McKinsey research predicted that total hydrogen demand globally could go up to 600-660 million tons by 2050. This would abate over 20% of global carbon emissions.[22]

"The introduction of hydrogen on a large scale would require a radical transformation of the global energy-supply system," the UNEP report said. This is still true, even though the report was published in 2006. "A vast infrastructure to produce, transport, store and deliver hydrogen, as well as to manufacture fuel cells, would need to be built. And consumers would need to invest in hydrogen fuel cell vehicles and related equipment.[23]

According to Alverá, hydrogen and ammonia can be used as ways of transporting electricity from renewable energy sources and other energy sources. Being able to transport renewable electricity around the globe removes the necessity of having the renewable sources close to the destinations where the power is used. This could stimulate economies in desert locations that are having financial difficulties currently, such as North Africa or parts of the Middle East. It is important that energy development in Africa support the local populations' well-being rather than being simply extractive.[24]

"As with any radically new technology, hydrogen could face the classic chicken-and-egg conundrum: the lack of a market in the first place deters investment, preventing the market from developing," the UNEP report said. "Put another way, why develop hydrogen cars when there is no distribution network, and why develop a distribution network if there are no hydrogen cars?"[25]

Achieving critical market mass is essential to the creation of a hydrogen economy, the UNEP report said. The market must be able to demonstrate to potential users and participants that hydrogen is safe, affordable, and reliable as an alternative to conventional fuels. Seeing hydrogen-fueled vehicles on the road would give consumers confidence. The network of fueling stations would have to be developed quickly, since they are essential for marketing and performance.[26]

"Developing economies have at least as much to gain from a move toward the hydrogen economy as industrialized ones,

"WE HAVE AN AMAZING SET OF TOOLS IN OUR NATIONAL LABS WITH ENGINEERS, TECHNOLOGY SPECIALISTS, AND SCIENTISTS LOOKING AT THE BEST WAYS TO EMPLOY HYDROGEN." — FRANK WOLAK, FCHEA

since they generally suffer more from urban pollution and their economies tend to be more energy-intensive," the UNEP report said. "Yet the transition will probably start later in most developing nations, as they are less able to afford to participate in R&D and the financial incentives needed to kick-start the process. The rich world must be ready to support developing economies in making this happen."[27]

There are many potential uses for hydrogen, according to the FCHEA 2020 report.[28]

In buildings, hydrogen can be used as a replacement for gas if companies blend it into the gas network. They can also put fuel cells in buildings to generate electricity and use the heat from their operations. To put this in perspective, 47% of U.S. homes have natural gas space heating; 3-8% use liquified petroleum gas heating.

Transportation uses of hydrogen are very versatile. Fuel cell electric vehicles can provide transportation with zero emissions and can store more energy onboard than battery electric vehicles. Fuel cells are especially useful for heavy loads, long trips, quick refueling, and frequent driving.

Industrial markets that are difficult to decarbonize, such as refining, steel-making, and chemical production, can use hydrogen. Companies engaged with refining, methanol and/or ammonia are already using substantial amounts of gray hydrogen and should transition to green hydrogen, the report said. Industrial operations are responsible for around 20% of carbon emissions in the United States.

Hydrogen can provide backup or off-grid power for locations such as hospitals, military bases, and data centers. Remote and/or critical facilities may benefit from this power source, which can help communities and organizations handle power outages that might otherwise lead to hardships or emergencies.

In the electric power grid, hydrogen production can be used to reduce the impact of the variations in energy supply from renewable sources. Utility data shows that grid loads fluctuate continually; renewable energy is available at some times more than others. To store this power, electrolyzers that generate hydrogen can be used flexibly to respond to changes in wind and solar energy, helping to even out the performance of the grid. The stored hydrogen can be used to power fuel cells or to fuel gas turbines at power stations.

Making sure that hydrogen is used safely is, of course, essential. The FCHEA report stated that hydrogen flames produce relatively little radiant heat compared to hydrocarbon fires. Hydrogen is less flammable than gasoline. However, there are safety risks due to its high pressure and very low temperature. Important safety measures will include robust leak-detection systems, good safety valves, and secure storage tanks. The industry is working to improve its codes and standards, which need to be stronger internationally. And emergency responders need to learn how to handle hydrogen-related safety hazards.[29]

"This is an engineering-driven industry," Wolak said. "Engineers will be at the core of defining the technologies and the best practices. Unlike finance or medical areas where engineering isn't as much of a core, hydrogen is at its heart made up of engineered systems, and engineers have a strong role to play in its success."

"There's not enough qualified people in this industry," Ciotti said. "They certainly need more engineers. There's just work everywhere. It's exponential. I wish we had more people coming out of school with more skills so I could hire them right away."

KAT FRIEDRICH is an engineering journalist who is the editor-in-chief of the magazine *Solar Today* and a regular contributor at *Popular Mechanics*. In 2012, she co-founded Clean Energy Finance Forum, an entrepreneurial news project that Yale Univ. acquired. She has written and/or edited material for the Northeast Sustainable Energy Association, Renewable Energy World, Energy News Network, Microgrid Knowledge, the Univ. of Wisconsin-Madison, and the American Council for an Energy-Efficient Economy. Previously, Kat was an engineer for American Superconductor and Forest Products Lab. She joined ΤΒΠ at the Wisconsin Alpha Chapter where she majored in mechanical engineering.

Works Cited

1. World Economic Forum. (2021, July 27). *Grey, blue, green – why are there so many colours of hydrogen?* World Economic Forum. https://www.weforum.org/agenda/2021/07/clean-energy-green-hydrogen/
2. Kindy, D. (2021, August 17). *"Blue" hydrogen may not be a very "green" energy source after all*. Smithsonian Magazine. https://www.smithsonianmag.com/smart-news/blue-hydrogen-20-worse-burning-coal-study-states-180978451/
3. Taft, M. (2022, January 21). *Shell CCS plant emits more greenhouse gases than it's captured*. Gizmodo. https://gizmodo.com/shell-ccs-carbon-capture-1848401554
4. Davis, J. A. (2022, Feb. 2). *Hydrogen rainbow may dazzle, but journalists should eye it warily*. Society of Environmental Journalists. https://www.sej.org/publications/backgrounders/hydrogen-rainbow-may-dazzle-journalists-should-eye-it-warily
5. Jones, J. S. (2021, December 20). *Turquoise hydrogen – an emerging variety in the colour spectrum*. Enlit. https://www.enlit.world/hydrogen/turquoise-hydrogen-an-emerging-variety-in-the-colour-spectrum/
6. Brown, F., & Roberts, D. (2021, May 27). *Green, blue, brown: The colours of hydrogen explained*. CSIROscope. https://blog.csiro.au/green-blue-brown-hydrogen-explained/
7. Brown, F., & Roberts, D. (2021, May 27). *Green, blue, brown: The colours of hydrogen explained*. CSIROscope. https://blog.csiro.au/green-blue-brown-hydrogen-explained/
8. Evans, S., & Gabbatiss, J. (2020, Nov. 30). *In-depth Q&A: Does the world need hydrogen to solve climate change?*. Carbon Brief. https://www.carbonbrief.org/in-depth-qa-does-the-world-need-hydrogen-to-solve-climate-change/
9. Davis, J. A. (2022, Feb. 2). *Hydrogen rainbow may dazzle, but journalists should eye it warily*. Society of Environmental Journalists. https://www.sej.org/publications/backgrounders/hydrogen-rainbow-may-dazzle-journalists-should-eye-it-warily
10. Alverá, M. (2022). *The hydrogen revolution: A blueprint for the future of clean energy*. Hodder Studio.
11. UN Environment Programme. (2006). *The hydrogen economy: A non-technical review*. https://www.unep.org/resources/report/hydrogen-economy-non-technical-review
12. Zorpette, G. (2022, August 17). 2022 - *The year the hydrogen economy launched?*. IEEE Spectrum. https://spectrum.ieee.org/hydrogen-economy-inflation-reduction-act
13. Douglas, M. (2022, October 5). *What will REpowerEU and the Inflation Reduction Act mean for hydrogen?* Wood Mackenzie. https://www.woodmac.com/news/opinion/what-will-repowereu-and-the-inflation-reduction-act-mean-for-hydrogen/
14. Higman, M., & Zacarias, M. (2022, July 14). *Hydrogen hubs proposals: Guideposts for the future of the U.S. hydrogen economy*. Center for Strategic & International Studies. https://https://www.csis.org/analysis/hydrogen-hubs-proposals-guideposts-future-us-hydrogen-economy
15. Moniz, E., Kizer, A., DiStefano, J., Breckel, A., Britton, N., Comello, S., Green, T., & Maranville, A. (2021, September). *The future of clean hydrogen in the United States: Views from industry, market innovators, and investors*. Energy Futures Initiative. https://energyfuturesinitiative.org/wp-content/uploads/sites/2/2022/03/The-Future-of-Clean-Hydrogen-in-the-U.S._Report-1.pdf
16. Majkut, J., Nakano, J., & Zacarias, M. (2022, July 29). *Making hydrogen hubs a success*. Center for Strategic & International Studies. https://www.csis.org/analysis/making-hydrogen-hubs-success
17. McFarlane, D. (2022, January 31). *GPI releases carbon and hydrogen hubs atlas for US decarbonization*. Great Plains Institute. https://betterenergy.org/blog/gpi-carbon-and-hydrogen-hubs-atlas/
18. U.S. Department of Energy. (2022, June 2). *DE-FOA-0002768: Notice of intent to issue funding opportunity announcement No. DE-FOA-0002779 - Bipartisan Infrastructure Law: Additional clean hydrogen programs (Section 40314): Regional clean hydrogen hubs*. Office of Clean Energy Demonstrations. https://oced-exchange.energy.gov/Default.aspx#FoaId4e674498-618c-4f1a-9013-1a1ce56e5bd3
19. Van Renssen, S. (2021, October 12). *Hydrogen tests climate policymakers with its job potential*. Energy Monitor. https://www.energymonitor.ai/tech/hydrogen/hydrogen-tests-climate-policymakers-with-its-job-potential/
20. Navigant Consulting. (2019). 2019 *Gas for Climate employment study*. Gas for Climate. https://gasforclimate2050.eu/publications/
21. Fuel Cell & Hydrogen Energy Association. (2020). *US hydrogen road map*. https://www.fchea.org/us-hydrogen-study
22. McKinsey & Company. (2022, November 23). *The clean hydrogen opportunity for hydrocarbon-rich countries*. https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-clean-hydrogen-opportunity-for-hydrocarbon-rich-countries
23. UN Environment Programme. (2006). *The hydrogen economy: A non-technical review*. https://www.unep.org/resources/report/hydrogen-economy-non-technical-review
24. Alverá, M. (2022). *The hydrogen revolution: A blueprint for the future of clean energy*. Hodder Studio.
25. UN Environment Programme. (2006). *The hydrogen economy: A non-technical review*. https://www.unep.org/resources/report/hydrogen-economy-non-technical-review
26. UN Environment Programme. (2006). *The hydrogen economy: A non-technical review*. https://www.unep.org/resources/report/hydrogen-economy-non-technical-review
27. UN Environment Programme. (2006). *The hydrogen economy: A non-technical review*. https://www.unep.org/resources/report/hydrogen-economy-non-technical-review
28. Fuel Cell & Hydrogen Energy Association. (2020). *US hydrogen road map*. https://www.fchea.org/us-hydrogen-study
29. Fuel Cell & Hydrogen Energy Association. (2020). *US hydrogen road map*. https://www.fchea.org/us-hydrogen-study

Association Awards

★ Laureates

Four Laureates have been selected in the 39th year of Tau Beta Pi's annual program **to recognize gifted engineering students who have excelled in areas beyond their technical majors. Award categories include arts, athletics, diverse achievements, and service. Recipients will receive a $2,500 cash award and a commemorative plaque.** This year's Laureates join 117 other outstanding Tau Bates to be cited since the program began in 1982.

MAXINE DUPUIS

NEW YORK NU '23

Maxine has been selected a **2023 ΤΒΠ Laureate** for athletic achievements. She is enrolled in the combined B.S./M.S. program at the State University of New York at Buffalo in biomedical engineering, earning her undergraduate degree this past May and her graduate degree will be completed in 2024.

Maxine is a multi-talented Div. 1 cross country & track-and-field student-athlete. She has also competed in the ISF World Scholastic Cross-Country Championships, representing Canada in Budapest (2016) and Paris (2018).

She also excels as an entrepreneur having owned and operated Go Green Yard Services, a lawn-care business that she started with the help of a grant from the Ontario government. All yard care was provided with battery-operated tools and Maxine towed her equipment using only her bicycle and a specialized trailer.

With the cancellation of NCAA championships due to COVID and after suffering a series of serious injuries, Maxine was able to shift her focus to volunteering and providing leadership to the NY Nu Chapter. She's served two terms as chapter president and led hands-on activities for kids at the Buffalo Museum of Science to boost interest in STEM fields during their Engineering Week.

As a student-athlete, she has also promoted initiatives related to the LGBTQIA+ community, International Students, and Mental Health within the Athletics Department and on her team. In addition, she volunteers with Girls on the Run Buffalo at their 5K races as a race leader, site clean-up coordinator, and as a role model to the girls.

In Maxine's nomination, she was described as "an outstanding athlete, compassionate community member, an advocate for ΤΒΠ, helping to foster a renewed interest in member involvement, and for exhibiting leadership and perseverance in all walks of life."

ALEXANDER J. FRANCISCO

NEW YORK NU '24

For his achievements in the arts, Alexander has been named a **2023 ΤΒΠ Laureate**. He is a rising senior majoring in electrical engineering at the State University of New York at Buffalo and plans to graduate in 2024.

He is an active professional trumpet player with such groups as the Amherst Symphony, Niagara Frontier Brass, the Greater Buffalo Youth Orchestra, the University at Buffalo Symphony, and the Williamsville East Chorale, and volunteers to play TAPS at veterans' funerals. Alex is a recognized music composer for wind ensemble, vocal, and orchestral groups, having mentored at symposiums.

In addition, he is a trained fine working artisan and has created a range of both utility and art-oriented work. Alex is also an active horticulturist, has four years of experience in tree felling and chainsaw maintenance, and two years experience with concrete and resurfacing.

Alex has given back to the community in a number of ways. After a successful high school volleyball career, he helped pioneer his district's first modified volleyball program. He also placed first in the 2020 UB Hackathon and was inspired by a devastating neighborhood fire to develop a prototype Internet of Things smoke detection system.

Inducted in December 2022, Alex has participated with the NY Nu Chapter's Career Fair organizing team, attended the 2023 District 2 Conference, and plans to attend the 2023 Convention in Atlanta. "Attending the conference inspired me to learn how to contribute more to my chapter," he said. Alex was recently elected to serve as chapter recording secretary and wants to help spread the word about ΤΒΠ on campus to bring in more brilliant minds.

The nominating chapter recognized Alex's leadership qualities, his well-rounded excellence, and talents in the field of engineering and beyond. They consider him a "true Renaissance man" deserving of recognition.

★ Laureates

GWYNETH M. SCHLOER

VIRGINIA BETA '22

Gwyneth's diverse achievements have led to being named a **2023 ΤΒΠ Laureate**. She has completed three bachelor's degrees and two master's degrees in just five years, all from Virginia Tech.

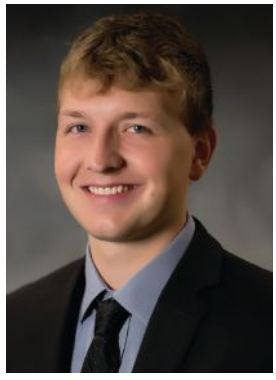
During her undergraduate career, she experienced tragedy when her mother passed away. Despite this, she completed two semesters of study-abroad helping to improve her Spanish and opening her mind to complex political, social, and cultural issues that exist outside the United States.

Gwyneth also completed four space-related full-time internships and continued part-time work during the academic year. She's conducted undergraduate research focused on the development of a novel acousto-optic non-destructive inspection system and published two papers.

In addition to academic success, Gwyneth was active in Science Olympiad at Virginia Tech, serving as president and tournament director for two years. She has demonstrated leadership through her involvement with InspireFly, a CubeSat design team, serving as payload engineering and imaging systems lead, and as project manager of the entire team of 54 members.

Immediately after joining ΤΒΠ, she encouraged her fellow members to attend monthly hiking trips. She took over as chapter president and managed the difficult transition from an online format to in-person activities. Her impact as a leader of the VA Beta Chapter also included a push for more service-oriented projects and to be more involved in the local community.

Gwyneth's well-rounded perspective and commitment to the pursuit of a multifaceted understanding of engineering research and its applications was cited as a motivating factor for her nomination. She is now a systems engineer II at Sierra Space.



MITCHELL SUEKER

SOUTH DAKOTA ALPHA '23

Mitchell has been named a **2023 ΤΒΠ Laureate** for athletic achievements. He earned a B.S. in electrical engineering from South Dakota School of Mines & Technology (SDSM&T) and an M.S. degree in biomedical engineering from University of North Dakota (UND), where he will complete his Ph.D. in 2024.

He was a three-year member of the Div. II men's basketball program at SDSM&T and then was a graduate transfer where he played one year of Div. I men's basketball at UND. During his time as a student-athlete, he was named to the Summit League Commissioner's List of Academic Excellence and, in 2022, was named one of five finalists for the Male Scholar Athlete of the Year, both at UND. While at SDSM&T, Mitchell was recognized as Rocky Mountain Athletic Conference Freshman of the Year, a two-time RMAC All-Conference honoree, and two-time RMAC All-Academic First Team selection. In his tenure as a collegiate basketball player, he was a 1000+ point scorer and a 500+ rebounder.

Off the court, Mitchell served on the SDSM&T Student Athletic Advisory Committee and was active with the Fellowship of Christian Athletes. Volunteering is extremely important to Mitchell and he previously spent a week in Kenosha, WI, to work and care for children at a women's and children's shelter. In addition, he traveled to Haiti, where he would climb the mountainside to bring goats and carry fruit-bearing trees back to local residents for planting. Mitchell also brought water filters and taught the Haitians how to use them.

In a recommendation letter, Mitchell was described as "a credit to the engineering profession and an impactful contributor to any endeavor he pursues" and was commended for balancing academics, service, and varsity athletic participation for the past six years. It is based on this passion for excellence in all facets that makes him deserving of this recognition.

Association Awards

★ McDonald Mentor

Established in 2005, the Tau Beta Pi-McDonald Mentor Award celebrates **excellence in mentoring and advising among educators and engineers who have consistently supported the personal and professional development of their students and colleagues.** It recognizes those who have shown true concern for individuals, supported an environment for developing talents, and earned respect and recognition in their field and the greater community.

RICHARD J. SPONTAK Ph.D.

PENNSYLVANIA BETA '83
NOMINATED BY RESEARCH TRIANGLE (NC) ALUMNI CHPT.

Richard Spontak **has been named the 2023 ΤΒΠ-McDonald Mentor.** He is a Distinguished Professor at North Carolina State University (NC State).

Dr. Spontak will receive $1,000, a bronze engraved medallion, and a replica lapel pin. A $1,000 grant will be presented to the Research Triangle Alumni Chapter, for nominating him.

Established by Marion and Capers W. McDonald, NC G '74*, and the Association, the McDonald Mentor Award recognizes engineering educators or professionals in industry, government, or service organizations.*

He earned a B.S. degree in chemical engineering from Pennsylvania State University (Penn State) and a Ph.D. in chemE from the University of California, Berkeley. Dr. Spontak also completed two post-grad research fellowships at the University of Cambridge and the Institute for Energy Technology.

The nomination recognized Dr. Spontak for "embodying the true meaning of the word 'mentor' through his efforts as an advocate for others, especially students, and taking a genuine interest in individuals" as unique people.

He was also cited for being the rare person "that possesses technical prowess and a soul for teaching."

This is evidenced by his research in the field of condensed matter, leading to 300+ publications in peer-reviewed journals and 30+ journal covers. Dr. Spontak was also recognized by NC State with the Alexander Q. Holladay Medal for Excellence in 2022, "considered to be the highest faculty award," and is a member of the Academy of Outstanding Teachers.

His career began as a soft materials engineer at Procter & Gamble. He accepted a faculty position at NC State in 1992 because of his love of teaching and mentoring students. Today, he is a Distinguished Professor of chemical & biomolecular engineering, a Distinguished Graduate Professor, and has established the Macromolecular Materials & Morphology Group.

In addition to mentoring K-12 students (via Science Olympiad and MathCounts), undergraduate students (via senior design and undergraduate research), and graduate students (via scientific inquiry and the NC State "Preparing the Professoriate" program), he has mentored one other important group of individuals: junior faculty. Dr. Spontak is known to provide both professional advice and personal/emotional support to those in need.

Dr. Spontak joined Tau Beta Pi as an undergraduate chemical engineering student at Penn State, has been a NC Alpha Chapter Advisor since 2003, previously served as director of the Research Triangle Alumni Chapter, and was a ΤΒΠ 2021 Distinguished Alumnus.

A colleague stated that as a mentor, "Rich is nothing short of exemplary. He is highly regarded by students in his classes, and has earned the cross-college reputation of being one of the most demanding, but genuinely caring, instructors on campus. As **Richard M. Felder, Ph.D.,** *NY H '62*, the so-called 'conscience of chemical engineering' once put it, student respect for Rich borders on adulation."

For his encouragement and kindness towards students, creativity and versatility in award-winning research, and the recognition of his contributions in mentoring and teaching, **we honor Dr. Richard Spontak as the 2023 ΤΒΠ–McDonald Mentor.**

★ Outstanding Advisor

The Tau Beta Pi Outstanding Advisor has been named since 1994 and **recognizes outstanding performance among the Chapter Advisors of the Association.** Selection is made by a committee of deans at engineering colleges and past award winners.

ANDREW E. TOY

MICHIGAN IOTA '95
NOMINATED BY MICHIGAN IOTA

Andrew "Andy" Toy, Chief Advisor to the MI Iota Chapter, is **the 2023 ΤΒΠ Outstanding Advisor.**

He will receive $1,000, a commemorative plaque, and a $1,000 grant will be presented to the University of Michigan-Dearborn's College of Engineering and Computer Science discretionary fund.

The Outstanding Advisor Award recognizes chapter advisors, lauds excellence in engineering education, and in the ethical practice of engineering.

Mr. Toy began serving as Chief Advisor in 2000 to the MI Iota Chapter. In the two plus decades since, he has been an invaluable resource to the MI Iota officers and members by providing extensive day-to-day assistance and guidance.

He earned B.S. and M.S. degrees in electrical engineering from the Univ. of Michigan-Dearborn. His professional experience includes working as a design engineer for TRW Automotive (1991-2005), senior project/software engineer and technical expert for the Ford Motor Company (2005-20), and is currently a senior solutions architect at Kinetica and owner/president of CAIANDA, LLC, a small consulting company.

Mr. Toy was lauded for his knowledge on the ΤΒΠ collegiate chapter rules, policies, and procedures. In addition, he is willing to share his experiences with students and makes himself available as a mentor.

Most importantly, he is unwavering in his commitment to the professional growth of the student members of the chapter and leads by example in setting high standards and expectations for himself and the students. He makes a great effort to attend organized chapter events scheduled for evenings and weekends, and ensures that all chapter members feel valued and empowered. Furthermore, he is a seasoned photographer who uses his skills to capture special moments at initiations and events.

In 2007, he was instrumental in the success of hosting and bringing the 102nd ΤΒΠ Convention to Dearborn, Michigan. Mr. Toy is a constant presence at Convention and enjoys sharing his passion for these events by encouraging multiple students to attend. Currently, he is leading a project to update the chapter's system used for initiation kit candles.

Mr. Toy has a long-standing history of service and leadership with the Science Olympiad dating back to 1990 and has served as event supervisor, regional director, and is now state director of Wayne-Monroe Science Olympiad. As such, he is able to leverage his connections to provide frequent volunteer and service opportunities to MI Iota members and candidates.

In a letter of recommendation for this award, **Ghassan Kridli, Ph.D.,** *MI I '86*, college of engineering & computer science dean, stated that "since the start of my appointment as dean, I can unequivocally say that Andy has been the most dedicated and engaged advisor of any organization within the college."

In the nomination, Mr. Toy was described as a "role model of service and excellence and (one who) deeply cares about the role excellence plays in the personal growth of professional engineers."

His passion and commitment as an advisor, even during challenging times such as COVID, helps foster a spirit of liberal culture for all members of the Association.

For his service as a cornerstone of the MI Iota Chapter, enthusiasm for the success of the organization, and sustained leadership, **Mr. Andrew Toy is the 2023 Tau Beta Pi Outstanding Advisor**.

Association Awards

★ Distinguished Alumni

Distinguished Alumni are **recognized for their demonstration of outstanding adherence to the ideals of Tau Beta Pi (integrity, breadth of interest, adaptability, and unselfish activity) and for fostering a spirit of liberal culture in society.** The 2023 awardee profiles follow and the press release is available at: *www.tbp.org/pressReleases.cfm*

EDWARD D. BASTA

OHIO EPSILON '82

In recognition of *his commitment and selfless service to the Association and lifelong efforts to improving the profession,* Edward Basta **has been named a 2023 ΤΒΠ Distinguished Alumnus.**

Mr. Basta earned his B.S. degree from Cleveland State University (CSU) in metallurgical engineering as a non-traditional student, taking night classes while working full-time and starting his young family.

His professional career began as a baseline technician with Republic Steel, and continued as head of quality at the Walker Forge company, chief metallurgist and head of QA with Concorde Castings, and lastly as a consultant for Atlas Steel. In 2001, he founded his own quality assurance consulting company, QTS Consulting, before retiring in 2019.

The nomination from the Ohio North Coast (Cleveland) Alumni Chapter, cited him for "being an outstanding example that all ΤΒΠ members can aspire to emulate." Mr. Basta has given back to the profession and supported professional societies through his skills, time and presence, and financial gifts. A great example was being recognized by CSU on their website for his bequest designated "to help support non-traditional students who need funding to achieve their goals," thus, demonstrating his dedication to providing opportunities similar to those he was afforded to help start his career.

Since joining ΤΒΠ at CSU, he's served as a chapter president and as chapter advisor for 11 years. However, Mr. Basta claims that the "crown in his career" is having been instrumental in returning the 1995 Convention to Cleveland, OH. As a District 7 Director in the '80s, he played a vital role in reestablishing the OH North Coast AC. Mr. Basta and his company QTS received the 2011 American Society for Metals (ASM) International Outstanding Company Support Award for "sustained, unselfish contributions to the Cleveland ASM Chapter." He lives his life by the creed of "integrity and excellence," and believes in "always doing the right thing, as well as doing things right."

BRENDAN J. CHAN Ph.D.

MICHIGAN BETA '03

In recognition of *his dedication to mentoring in professional and technical development and innovation in commercial vehicle safety,* Brendan Chan, **has been named a 2023 ΤΒΠ Distinguished Alumnus**.

Dr. Chan obtained a B.S in electrical engineering from the Michigan Technological University, as one of the first students to graduate with an engineering enterprise concentration. In 2008, he earned a Ph.D. in mechanical engineering from Virginia Tech.

He is the senior chief engineer of autonomy and active safety for Oshkosh Corporation, where he leads all business and technical development related to the core technology. Prior to this, he was the ADAS/autonomy lead at Navistar Corp., where he oversaw the development of new and forward looking technologies in active safety and autonomy for trucks and school buses under the International brand.

A lifelong believer in the value of mentoring and nurturing the next generation of scientists/engineers, he volunteered for the First Lego League while at Virginia Tech and has served on many dissertation and thesis committees.

Dr. Chan was recognized in his nomination for "his efforts in mentoring the next generation of engineers, research contributions, and a commitment to STEM engagement."

A proponent of Diversity, Equity & Inclusion, Dr. Chan encourages the hiring of deserving diversity candidates at Oshkosh. He also provides coaching and mentorship to team members and helps to create inclusive developmental goals to maximize the potential of the individual and team. Dr. Chan is a regular volunteer for ASME, SAE, and SWE, and has participated as an alumni panelist for the MI Beta Chapter.

His efforts in support of the SAE Commercial Vehicle Congress and Technical Standards Board resulted in receiving the 2012 SAE Forest R. McFarland Award for outstanding contributions toward the work of the SAE EMB and for enhancing the interchange of technical information.

Dr. Chan continues to proactively foster a spirit of liberal culture and holds a deep conviction that the engineering profession is about creating value at all levels for everyone.

H. Alan Mantooth is the first recipient of the **Asad M. Madni Distinguished Alumnus Award**. Dr. Madni, *CA E '69*, made a gift in 2023 to permanently endow this award to annually recognize one Tau Bate with this distinction. He believes that a successful professional career includes philanthropy and considers it a privilege to give back and recognize those who echo the same value system.

H. ALAN MANTOOTH Ph.D., P.E.

ARKANSAS ALPHA '85

In recognition of *his illustrious research and teaching career and genuine desire to invest in and develop students,* H. Alan Mantooth, **has been named the 2023 Asad M. Madni Distinguished Alumnus.**

Dr. Mantooth has B.S. and M.S. degrees in electrical engineering from the University of Arkansas (U of A) and focused on analog integrated circuits for his Ph.D. from the Georgia Institute of Technology.

He is a Distinguished Professor and research chair in eng'g at the University of Arkansas. Known on campus for being an "excellent and engaging teacher," Dr. Mantooth has advised or mentored 277 students to date, and has been recognized for his efforts with several U of A awards, including the Outstanding Mentor Award in 2006, 2007 & 2008, for his work with students and earned the college of engineering's Outstanding Public Service Award in 2018.

As Chief Advisor to the AR Alpha Chapter since 2002, he was able to realize his vision of establishing a board of advisors consisting of representatives from each department of the college of engineering (COE). This, in turn, has attracted students from a broader range of majors and strengthened the chapter overall. During his time as an advisor, the chapter has also won several awards, including the ΤΒΠ Chapter Excellence Award, *with distinction*, in 2017.

Nominator **Heather L. Walker, Ph.D.,** *AR A '89*, highlighted two things that stand out when working with Dr. Mantooth: From the start, he develops members and new initiates as leaders, from having chapter officers over for dinner to explaining the importance of officer transitions. Second, he prioritizes ΤΒΠ, even as one of the busiest people in the COE. It is clear that involvement with the Association is something he's very proud of.

Dr. Mantooth has a distinguished record of volunteering as IEEE past-president, U of A electric boat advisor, and giving tours of his high-power lab to 10,000 K-12 students. These are just a few examples of his characteristics of unselfishness, professionalism, and exemplary character making Dr. Mantooth the ideal recipient of this award.

JOIN US FOR THE 2023 CONVENTION IN ATLANTA, GEORGIA

- **October 12-14 at the Courtland Grand Hotel (formerly the Atlanta Sheraton Hotel)**
- **Hosted by the Georgia Alpha Chapter at Georgia Tech and the Atlanta Alumni Chapter**

More information is available at: www.tbp.org/convention.cfm or, contact tbp.convention@tbp.org, with any questions.

TBP SCHOLARS

Scholarships have been awarded to 265 undergraduate members for the 2023-24 year.

The Fellowship Board announced the selection of 265 engineering students from 452 applicants. Most recipients will receive a cash award of $2,000 for one year and a few will receive $1,000 for one semester. This year, a total of $519,000 was awarded. All ΤΒΠ Scholarships are awarded on the competitive criteria of high scholarship, campus leadership and service, and promise of future contributions to the engineering profession. These awards bring the total to 4,148 scholarships granted since 1998.

Anthony D. Acierto NY Β '24
Record No. 1843 | Bioengineering

Pelumi T. Adebayo DC Α '24
Stabile No. 1131 | Mechanical eng'g

Ibukun Adetola NY Ν '24
Pasadyn No. 1 | Biomedical eng'g

Unnati A. Agarwal NY Ν '24
Record No. 1844 | Biomedical eng'g

Carolina Aguilera Barraza MA Ε '24
Record No. 1845 | Chemical eng'g

Samuel O. Akinlolu NJ Ζ '23
Record No. 1846 | Engineering Science

Yazan E. AlBakheet CA Θ '23
Record No. 1847 | Chemical eng'g

Adam P. Allinson UT Β '24
Stabile No. 1132 | Mechanical eng'g

Grace A. Almgren MO Ε '24
Record No. 1848 | Biomedical eng'g

Drew W. Altieri ID Δ '24
Stabile No. 1133 | Civil eng'g

Zane Amray NY Η '24
Stabile No. 1134 | Civil eng'g

Luke T. Andersen UT Γ '24
Alford No. 24 | Electrical eng'g

Benjamin T. Arnesen UT Β '24
Alford No. 25 | Electrical eng'g

Fouad Awwad PA Β '24
Stabile No. 1135 | Mechanical eng'g

Andrew Bae NY Ο '24
Record No. 1849 | Computer Science

Charles D. Bailey IV TN Α '24
Brems No. 24 | Aerospace eng'g

Noah C. Bailey UT Β '23
Althouse No. 15 | Electrical eng'g

Audrey A. Ball MI Ε '24
Stabile No. 1136 | Mechanical eng'g

Kaitlyn M. Bartlett NY Κ '25
Stabile No. 1137 | Mechanical eng'g

Megan E. Batchelor GA Β '25
Stabile No. 1138 | Mechanical eng'g

Sun Li Batten MN Α '24
Dodson No. 92 | Chemical eng'g

Delaney J. Baumberger SD Β '24
Stabile No. 1139 | Mechanical eng'g

Zachary J. Bayler CO Γ '24
Skaggs No. 17 | Electrical eng'g

Logan A. Beatty FL Β '24
Record No. 1850 | Biomedical eng'g

The following scholarships are named for members:

Henry M. Alford, *MS Α '27*, left a bequest sufficient to permanently endow the **Alford Scholarships**.

The **Althouse Scholarship** honors Ernest E. Althouse, *PA Α '26*, who left a bequest in 2006.

The **Basta Scholarship** is in recognition of Edward D. Basta, *OH Ε '82*, a 2023 recipient of the ΤΒΠ Distinguished Alumnus Award.

Thomas R. Berthold, *IL Α '70*, made gifts to the Association to fund the **Berthold Scholarship**.

The **Bloomberg Scholarship** is named for Michael R. Bloomberg, *MD Α '64*, whose gifts have funded one award for 16 years.

Marian K. and John H. Brems Jr., *MI Γ '46*, left a bequest in 2016 to fund the **Brems Scholarships**.

Ruth M. and Cleveland L. Campbell, P.E., *IA Α '47*, made gifts to permanently endow the **Campbell Scholarships**.

The **Chan Scholarship** is in recognition of Brendan J. Chan, Ph.D., *MI Β '03*, a 2023 recipient of the ΤΒΠ Distinguished Alumnus Award.

A 2007 bequest from the estate of Richard A. Curtis, Ph.D., *OH Α '64*, permanently endows the **Curtis Scholarships**.

The **Dechman Scholarship** was established by David, *VA Β '82*; Ken, and Jim Dechman, *TX Α '89*; to honor their father, Don A. Dechman, *TX Α '57*, on his 80th birthday.

The **Dodson Scholarships** are sponsored by the late Charles R. Dodson, *MD Β '30*, who made gifts to the Association in 1998 and 1999.

Charles O. Forge, *CA Γ '56*, left a bequest in 2010 to support the **Forge Scholarships**.

The **Mantooth Scholarship** is in recognition of H. Alan Mantooth, Ph.D., P.E., *AR Α '85*, a 2023 recipient of the Asad M. Madni Distinguished Alumnus Award.

All Scholars submitted a short bio that has been posted on our ΤΒΠ website at:
www.tbp.org/memb/ScholarArchives/ScholarBios/ScholarBios23-24.pdf

Hannah E. Beaven IN Ζ '23
Record No. 1851 | Biomedical eng'g

Timothy A. Behrer CO Β '24
Stabile No. 1140 | Aerospace eng'g

Matthew B. Belanger SC Β '24
Skaggs No. 18 | Electrical eng'g

Samuel A. Berman NY Α '24
Record No. 1852 | Computer Science

Vlad M. Bershchanskiy NY Ι '24
Stabile No. 1141 | Mechanical eng'g

Kimberly L. Betty MI Ζ '24
Stabile No. 1142 | Mechanical eng'g

Tycho J. Bogdanowitsch NY Α '24
Stabile No. 1143 | Mechanical eng'g

Morgan A. Boothe VT Α '24
Stabile No. 1144 | Civil eng'g

John A. Bowzard. GA Α '24
Stabile No. 1145 | Computer eng'g

Garrett M. Bradshaw MS Α '23
Record No. 1853 | Electrical eng'g

Samantha M. Bratcher OK Γ '24
Stabile No. 1146 | Aerospace eng'g

Danielle O. Brennan DC Α '24
Dodson No. 93 | Chemical eng'g

Katelyn Brennan CO Δ '26
Record No. 1854 | Chemical & biol.eng'g

Clayson M. Briggs CA Ω '24
Record No. 1855 | Engineering

Michael L. Brough OH Α '24
Dodson No. 94 | Chemical eng'g

Annabelle G. Broussard TX Ζ '24
Dodson No. 95 | Chemical eng'g

Meghan A. Brown WI Α '24
Nagel No. 70 | Mechanical eng'g

Emily M. Buckner TN Α '24
Stabile No. 1147 | Mechanical eng'g

Samantha R. Burkart OK Γ '24
Record No. 1856 | Biosystems eng'g

Deidre M. Burke MA Θ '25
Skaggs No. 19 | Electrical eng'g

AJ Burns UT Γ '24
Stabile No. 1148 | Mechanical eng'g

Devin R. Capece IN Α '24
Dodson No. 96 | Chemical eng'g

Carrie M. Carpenter ND Β '24
Stabile No. 1149 | Mechanical eng'g

Santiago A. Cartagena Lebron PR Α '25
Soden No. 24 | Chemical eng'g

Maria J. Carter NE Α '24
Record No. 1857 | Biological sys. eng'g

Angelo A. Casale NY Ξ '24
Stabile No. 1150 | Civil eng'g

Hayden M. Cashat LA Γ '24
Soden No. 25 | Chemical eng'g

Kevin P. Castner Jr. NJ Α '24
Campbell No. 55 | Mechanical eng'g

Alex H. Chau CA Ξ '23
Stabile No. 1151 | Civil eng'g

Jeremy M. Chauvin TX Α '24
Dechman No. 9 | Chemical eng'g

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

The first **Pasadyn Scholarship** has been awarded through a gift from Ronald C. Pasadyn, P.E., *OH Ε '70*, to establish the Judith L. and Ronald C. Pasadyn Scholarship Fund.

The **Record Scholarships** commemorate Leroy E. Record, *KS Α '29*, whose generous bequest will provide earnings to support awards in perpetuity.

The **Schwaller Scholarship** commemorates Shawn R. Schwaller, *SD Α '95*, whose friends and family established a fund in 2007.

A bequest from A. Clayton Scribner, *NY Γ '29*, permanently endows the **Scribner Scholarships**.

The **Sickafoose Scholarship** is named for Kathleen A. and Robert D. Sickafoose, *IL Β '50*, who left a bequest in 2012 and 2013.

Glenn A. Skaggs, *MD Β '57*, left a bequest in 2017 to permanently endow the **Skaggs Scholarships**.

The three **Soden Scholarships** are named for Archie D. Soden, *CA Δ '51*, who made gifts to ΤΒΠ to fund scholarships in perpetuity.

The **Spirit of Apollo Scholarship** is supported by an anonymous donor to honor the legacy of the U.S. NASA Apollo program.

The **Stabile Scholarships** are named for Vincent A. Stabile, *NY Λ '40*, whose gifts to the Association have permanently endowed scholarships.

A corporation sponsors the remaining scholarship.

The Alabama Power Foundation, Inc., made a gift in 1995 to endow an **Alabama Power Scholarship,** awarded for the 20th time.

TBP SCHOLARS

Continued

Timothy A. Chiu MD Γ '24
Stabile No. 1152 | Ocean eng'g

Elizabeth R. Clarkson PA Z '24
Scribner No. 72 | Environmental eng'g

James R. Clinton CA Ω '24
Forge No. 135 | Engineering

Matthew S. Cochran TX B '24
Stabile No. 1153 | Civil eng'g

Steven N. Coscino MI A '24
Stabile No. 1154 | Mechanical eng'g

Isabella G. Cozzone FL B '25
Record No. 1858 | Biomedical eng'g

Eoin J. Crane WY A '24
Soden No. 26 | Chemical eng'g

Aeryn D. Cronin GA B '24
Record No. 1859 | Biomedical eng'g

Riley A. Davis TN Γ '24
Record No. 1860 | Chemical eng'g

Shannon E. DePratter SC B '24
Record No. 1861 | Biomedical eng'g

Zihao D. Ding PA E '24
Stabile No. 1155 | Mechanical eng'g

Nicholas R. Divilbiss KS Γ '24
Stabile No. 1156 | Architectural eng'g

Michaela S. DiVito CA AE '24
Forge No. 136 | Industrial & sys. eng'g

Mackenzie E. Donald IA A '24
Record No. 1862 | Chemical eng'g

Eric G. Dubberstein WI A '24
Stabile No. 1157 | Computer eng'g

Kathy Duong CA T '24
Forge No. 137 | Biomedical eng'g

Emmie G. Dyer UT Γ '24
Record No. 1863 | Biological eng'g

Simeon L. Ehm IN Δ '24
Scribner No. 73 | Environmental eng'g

Sophie H. Ehudin NY Δ '24
Record No. 1864 | Computer Science

Cameron A. Eldridge MD Γ '24
Record No. 1865 | Electrical eng'g

India S.J. Elkhazin TX K '25
Mantooth No. 1 | Electrical eng'g

Sydney L. Eng CA Θ '24
Forge No. 138 | Electrical eng'g

Maria A. Erquiaga DC B '24
Stabile No. 1158 | Mechanical eng'g

Joseph D. Evans MT B '24
Stabile No. 1159 | Mechanical eng'g

Tobey R. Field PA B '24
Stabile No. 1160 | Civil eng'g

Dilara I. Flor CA E '24
Forge No. 139 | Chemical eng'g

Samuel P. Fowler PA E '24
Record No. 1866 | Elect. & Comp. eng'g

Alexander J. Francisco NY N '24
Record No. 1867 | Electrical eng'g

Marcus H. Francisco NY N '24
Record No. 1868 | Electrical eng'g

Luke M. Freyhof NE A '24
Record No. 1869 | Biological sys. eng'g

Emily N. Friedman LA A '24
Stabile No. 1161 | Mechanical eng'g

Xander E. Fries CA Ω '24
Forge No. 140 | Engineering

Emma M. Frost UT B '24
Record No. 1870 | Electrical eng'g

Shane P. Gallagher NJ B '24
Basta No. 1 | Materials Science eng'g

Roshan Gautam IN Δ '24
Stabile No. 1162 | Mechanical eng'g

Layla Ghalayini GA A '24
Record No. 1871 | Chem. & biomol eng'g

Taylor N. Girard CA Θ '24
Forge No. 141 | Computer Science

Megha Gopal NY O '24
Record No. 1872 | Biomedical eng'g

Jared E. Gould CT A '24
Record No. 1873 | Biomedical eng'g

William L. Gunn MA A '24
Stabile No. 1163 | Mechanical eng'g

Jacquelyn M. Gwynn MD Γ '24
Brems No. 25 | Aerospace eng'g

Elijah S. Hammarlund NY Σ '25
Record No. 1874 | Biomaterial eng'g

Katharine G. Hart PA Γ '24
Scribner No. 74 | Environmental eng'g

Aasim Z. Hawa NY K '24
Record No. 1875 | Biomedical eng'g

Megan E. Hayes AL A '24
Stabile No. 1164 | Aerospace eng'g

Rongyi "Caroline" He NY Δ '24
Stabile No. 1165 | Oper. Res. & eng'g

Loryn "Grace" Hendrix OK Γ '25
Stabile No. 1166 | Ind. eng'g & Mgmt.

Grace E. Herchenroder PA E '24
Stabile No. 1167 | Mechanical eng'g

Elias C. Hinson OH A '24
Record No. 1876 | Electrical eng'g

Jennifer R. Hong CA Ξ '24
Forge No. 142 | Aerospace eng'g

Luke C. Horne TN Γ '24
Record No. 1877 | Chemical eng'g

Levi J. Houghton UT B '24
Record No. 1878 | Electrical eng'g

Nicole C. Huning TX Ξ '24
Record No. 1879 | Biomedical eng'g

Anna Huszar FL H '25
Record No. 1880 | Chemical eng'g

Sarah T. Hutchinson NH B '24
Curtis No. 16 | Elect. & Energy eng'g

Mason Jacob RI B '25
Record No. 1881 | Electrical eng'g

Khadija Jalloul AL Δ '23
Brems No. 26 | Aerospace eng'g

Alyna-Marie "Dani" Janus MS A '24
Record No. 1882 | Biomedical eng'g

David "Sam" Jesse Jr. AL E '24
Stabile No. 1168 | Mechanical eng'g

Alden S. Johnson MA A '24
Stabile No. 1169 | Mechanical eng'g

Alice "Caroline" Johnson WV Α '23
Stabile No. 1171 | Industrial eng'g

Diana D. Johnson OH Μ '25
Stabile No. 1170 | Indust. & sys. eng'g

Tanner A. Jones MS Α '24
Record No. 1883 | Biomedical eng'g

Om A. Joshi TX Α '24
Record No. 1884 | Electrical eng'g

Caleb M. Julian-Kwong NY Δ '24
Sribner No. 75 | Environmental eng'g

Lauren V. Kadlec IN Δ '24
Record No. 1885 | Biomechanical eng'g

Lina N. Kafadarian CA Ε '24
Forge No. 143 | Bioengineering

Kathleen E. Kane NY Ν '24
Record No. 1886 | Electrical eng'g

Jack E. Karapetian CA Θ '24
Forge No. 144 | Aerospace eng'g

Gracey L. Kelley KY Α '24
Record No. 1887 | Chemical eng'g

Cameron A. Kenefick NY Σ '24
Stabile No. 1172 | Mechanical eng'g

Ethan Q. Kessel IN Α '25
Spirit of Apollo No. 10 | Aero/Astro eng

Caroline G. Kinney AL Α '24
Stabile No. 1173 | Mechanical eng'g

Nolan C. Knight IN Ζ '24
Record No. 1888 | Biomedical eng'g

Caden E. Knutsvig ND Β '25
Stabile No. 1174 | Mechanical eng'g

Ryan Kong PA Α '24
Stabile No. 1175 | Mechanical eng'g

Nicole Krockenberger CA Ε '25
Forge No. 145 | Mechanical eng'g

Jarin K. Kurashige MI Η '24
Stabile No. 1176 | Computer eng'g

Emily E. Labour NY Β '24
Record No. 1889 | Bioengineering

Catherine E. Lacey LA Γ '24
Record No. 1890 | Biomedical eng'g

Lilian R. Lamb SC Β '23
Stabile No. 1177 | Computer eng'g

Abigail N. Lanter KY Α '24
Stabile No. 1178 | Mechanical eng'g

Juanita Latorre Jaramillo MO Ε '23
Stabile No. 1179 | Aerospace eng'g

Olivia Y. Lee CA Γ '24
Forge No. 146 | Computer Scieence

Sein Lee CT Α '24
Record No. 1891 | Biomedical eng'g

Sophia M. Leeman NC Γ '24
Record No. 1892 | Biomedical eng'g

Jay D. Lesny Drake CA Ε '24
Forge No. 147 | Bioengineering

Shicheng Li MO Γ '24
Stabile No. 1180 | Mechanical eng'g

Anna Lin NY Δ '24
Stabile No. 1182 | Material sci. & eng'g

Jaimie S. Lin MO Γ '24
Stabile No. 1181 | Mechanical eng'g

Rebekah E. Lindblade LA Γ '24
Record No. 1893 | Biomedical eng'g

Alan Z. Liu OK Γ '24
Record No. 1894 | Biosystems eng'g

Oliver W. Long GA Α '24
Record No. 1895 | Chem & biomol. eng'g

Sebastian R. Löschner AL Ε '24
Scribner No. 76 | Civil eng'g

Ryan M. Luetjen MD Γ '24
Stabile No. 1183 | Computer eng'g

Sarah G. Lutkins NY Σ '24
Stabile No. 1184 | Ceramic eng'g

Spencer R. Lutz SD Β '24
Stabile No. 1185 | Mechanical eng'g

William G. MacDonald CO Β '24
Curtis No. 17 | Engineering Physics

Michael S. Macri FL Α '24
Stabile No. 1186 | Mechanical eng'g

Cecilia L. Mainzer OH Κ '24
Record No. 1896 | Chemical eng'g

Elijah M. Mansur OH Γ '24
Record No. 1897 | Computer sci. & eng'g

Kevin Masel MI Γ '24
Stabile No. 1187 | Materials sci. & eng'g

Logan C. Maurer KS Γ '24
Stabile No. 1188 | Industrial eng'g

Railey S. Mayatt MS Α '24
Record No. 1898 | Biomedical eng'g

Callie M. McCaffery CO Α '24
Schwaller No. 13 | Mechanical eng'g

Hannah S. McCollum AZ Α '24
Record No. 1899 | Chemical eng'g

Anya C. McDaniel AL Α '24
Record No. 1900 | Chemical eng'g

Benjamin N. Meiner NY Ι '24
Stabile No. 1189 | Mechanical eng'g

Kris H. Melag PA Ζ '24
Stabile No. 1190 | Civil eng'g

Gabriel A. Mendez-Sanders PA Γ '24
Record No. 1901 | Chemical eng'g

Daniel A. Messerli SD Β '24
Stabile No. 1191 | Mechanical eng'g

Alexander H. Meyers KY Α '24
Stabile No. 1192 | Civil eng'g

Emilee M. Middleton AL Α '24
Record No. 1902 | Chemical eng'g

Arya Mididaddi CA Ω '24
Forge No. 148 | Engineering

Abby L. Mock AL Ε '24
Record No. 1903 | Chemical eng'g

Braden T. Moore IL Α '24
Stabile No. 1193 | Nuclear/plasma eng'g

Connor F. Moran UT Β '24
Record No. 1904 | Chemical eng'g

Luke D. Mugler KS Γ '24
Stabile No. 1194 | Architectural eng'g

Craig W. Mullarkey OK Γ '24
Stabile No. 1195 | Mechanical eng'g

Lincoln D. Murr TN Β '24
Record No. 1905 | Computer Science

TBP SCHOLARS

Continued

Colin D. Myers OK Γ '24
Stabile No. 1196 | Mechanical eng'g

Vansh Nagpal SC Β '24
Record No. 1906 | Computer Science

Julia Nelson AL Ε '24
Stabile No. 1197 | Mechanical eng'g

Tri H. Nguyen OH Β '24
Stabile No. 1198 | Aerospace eng'g

Nathan C. Noland TX Α '25
Stabile No. 1199 | Mechnical eng'g

David A. Ochner KS Γ '24
Record No. 1907 | Electrical eng'g

Robert P. Oleynick MA Α '24
Record No. 1908 | Elect. & comp. eng'g

Hallie M. Olsen MI Β '25
Chan No. 1 | Mechanical eng'g

Ekin Gunes Ozaktas MD Α '24
Bloomberg No. 17 | Electrical eng'g

Paige E. Palazzo AL Ε '24
Stabile No. 1200 | Mechanical eng'g

Byron H. Panrudkevich NJ Α '24
Stabile No. 1201 | Mechanical eng'g

Elliot A. Papendorf MT Α '24
Record No. 1909 | Chemical eng'g

Stella H. Park NY Α '24
Record No. 1910 | Biomedical eng'g

Woodson H. Parker UT Β '24
Record No. 1911 | Electrical eng'g

Milan Patel NJ Γ '24
Record No. 1912 | Biomedical eng'g

Joshua T. Patterson MO Β '23
Stabile No. 1202 | Aerospace eng'g

Benjamin W. Payson VT Α '24
Stabile No. 1203 | Mechanical eng'g

Grace E. Peterson KS Β '24
Stabile No. 1204 | Mechanical eng'g

Mary R. Peterson KS Β '24
Record No. 1913 | Electrical eng'g

Demetrios P. Petrou II RI Β '24
Stabile No. 1205 | Computer eng'g

Antoni Z. Piascik MA Κ '24
Stabile No. 1206 | Mechanical eng'g

Peyton A. Pierson OK Γ '24
Record No. 1207 | Aerospace eng'g

Jake E. Pratt FL Α '24
Stabile No. 1208 | Mechanical eng'g

William T. Quinlen MS Α '23
Stabile No. 1209 | Mechanical eng'g

Anna Rahn CO Β '24
Nagel No. 71 | Computer Science

Mukund Ramakrishnan NJ Β '24
Record No. 1914 | Elect. & Comp. eng'g

Elizabeth A. Reardon IA Β '24
Record No. 1915 | Biomedical eng'g

Justin A. Reicher NY Τ '24
Stabile No. 1210 | Mechanical eng'g

Jessica A. Restivo SC Β '24
Record No. 1916 | Biomedical eng'g

Rebekah Revadelo OH Θ '24
Stabile No. 1211 | Mechanical eng'g

Ashley C. Rhodes IA Β '24
Record No. 1917 | Biomedical eng'g

Brandon T. Richard TX Β '24
Stabile No. 1212 | Mechanical eng'g

Hayes J. Richey MS Α '24
Stabile No. 1213 | Aerospace eng'g

Ethan T. Romano NY Α '24
Record No. 1918 | Biomedical eng'g

Rosie S. Rothschild CT Α '24
Record No. 1919 | Elect. eng'g/Comp Sci

Aidan P. Rowell GA Γ '24
Stabile No. 1214 | Mechanical eng'g

Jenna M. Russell MI Λ '24
Record No. 1920 | Mechanical eng'g

Maria N. Russo FL Ε '24
Stabile No. 1215 | Mechanical eng'g

Isaac Saneda VA Ε '24
Stabile No. 1216 | Mechanical eng'g

Isabelle W. Sanz NC Γ '24
Stabile No. 1217 | Mechanical eng'g

Sayre P. Satterwhite IA Β '24
Stabile No. 1218 | Mechanical eng'g

Abby R. Scott FL Η '24
Record No. 1921 | Biomedical eng'g

Eric Silfies NY Β '24
Stabile No. 1219 | Mechanical eng'g

Miles T. Sitcawich TN Β '24
Record No. 1922 | Chemical eng'g

Nicholas G. Snyder OH Ν '24
Stabile No. 1220 | Civil eng'g

John T. Sorensen FL Η '24
Record No. 1923 | Biomedical eng'g

Jillian Stanton NJ Ζ '24
Stabile No. 1221 | Civil eng'g

Abigail E. Staudt OK Γ '24
Stabile No. 1222 | Architectural eng'g

Isabella Steinley PA Λ '23
Record No. 1924 | Chemical eng'g

Nathan B. Stern TX Α '23
Record No. 1925 | Elect. & Comp. eng'g

Benjamin A. Stettin NY Α '24
Stabile No. 1223 | Mechanical eng'g

Justin X. Taing CA Ξ '24
Stabile No. 1224 | Computer eng'g

Kelly Y. Tamura CA Ε '24
Record No. 1926 | Bioengineering

Ahmad Tashfeen AL Ε '24
AL Power No. 20 | Elect. & Comp. eng'g

Carter D. Taylor OH Γ '24
Stabile No. 1225 | Mechanical eng'g

Annamarie L. Thompson MS Α '25
Record No. 1927 | Biomedical eng'g

Jocelyn E. Tillman SD Β '24
Record No. 1928 | Electrical eng'g

Benjamin N. Todes TX Α '24
Stabile No. 1226 | Civil eng'g

Aiden J. Tombuelt SC Α '24
Stabile No. 1227 | Mechanical eng'g

Andrew L. Tran CA Ε '25
Record No. 1929 | Bioengineering

TBP SCHOLARS

Continued

Joshua C. Trimm TX Λ '24
Stabile No. 1228 | Civil eng'g

Peter A. Tsibouris OH N '24
Stabile No. 1229 | Mechanical eng'g

Natalie K. Tsubamoto CA E '25
Record No. 1930 | Bioengineering

Kara O. Ushijima CA Δ '24
Record No. 1931 | Biomedical eng'g

Emma J. Van Epps MS A '24
Record No. 1932 | Biomedical eng'g

Cody J. VanNostrand NY B '24
Stabile No. 1230 | Aerospace eng'g

Julia H. VanPutte NY Δ '24
Stabile No. 1231 | Ops Rsrch & Info eng

Elizabeth R. Viox MO B '24
Stabile No. 1232 | Architectural eng'g

Landon J. Vogts OK Γ '25
Stabile No. 1233 | Aerospace eng'g

Cassandra A. Volpe IA A '24
Record No. 1933 | Chemical eng'g

Lucien R.G. Wallace MA A '24
Stabile No. 1234 | Mechanical eng'g

Leah L. Walter OH Z '25
Scribner No. 77 | Environmental eng'g

Yiran Wang MD A '24
Record No. 1934 | Chem & biomol. eng

Alayna G. Wanless MI Z '24
Record No. 1935 | Electrical eng'g

Camille A. Wardlaw CA Σ '24
Record No. 1936 | Electrical eng'g

Kirsten J. Welch CA AA '24
Stabile No. 1235 | Mechanical eng'g

Hannah G. West GA A '24
Record No. 1937 | Chem & biomol. eng'g

Elizabeth L. Williams OH Λ '24
Stabile No. 1236 | Industrial & sys. eng'g

Jacob D. Wills NJ A '24
Stabile No. 1237 | Civil eng'g

Benedikt Winzer NY K '24
Record No. 1938 | Biomedical eng'g

Lauren A. Wolf KS A '24
Campbell No. 56 | Chemical eng'g

Ina S. Wong MA A '24
Record No. 1939 | Biomedical eng'g

Huihan "Jack" Yan IL A '25
Berthold No. 2 | Mechanical eng'g

Jacqueline O. Yang NY A '24
Record No. 1940 | Electrical eng'g

Jared M. Yang IL Γ '24
Stabile No. 1238 | Mechanical eng'g

Guangbei Yi WA B '24
Stabile No. 1239 | Software eng'g

Alison F. Yurchak IL B '24
Sickafoose No. 13 | Biomedical eng'g

Mohammed Yusufali NY A '24
Record No. 1941 | Biomedical eng'g

Nicholas M. Zanowicz NJ E '24
Stabile No. 1240 | Mechanical eng'g

Kyle L. Zoellner OK B '24
Stabile No. 1241 | Mechanical eng'g

Lucas J. Zurbuchen IL Γ '24
Record No. 1942 | Computer Science

BRAIN TICKLERS

Results From Spring

Perfect Scores

*Backus, Jason D.	MI	Γ	'03
Berthold, Kristopher D.	TX	B	'04
*Brana-Mulero, Francisco	PR	A	'74
*Couillard, J. Gregory	IL	A	'89
*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
*Holcomb, J. Eric	OH	A	'82
*Johnson, Mark C.	IL	A	'00
Kimsey, David B.	AL	A	'71
Kuhn, Walter A.	OH	A	'81
*McHenry, S. Dale	MO	B	'81
*Medvecz, David J.	IN	A	'83
*Norris, Thomas G.	OK	A	'56
*Sensmeier, Mark D.	IN	A	'85
*Slegel, Timothy J.	PA	A	'80
*Strong, Michael D.	PA	A	'84
*Upshur, John I.	VA	A	'83
*Van Dillen, David E.	NJ	B	'67

Other

*Bertrand, Richard M.	WI	B	'73
*Bohdan, Timothy E.	IN	Γ	'85
Chinn, Douglas S.	NY	Δ	'73
Doo, Yi-Hsien	MI	Z	'81
Douglass, Rodney W.	NE	A	'72
*Fenstermacher, T. Edward	MD	B	'80
*Gaston, Charles A.	PA	B	'61
*Grewal, Kalwant S.	TX	H	'73
Jordan, R. Jeffrey	OK	Γ	'00
Lalinsky, Mark A.	MI	Γ	'77
Marks, Lawrence B.	NY	I	'81
Hertz, Caryn M.	NY	I	'81
*Schwam, Susan E.	WA	A	'88
Schwam, Freely	Spouse of member		
Skowronski, Victor J.	NJ	A	'71
Smith, Charles E.	OR	A	'55
Spring, Gary S.	MA	Z	'82
Szostek, Reneé	MI	A	'87
*Voellinger, Edward J.	Non-member		

*Denotes correct bonus solution

Spring Review

Members did very well on the Spring puzzles with more than half of submitted answers achieving a perfect rating.

There was one minor issue related to Question 2 (Two brothers estimating the diameter of the Earth): several members submitted the estimated Earth radius rather than diameter. The judges decided to accept both the diameter and the corresponding radius as correct.

Summer Answers

1: Y-I-R-G-V-O-B. The rainbow ordering is R-O-Y-G-B-I-V. Observe that with Bill's rearrangement, color mappings can only occur in cycles of one or two. G is the only color where the title matches the binding, so its cycle is one, and the other six colors must be combined into three pairs. Y and B cannot be paired since they are on opposite sides of G. Similarly, O↔Y and B↔I cannot be paired, since they would remain side-by-side after rearrangement. Furthermore, observe that only one book can move from before G to after G in the rearrangement; choosing any two will force a previously adjacent pair to become adjacent elsewhere in the reordering. Therefore, the only mapping available is R↔Y, I↔O, B↔V, and the new ordering is Y-I-R-G-V-O-B.

2: 3√11 ≈ 9.94987 is the value of x that minimizes the percentage error. For a given guess z, the percentage error is given by

$$\int_{9}^{11} (|z - x|/x)\, dx = z(2 \ln z - \ln 9 - \ln 11 - 2) + 20$$

To find the value of z where the percentage error is minimized, take the derivative and set to 0, that is, $\frac{d}{dz}\, z(2 \ln z - \ln 9 - \ln 11 - 2) + 20 = 2 \ln z - \ln 9 - \ln 11$.

Setting to zero, $2 \ln z - \ln 9 - \ln 11 = 0$, or $2 \ln z = \ln 9 + \ln 11$. Rearranging, $z = e^{(\ln 9 + \ln 11)/2} = \sqrt{99} = 3\sqrt{11}$.

In general, for bounds A and B, the value of x is the geometric mean or $\sqrt{AB}$.

3: 343 / 902 ≈ 38.0% of the light is transmitted through the three panes of glass. There are three panes of glass: call the quantity of light incoming pane i in the forward direction x_{i-1} and outgoing x_i. Similarly in the reverse direction y_{i-1} and y_i. Let A be the transmittal rate 0.7 and B the reflection rate 0.2. There are six simultaneous equations, three for reflected light $y_{i-1} = Ay_i + Bx_{i-1}$ and three for transmitted light $x_i = Ax_{i-1} + By_i$. Let the incoming light source form the forward direction $x_0 = 1$, and there is no incoming light in the reverse direction $y_3 = 0$. Solving the six equations with six unknowns, we find the outgoing light $x_3 = 686 / 1804 = 343 / 902$, completely reflected light $y_0 = 645 / 1804$, and the total absorbed light by the three panes = 473 / 1804.

4: Cabernet is Santa's favorite color and the Ghost made **6171** socks vanish. When only two sock colors remain, we know there are 25 total socks and the chances of picking a pair are 50%. So, A+B=25 and (A(A-1) + B(B-1)) / (25)(24) = ½. The only positive integral pair for A and B is 10 and 15, though we don't know, or likely care, which is which. Considering the three sock scenario, (A(A-1) + B(B-1) + C(C-1)) / (25+C)(24+C) = ½ or 2(90 + 210 + C(C-1)) = (25+C)(24+C) which simplifies to C = 51. Similarly for D, we find D = 2(10 + 15 + 51) + 1 = 153. By induction D = 3C, E = 3D, and so forth. So D=153, E=459, F=1377, and G=4131. The total number of socks is 6196, and the number made disappear is 6196-25 = 6171. Of the colors, only 51 divides 6171 evenly, so cabernet is Santa's favorite color.

5: 0588235294117647 is a 16-digit integer such that when multiplied by any positive number up to 16, a rotated version of itself is produced. Such integers are known as *cyclic numbers*. Readers may recognize from the provided

example that 142857 as the 6-digit repeating part of the fraction 1/7. Following this lead, for each prime number p, determine if $1/p$ generates a repeating decimal of full length p-1. Then verify that each of the p-1 products is a rotation of the original. Any p that generates a cyclic number is called a *full reptend prime*.

The next three smallest solutions:

p = 19, 18 digits:
052631578947368421

p = 23, 22 digits:
0434782608695652173913

p = 29, 28 digits:
0344827586206896551724137931

BONUS: Your number is **13.** The prime number and triangle restrictions limit the possible triples to a relatively small set. For example, allowable side triples (on unspecified foreheads) include 3-3-5, 3-5-5, 5-5-7, 5-7-7, 5-7-11, 5-11-13, 5-13-13, 7-11-11, 7-11-13, 11-11-19, 11-13-13, 11-13-17, 11-13-19, 11-13-23, 13-13-17 plus others with larger primes.

For simplicity, call the three people in the room Y (you), F (5 on their forehead) and E (11 on their forehead). Y sees 5 and 11. So, Y can tell immediately that their number is either 7 or 13.

Y considers the case where Y = 7. Then E sees 5 and 7, and can deduce without any additional information that their own number is 5, 7, or 11. And F sees 7 and 11, similarly can say their own is 5, 11, or 13. Neither can identify their own number on their first turn.

Y then considers E's perspective when Y = 7. E will first consider the possibility that E = 5. Then Y would see 5-5, and consider Y = 3. But then E and F would both see 3-5. The first of the two to respond would be unable to decide (either 3 or 5), but that tells the second that the first did not see 3-3. The second would then deduce from seeing 3-5 proclaim their number as 5 and Y announce theirs as 7. That doesn't happen, so Y knows if Y = 7, E ≠ 5.

E will then consider the scenario when Y = 7, E = 7. In that case, F would see 7-7, and must choose between F = 3 and F = 5. F knows their number is 5 as soon as they hear another responder is unable to decide. Had that responder seen 3-7, then they know their own number is 7. Since F does not announce themselves to be 5 on one of their first two turns, E concludes their own number is not 7.

E then will conclude that if Y = 7, E themselves must be 11 and will announce that by their second turn. But since E does not do that, Y concludes that Y ≠ 7.

The only possibility left is Y = 13.

COMPUTER BONUS:

The expected value of the longest run in 1,000 flips is **10.299**. An initial solution can be arrived at through computer simulation. In a search of mathematical publications, one can find the approximation $E(f) = ((\ln(f) + \gamma) / \ln 2) - ½$ where f is the number of flips and γ is the Euler-Macheroni constant.

The approximation can be further simplified (with a slight loss of accuracy) to $E(f) = \log_2 f + ⅓$. From the $\log_2$ component, one can see that the expected value increases by one as f doubles, and that the students unmotivated to actually flip the coins should include a maximal run of about $\log_2 f$.

New Fall Problems

1: New Cryptic Challenge

Solve the following cryptic addition: WE + WANT + NO + NEW + ATOMIC = WEAPON

As usual, different letters stand for different decimal digits, no leading zeros, and the same letter is the same digit throughout.

—**Richard I. Hess,** *CA B '62*

2: Positive Integers

Find the smaller of two consecutive positive 30-digit integers such that the difference of their cubes is a perfect square.

That is: $(j+1)^3 - j^3 = k^2$, where j and k are positive integers.

Hint: The first few small $[j,k]$ solutions are: [0,1], [7,13], [104,181].

—**F.J. Tydeman,** *CA Δ '73*

3: Hands of a Clock

Consider a circular 12-hour clock with hour, minute, and second hands that do not move continuously but rather update simultaneously and instantaneously at one-second intervals. At each update, each of the three hands moves to a location that represents the correct time at that instant. That is, throughout the day, the second hand has 60 possible locations, the minute hand 60×60 locations, and the hour hand 12×60×60.

At 12 o'clock, the center lines of the three hands are exactly over each other, a situation that will not occur again until 12 hours later, although there are times when the three hands will be close to each other. Other than 12 o'clock, what is the minimum angular separation (in radians) between the center lines of the two hands that are farthest apart, and when does this close encounter occur?

—**Walter O. Stadlin,** *NJ Γ '52*

4: Timber Harvesting

This problem combines the game of chess and timber management. A closed knight's tour is used as a model for timber harvesting, since it gives a pattern for cutting sections of the forest so that successive cuts are not on adjacent land. Even better would be a closed tour of a "superknight" that moves 3 squares in one direction and 2 in the other (instead of the usual 2 and 1).

The smallest chessboard containing a closed (regular) knight's tour is 6x6. There is no known solution on a 12x12 chessboard for a superknight. What is the smallest chessboard containing a closed superknight's tour? That is, visit every square exactly once and end up back where you started.

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

Continued on page 42

MAY 1 — JULY 31, 2023

Alumni Giving

Donor Recognition Clubs

The Donor Recognition Clubs are part of our effort to recognize a donor's total lifetime cumulative giving to Tau Beta Pi. **THANK YOU** to the 1,331 TAU BETA PI ALUMNI and others who made donations to the Association totaling $290,952 between May 1, 2023, and July 31, 2023. Gifts received after July 31 do not appear here but will be published in the Winter 2024 issue. These club names and amounts, updated by the ΤΒΠ Executive Council, are set at the following levels:

$1 MILLION+
Williams Club

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

$500,000+
Heikes Club

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

$250,000+
Harelson Club

Katharine C. Harelson, *KY A 1924*
1st Women's Badge (WB) recipient

$100,000+
Matthews Club

R.C. "Red" Matthews, *IL A 1902*
1st Sec.-Treasurer of ΤΒΠ

$50,000+
Franklin Club

Marjorie A.H. Franklin, *KS A 1957*
1st woman initiated into Sigma Tau

$25,000+
Nagel Club

Robert H. Nagel, P.E., *NY D 1939*
2nd Sec.-Treasurer of ΤΒΠ

$10,000+
Clarke Club

Edith Clarke, WB #95
Inventor of graphic calculator

$5,000+
Evans Club

Henry B. Evans, Ph.D., *PA A 1893*
1st president of Tau Beta Pi

$2,500+
Eaves Club

Elsie Eaves, *CO B 1920*, WB #24
Influential civil engineer

$1,000+
Downing Club

Lewis K. Downing, *MI G 1921*
1st Black HBCU engr. dean

$500+
Moore Club

A.D. Moore, *PA G 1915*, ΤΒΠ president, Fellowship Program founder

$250+
Forman Club

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

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

Evans Club
Russell W. Pierce
WA Α '70
Tau Beta Pi has given me so much, it is an honor to give back.

Evans Club
David J. Clark
CA Μ '99
I'm grateful for the opportunity to help ΤΒΠ continue their mission for generations to come.

Moore, Forman & Pre-Club Members Listed on website

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

$1 MILLION+ Williams Club

No alumni gifts for this quarter

$500,000+ Heikes Club

TX Α Brill, Arno William '71

$250,000+ Harelson Club

No alumni gifts for this quarter

$100,000+ Matthews Club

IA Α Anonymous '69
LA Α Longwell Jr., Harry J. '63
NJ Δ Lim, Yung Bong '87
OH Γ †Rockow, Ralph Arthur '58

$50,000+ Franklin Club

CA Ε Madni, Asad Mohamed '69
IN Δ Koller, David Christ '62
MS Α Sinclair, Bill Fredrick Hall '63
OH Η Merkle, Larry '92

$25,000+ Nagel Club

CA Ν Steenhoven, Jerry C. '77
IN Α Newcomb, Robert Wayne '55
MI Α Colbry, Dirk Joel '06
Colbry, Katy Luchini '99
MI Ε Gomulinski, Curt Dennis '01
NY Β Anonymous '80
OH Α Salamon Jr., Peter Francis '71
SD Α Gomulinski, Tricia E. '98
TX Γ Loewenstern Jr., Walter '59
TX Δ Fox, Craig Alan '77
WV Β Teti Jr., John J. '71

$10,000+ Clarke Club

SPEC Anonymous
CA Β Shombert, Lee Alan '79
CA Γ Davies III, Paul Lewis '83
CA Δ Fong, Frank Moodo '69
CA Η Trebaol, George Olivier '75
CA Λ Holl, Sue '76
CA Υ Idenmill, Ethan Matthew '04
DE Α Gutshall, Thomas Lee '60
IL Α Luzbetak, Paul Daniel '96
IN Α Davidson, Charles Dean '72
Hooks, Collis Charles '64
LA Ε Champagne Jr., Pierre '76
MA Α Chace, Brian David '69
Keogh, Brian James '84
MA Ζ Quaid, Rich C. '65
MO Γ Gibbs, Ken Paul '76
NY Β Fleisher, Richard Stephen '72
PA Β Klingensmith, Rick Lee '82
PA Δ Moore, John Howard '68
TN Α Holmes, Sammy Sanner '78
Stiles, Larry '71
TX Δ Rushing, Jay Alan '76
WA Α Asplin, Lyle Irving '59
WV Β Payne, Michael E. '81

$5,000+ Evans Club

AL Α Wilhelm, William Jean '58
AL Δ Koelbl, Terry Gene '84
AR Α Jenkins, Lynn Page '61
CA Ε Warner Jr., John Hilliard '63
CA Ζ Cancilla, Charles Edmund '59
CA Λ Crews, Brian '70
CA Μ Clark, David James '99
CA Ν Erickson, Ralph Edward '71
CA Υ Alexander, Joseph William '06
Alexander, Rachel Kristin '15
CO Β Clair, David Richard '58
Kinzie, Edward Ottis '64
CT Β Klopfenstein, Rex Carter '59
FL Α Lewis, Becky Ann '04
FL Ε Cowan Jr., David James '14
IL Α Beanblossom, Todd M. '80
Tracy, Mark Alfred '86
IL Β Jaras, Anthony A. '67
IN Α McDonald, John Douglas '73
Schlosser, Samuel Charles '71
Vosteen, Louis Frederick '52
IA Β Smull, Warren Lindsey '57
KS Α Reid, Jack Powell '57
LA Β Vaughan, Robin Marie '81
MD Β Jansen, Russell Onas '74
MA Α Bujaucius, Jerry Alan '79
MA Β Hirsch, Alan Robert '66
Nobel, Sanford Millard '58
Poduska Sr., John William '59
MI Γ Bell, Lawrence David '68
Holderness, Jim Henry '67
MI Δ Klimaszewski, Richard A. '65
MI Ε Husak, Philip William '72
MI Ζ Dymale, Raymond C. '70
MI Η Pascany, Kenneth Michael '86
MS Α Boozer, Drayton Daniel '66
MO Α Edgington, Bobbie George '69
NJ Γ Kenney, Thomas Edward '70
NY Δ Hart, Marjorie Leigh '51
NY Ε Grosso, John Joseph '69
NY Ξ O'Keefe, Luke Francis '80
NY Τ Olenik, Anthony Michael '08
OR Α Hansen, Steven William '69
PA Β Hertneky, John A. '79
PA Ε Babbitt, Walter Howard '77
PA Η Reiner, Bob Elmer '64
TN Α Trundle, Max Don '72
TN Δ Knight, Joseph Brent '93
TX Α Smith, Matt Thomas '93
TX Γ Capshaw, David M. '80
Jordan, Paul Joseph '90
TX Ζ Wint, Stephen Peter '83
VA Α Agosti, Steven J. '81
Orphan, Victor John '62
VA Β Carpenter, Joseph Andrew '63
WV Β Ashman, Michael D. '84

$2,500+ Eaves Club

AL Α Cowles, Gary Dreaper Edward '87
Henderson, Phillip Roy '62
AL Β Andrzejewski, Joseph Richard '90
AR Α Gunderman, Tony Raymond '89
CA Γ Hillier, Frederick Stanton '58
CA Ε Welstand, Steve Stephen '64

Alumni Giving

Eaves Club continued

CA H Clark, William Charles '72
CA Λ Okpisz, Alexander Edward '91
West, Timothy Dewayne '78
CA Ξ Preston, Kimberly Denise '96
CA P Kraft, Lyle David '87
CO B Frey, Bryce Alfred '56
CO Γ Lee, Don Evard '59
Ton, Scott Marshall '74
DC B King, David Alan '68
DC Γ Keltie, Robert Joseph '69
FL Δ Paulley, Jason '93
GA A Farr, Emory Warren '54
IL A Beernink, Kurt Patrick '82
Tatara, Richard '78
IL B Uherek, Frank C. '82
IN A Hohn, Richard Edward '62
Rushworth, James Lynn '58
Sommer, Dianna Marie '83
White, Stanley Archibald '57
IN B Mills, Matthew Dillon '87
IN Γ Poore, Michael Francis '71
IN Δ Luecke, Edgar Jacob '55
†Vocke, Merlyn Clarence '55
IA A Hammar, Kelly Jean '89
Harms, Richard Paul '65
Wallace, Jean Ellen '81
IA B Schmidt, Chuck Chris '73
Schwarting, Eugene Raymond '63
KS A Moore, Richard Arthur '51
KS Γ Gemaehlich, Donald Joel '83
LA B Chaffe III, Black B H '55
LA Γ Poole, Ronald Gene '69
MD A Tate, David Marshall '84
MD B Beard, James Lawrence '67
Booth, Andrew William '64
Joseph, John Hamilton '85
Roberts, Carla '82
MA B Patterson, John Bryan '68
Zelazo, Ronald Elliot '66
MA E Moore, Timothy Eugene '71
MA Z Kelly, Thomas William '80
Lastella, Michael James '72
MA H Duda, James A. '84
MA I Musiak, Ronald E. '68
MI Γ Baxter, John Edward '57
Holmes, John William '65
Liepa, Mark Albert '81
Reines, Jose '59
Stewart, Steve Russell '66
Washburn, John Robert '69
MI H Johnston, Richard '78
MS A McKay Jr., Frank Fay '60
Sutphen, Fred Marshall '73
MS B Woody, Marvin David '79
MO A Oehrke, Timothy Chris '75
MO Γ Anonymous '99
NE A Doerr, Eric Arthur '88
Steube, Milan Ray '74
NJ Γ Mauermeyer, Henry A. '72
Reitano Jr., Anthony James '72
NM A Peace, Jeffrey Howard '76
Smith, Jeffrey A. '84
NY Γ Chamberlin, Donald Melsom '67
NY E Febesh, Melvin '47
Martin, Kent Richard '66
NY K Allyn, Elwyn George '61
Casper, David A. '88
Gaul, Michael Arthur '76
NY M Meader, Lyla Rebecca '86
NY N Marso, Rudolf '59
Roach, Linda J. '82
NY Π Wong, Richard Yee '94
NC Γ Vadnais, Paul A. '73
OH A Hamilton, Joshua J. '09
Whittington, John Thomas '93
OH Γ Cowan II, Robert Lee '66
Feltz, John Francis '61
Ouellette, Andrew Louis '86
Robinette Jr., William Henry '68
Wolff, Mark Frederick '88
OH Δ Miller, Truesdell Charles '64
OH Z Bliss, Douglas Paul '75
OH H Kelso, Tom Sean '88
OH Θ Doyle, James Thomas '65
OH Λ Krueger, Karl Hermann '73
OH M Kovacs II, William '74
OK B Sossamon, Dana Ray '76
OR A Bishop, Donald Lee '65
Miller, George Edward '77
Milton, Stuart W. '84
PA A Lasser, Howard Gilbert '50
Lynch, Sarah Hayward '89
Weber Jr., John Herbert '63
PA B Beecher, Gregory A. '78
Laverty, Bruce Andrew '82
PA Γ Shaffer, David Bruce '68
PA E Ryan, Richard Edward '86
PA H Hills, Frederick James '61
Hotchkiss, Jeff R. '69
McDonnell, Robert William '48
PR A Merle-Ramirez, Luis F. '93
RI B Luz, Jim J. '80
SC A Bishop, Frank Moss '65
Di Lapi, Christine Marie '87
TN A Kennedy, Michael Earl '86
TN B Casson Jr., Walter Andrew '56
Kepper III, James Henry '71
TN Γ McDonald, Gary Haywood '77
TX A Haley, Dennis Clyde '70
Meers, Steve Wayne '72
Peterson, Robert Adrian '80
Sweet, Paul Alan '70
TX B Berthold, Kris David '04
Stinson, John Michael '66
TX Δ Kaminski, Bryan Joseph '84
Simpson, Stancy Jean '79
Woram, Brian James Anthony '81
TX Z Storey Jr., Arthur Lipscomb '65
TX H Bishop, Neil Erasmus '66
Godwin, Albert Eugene '84
Hoffman, Heather Brunn '92
TX Θ Alvarado, Ruben Armando '72
Stokes, F. Xavier '78
Van Landingham, David J. '74
VT A Kellogg, David Holt '62
VA A Harris, Wesley Leroy '64
VA B Marcus, Larry Allen '72
Shearer, Richard Lee '70
WA A Hulsizer, Stephen Anthony '69
WV A Rockenstein, Richard C. '63
WI A Wulff, Kurt Henry '63
WI B Hutton, Teresa Jean '91
Whittington, Laura Lee '88

$1,000+ Downing Club

AL A Carey, George Walter '69
Glover, Martin Cochran '70
Goodwin, James Joseph '58
AL Γ Hamilton, George Seaton '89
AZ A McSpadden Jr., William R. '56
Park, Trevor Howard '97
Sacha, Robert Alan '82
AZ B Beemer, Jeffrey Brian '80
Leach, David Robert '76
AR A Weaver, Mark Edwin '77
CA A Ong, Allen '70
Reynolds, Barry Duane '84
Van Dyke, Korbin S. '80
CA Γ McClendon, Scott '60
Orr Jr., Franklin Mattes '69
Putt, Brian Hollis '72
Roodhouse, James Greenlee '59
Taniguchi, Brian Yoshito '77
CA Δ Fernandez, Ferdinand Francis '58
Herzberg, Donald Edward '79
Kohlenberger, Gerald Lewis '74
Nakatani, David Takeshi '63
Rey, Daniel '66
CA E Holzman, Eric Louis '84
CA Z Overbey, John Kirkwood '77
Viano, David Charles '68
CA H Holstead, Raymond H. '71
Pershon, James M. '79
Ramirez, Victor George '70
CA Θ Bach, David P. '69
Blanco, Catherine Elaine '97
Hoekstra, Gerben N. '66
CA Λ Fujitani, Paul Edward '79
Schmitz, James Arthur '83
Smith, Robert Press '75
CA N Armstrong, Lorrie Ann '84
Armstrong, Robert Allan '81
Mayer, Robert James '85
Michelson, Gregory James '88
Newberry, Conrad Floyde '57
Schmitt, Thomas G. '74
CA Ξ Greco, Anna Maria Elvira '81
Hawkins II, John Colman '79
CA O Mulvihill, Michael Edmund '60
CA Y Intagliata, John David '95
CO A Benjes III, Skip Henry Herman '87
CO B Farmer, Brian Keith '78
Herhold, Mark Kenneth '80
Hidahl, Jerry Paul Edward '77
Talcott Jr., Noel A. '73
Watry, Michael Owen '86
CT A Bennett, Beth Anne '91
Troutman, John Leo '65
CT B Conklin, James Charles '70
Douglass, Michael Richard '79
Greene Jr., Joseph Fred '53
Hill, Dorian Evan '69
Sobol III, Anthony Joseph '70
CT Γ Judd, Kyle Peter '91
DE A Folsom, Steven Allen '77
Gulian, Franklin Joseph '83
DC B Delgado, Tony J. '93
Murphy, Joseph A. '60
DC Γ Sonsteby, Ornulv '74
FL A Burkart, Scott Lawrence '78
Giolma, J. Paul '69
Vande Vusse Jr., Gerald '65
Walton, Ray '77
FL Γ Ball, Arthur Morley '70
Glenn, Frederick '92
Stagner, Ralph Scott '82
FL Z Oppliger, Gerald T. '59
GA A Barber, Brian Robert '81
Brush, Gary Stoddard '80
Northington, Peyton Alexander '78
Priest, Anthony James '88
Shurbutt, J. Steven '75

Downing Club
Brian S. Bourgeois, Ph.D.
LA B '82
ΤΒΠ promotes the ethos of excellence, integrity & service to others for the next generation of engineers.

Forman Club
Jim C. Lugannani
NJ Δ '81
Tau Beta Pi does so much for the students. It's a pleasure to help!

Downing Club continued

GA A
Smith, Micheal Monroe '79
Taylor, Hubbard Harvey '75
Ware Jr., Clyde Lee '59

IL A
Graham, Joseph Gund '51
Schuhrke, Donald Kenneth '55
Splitt, Frank George '52
Vogel, Frederick M. '80
Waranauskas, Amy Louise '85

IL B
Kaplan, Edward '65

IL Γ
Asbury, Michael George '83
Pineault, Wayne '79
Witt, Frank A. '55

IL Δ
Kobiella, Anthony Robert '93
Zapinski, Susan Marie '83

IN A
Alexander, John Albert '56
Becker, Kenneth Alan '81
Forster, Allen Vaan '72
Frazier, George E. '57
Lee, Robert Edward '67
Levine, Jerrold Louis '61
Lin, Jeffrey Eugene '97

IN B
Graham, James Henry '72

IN Γ
Bajura, Richard Albert '62
Drnevich, Raymond Francis '70
Silio Jr., Charles B. '65

IN Δ
Dietrich, Jay Michael '80
Lyons, David William '71

IN E
Shefer, Ilan Gideon '77

IA A
Cortum, John David '77
Henderson, Jim Allen '70
Irvine, Alexander John '79
Olson, Scott E. '69
Rush, David Grant '85
Rustwick, John Douglas '71
Sutherland, Keith Allan '69

IA B
Corrao, Debbie G. '93
Schaefer, Dean Allen '66
Warner, Diana Hix '73

KS A
Harmony, Marlin Dale '58
Anonymous '82

KY A
Craig, Joe Lockett '50

KY B
Thornton, Patrick Joseph '82

LA A
Knighten, James Leo '65
Smith, Stewart Van '73

LA B
Rickman, Philip Mark '83

ME A
Atkinson III, Landy Guy '78
Carsley, Denice Loring '92
Ouellette, Alfred David '76

MD A
Capecci, Dennis W. '79
Gormley, Paul Edward '68
Hart, Edwin Flessner '68
Linaweaver, Pierce '55
Piedrafita, James L. '78

MD B
Birkmire, John Christopher '95
Mentzer Jr., William Richard '61
Sacks, Herbert Kenneth '64
Wamsley, Brian Woodrow '77
Zalesch, Steven Elliot '73

MA A
Mangiarelli, Christopher A. '96
Steinka, Bradford Roland '81

MA B
Ball, Norman Addison '60
Borrmann Jr., George H. '57
Butkus, Lawrence Michael '85
Koehler Jr., Richard F. '67
Lawes, Charles Peter '58
Manganaro, James Lawrence '61
Maskrey, Robert Harley '63

MA Δ
Gunn, John F. '64
Munsey, Michael C. '89
Savage, Paul David '77

MA E
Sciartelli, Anthony Paul '86
Williams, Charles Robert '53

MA Z
Koch, Robert F. '79
Wylie, Bruce Kerr '66

MI A
Beimers, Chuck John '69
Derby, Stephen George '69
Gidner, Richard V. '53
Kupfer, Michael David '83
Watanabe, Gerry Torao '72

MI B
Dejonge, Michael Kent '65
Newman, Frederick Alan '83
Sonsalla, Tim Carl '95
Wilden, Helm '65

MI Γ
Altin, Mehmet '68
Capelli, Ronald B. '73
Davis, Robert Allan '81
Grossman, Michael Alan '88
Miller, Carol Jean '79
Miller, Stephen Scott '78
Nobunaga, Brian N. '83
Stewart, David Mark '76
Stover, Dennis Eugene '67

MI Δ
Dauerer, Walter Peter '60

MI Z
Gillham, Gregory V. '83
Haines, John Gregory '72

MI Θ
Spall, Jim Charles '79

MN A
Mortenson, Robert Lee '64
Petrich, Gale Sean '86

MS A
Carman Jr., Jack Baker '62
Hotard, Daniel Gerard '76
Linder, Richard A. '57
Tyner, Fred Mack '93

MS B
Gray, James Michael '88
Simmons, Mary Ann '85

MO A
Gardner, Roger William '63
McCarthy, Thomas Owen '70
Miller, Raymond Bryant '53
Salerno, Michael Joseph '84

MO B
Brockhaus, Douglas Adolph '68
Buenemann Jr., Morris C. F. '82
Friedman, Marc Andrew '00
Mahin, Clif Alan '76
Patterson, Michael A. '77
Schmidt, Thomas Edward '70

MO Γ
Salman, Naif Diab '56
Standridge, Charles Robert '75

MT B
Montgomery III, Wayne W. '83

NE A
Matthews, Deborah Jo '82
Patterson, Roger Kent '73

NV A
Jones, Keith Alan '85
Van Horn, Michael David '76

NH A
Bailey, Joseph Gregory '86
Bickford, Maurice Dudley '59

NJ A
Brechka, Thomas Michael '73
Meyer, Alfred P. '60
Ricco, Robert Philip '70
Seventko, Joseph M. '60

NJ B
McCord, William Fred '64

NJ Γ
Andrus, James '02
McWilliams, John Paul '65
Morgan, Dennis Ross '68
Reitsma, David '65

NJ Δ
Gross, Gary Robert '80
Wolff, Richard John '72

NM A
Walker, Michael '63

NY A
Zimmerman, Robert W. '77

NY B
Bickley, Thomas Duane '78

NY Γ
Buck, Frederick Alan '76
Dowgwillo, Robert Michael '75
Dupier, Dennis George '61
Goldschmidt, David Joel '91
Lewandowski, Michael '96
McCormick, Peter Elliott '80

NY Δ
Kahn, Mindy S. '89
Kuehne, Don L. '73
Van Arsdale, George Davis '62

NY E
Boyarsky, David '59
McConnell, Donald Patrick '71

NY H
Filipek, Stephan John '82
Goodman, Alvin Solomon '44
Wu, Randall '75

NY Θ
Candelora II, John Philip '91
Godlove, Katie Ann '02

NY I
Cassella, Judith Ann '71
Hauge, Kenneth '61
Levy, Rami C. '92
Schwartz, Richard '57

NY K
Martens, Hinni Robert '57
Singer, Bart Alan '82

NY N
Aloysius, Ronald J. '85
Davis, James Steven '70
Anonymous '91
Kocher, Lawrence Harold '67
Kuroski, Anthony '77
Stearns, Richard Earl '67

NY Ξ
Defelice, Nicholas James '77

NY P
Lubrano, Michael '80
McBrien, William J. '87

NC A
Cutchin IV, James McKenney '62
Minday, Richard Michael '66
Poindexter, Richard Clinton '64
Shelton, Monty Lee '84

ND A
Engbrecht, James Richard '59

OH A
Ammar, Gregory Steven '81
Bacevice Jr., Anthony Edward '70
Cares, William Ronald '63
Drier, Delmar Waldemar '52
Kownacki, Edward Joseph '67
Whitney, Gina Marie '80

OH B
McCarthy, Martin David '70

OH Γ
Bouman, Robert William '60
Carr, Stephen J. '70
Case, William Frederick '64
Edwards, Randy Randall '71
Fireovid, James Alan '75
Mohr, John Glover '63
Overmyer, Ray Arthur '73
Stumbaugh, Gary Allen '66

OH Δ
Kurzen, Mark R. '71

OH E
Duscha, Rudolph Albert '59

OH Z
Dembrow, David Alan '82
Herman, Madison Rachelle '13

OH H
Hartman, Dean H. '99
Miller, William Gilbert '83
Schneider, Greg Richard '80

OH I
Larson, William Jed '75
Schilling Jr., Walter William '97

OH K
Duffy, Stephen Francis '78

OH Λ
Norling, Samuel Alfred '82
Suhar, Richard Allen '83

OH M
Hill, Leah Beth '10

OK A
Brown, Leslie Wray '70
Duke, Chris '83
Dunn Jr., Robert Ovington '82
Norris, Thomas Gilbert '56
Wustenberg, John Walter '84

OK B
Hand, Ronald Wayne '72
Perrault Jr., John Edward '75
Sherrill, Shirley Whitmore '82
Weston, Kenneth Clayton '55

OK Γ
Havner, Kerry S. '55

PA A
Arrowsmith, Donald Leighton '65
Bradley, Gordon Hoover '62
Jones, Donald Paul '65
Shuey, David Edwin '78

Alumni Giving

Forman Club
Blake L. Shatto
FL H '10
I'm proud to support ΤΒΠ because exemplary character is vital for those tasked to apply science for the better.

Downing Club continued

PA B Andrichak, Stephen Michael '58
Fisher, Robert Harold '72
Kardos, John Louis '61
Pickenheim, Timothy Ronald '90
Ripsom, George Anthony '60
PA Γ Chan, Allen Henry '82
Chang, Yue Cathy '00
Dvorsky, James Eric '81
Kuhr, Tina Michelle '81
Riedel, Frederick William '68
Rudolph, Anna Jane '79
Sack, John Stuart '75
PA E Hagadorn, Hubert William '59
Hermann, Frank Valentine '59
Nolan, Christopher William '86
Stratton, Carl William '81
Wetzel, Edward Donald '74
PA Z Aepli, Theodore Carl '62
Hrebien, Leonid '75
Kirsch, Paul Andrew '75
Shaffer, David Eugene '78
PA H Zimmerman Jr., Carle Clark '56
PA Θ Braun, James Francis '84
Gallen, Robert Michael '64
Salvo, John P. '56
PA I Dehoff, Gregg Alan '86
Schoenberger, Lewis Robert '84
PA K Beseler, Jan W. '88
PA Λ Anselm, Gregory Alan '81
Fitzpatrick, Anthony Ryan '03
Taylor, Thomas Ray '73
RI A Biddle, Justin Miller '56
Townsend, James Courtland '60
RI B Lieberman, James '67
SC A Hunter, James Richard '85
Marley, Brian Lee '89
Peters, William J. '70
SC B Hidlay, Charlene Marie '96
SC Γ Fletcher, Robert Hough '64
SD A Byg, Jerald Norman '72
Case, Robert Howard '75
Jenkins, Creties David '83
TN A Cashion, Greg Lee '79
Tomlinson, Edward Thomas '72
TN B Brown, Kevin George '85
TN Γ Buell, Phillip Ray '95
TN E Climer, Charles Edward '82
Nolte, Jennifer Jan '77
Nolte, Paul Allen '77
TN Z Wilson, Matthew William '00
TX A Courtney Jr., Lonzo Cleveland '58
Crippen, Robert L. '60
Kassler, Harlan Larry '91
Malins, Chester Joseph '76
Seaman, George Cook '65
Wong, Lucas '84
TX B Baker Jr., Marvin Elroy '86
Jain, Ravinder K. '71
Osborne, David Charles '61
TX Δ Boortz, Marielle Jean '77
Embry, Dale Lee '77
Garner, Scott Jahrand '77
Hall, Robert Arlin '63
Massett, Donald Allen '70
McGinnis, Charles Irving '49
Mitchell, Melvin M. '52
Nolen, Kenneth Bernard '57
Pollock, Stephen Theodore '70
Richards, Tamela Lynn '81
TX E Brown Jr., Thomas Brooks '72
Mitchell, John Dennis '68
TX H Southall, Hugh Landon '68
Tepper, John C. '82
TX Θ Brown, James '79
TX I †Harris, E. Douglas '83
TX K Harness Jr., Jerry Wayne '03
TX Λ Coon, John W. '91
UT B Paxton, Thornton Shirrel '63
VT B Dekalb, Shawn Wayne '85
Guerreri, Carl N. '62
VA A Lanford Jr., Stanard Franklin '55
Mac Glashan, Donald Welton '57
Mizelle, Peter Privott '60
VA B Cassell II, Ray Vaughn '88
Hyduke, Robert Alan '74
Maloney, Melissa Marie '90
Michelson, Darlene Sue '86
Snidow III, Lyle Christian '74
WA A Follett, Mark Samuel '74
Fosberg, Ted Michael '59
McGuire, Jeremiah James '77
Melton, Ronald Benjamin '77
Oiye, Martin Yasuyuki '76
Rising, Jerry Joseph '61
Stiegler, Joe Edward '58
WA B Groat, J. Everett '94
Williams, Harvey Ray '59
WV A King, Staci Renee '96
Lilly, Larry Joe '64
Tompkins, Joseph Andrew '77
WV B Janeshek, Anthony Martin '74
WI A Goba, John J. '66
Shimko, Darl Vann '79
Williams, Lynn Edward '67
WI B Derra, Kenneth William '90
Simon, James Bernard '65
Sommerville, Martin Glenn '94

Ensuring the Future of Tau Beta Pi through Planning Today

Meet Paul D. Wetenhall

For more information about planned giving, email Sherry Jennings-King at *tbp.development@tbp.org* **or visit** *www.tbp.org/?Give*

Paul, *GA A '73*, grasped the power of engineering analysis and discipline through the dinnertime stories of his engineer father whose life demonstrated that integrity and honesty were more important than technical expertise. Paul appreciates that Tau Beta Pi recognizes students who demonstrate excellence in their engineering studies and personal values. Paul supports ΤΒΠ annually to help American universities continue to educate engineers who will act with technical brilliance and personal integrity. He has included Tau Beta Pi in his estate plans to join others in strengthening the organization's long-term financial resources. Your donations make all the difference. Large or small, every dollar counts and helps turn students' dreams into reality. If you want to ensure that your support for Tau Beta Pi continues, a gift in your will or trust may be right for you.

The STORY BEHIND The PHOTO

Announcing the Fall 2023 "Caption This Photo" Contest!

The image at right was discovered among the photo archives of the 1997 Convention held in Minneapolis, MN. Assistant Secretary-Treasurer Roger E. Hawks, *NY L '75,* and John R. Luchini, Ph.D., P.E., *MI G '71,* hum a few bars before their next meeting.

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

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

DEADLINE: WEDNESDAY, NOVEMBER 1, 2023, 5 P.M. [ET]

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

WINNERS of the Summer 2023 "Caption This Photo" Contest:

Although this image was not as popular as others with the contestants, we received 71 captions from 33 members for the Summer 2023 contest. You can read all entries, including captions and results from recent contests, at ***tbp.org/pubs/captionContest.cfm***.

1ST PLACE:

"Oh no, her head's not there! Quick someone look under the table."

Michael S. Bronzini, Ph.D., *CA G '67*

2ND PLACE: 2-WAY TIE

"Flipping the coin was the easy part; finding it — not so much!"

Richard R. Roll, P.E., *IN B '81*

"Tau Bates have magnetic personalities."

David A. Bailey, *NY K '84*

3RD PLACE:

"After years of exhaustive research, a team of Tau Beta Pi engineers has located Schrödinger's cat hiding under a table at The Holiday Inn in Minneapolis, MN."

Thomas G. Hausheer, *IL B '70*

NOTE: The "Anonymous" 2nd place winner of the Spring 2023 Caption Contest has been identified. Congratulations, Timothy F. Boland, P.E., *NY B '73*!

▲ The Summer 2023 contest image (above) was taken at the 1998 Convention in Manhattan, KS. It most likely captures a scene from the Resolutions Committee's final skit at the closing banquet.

CONGRATULATIONS TO OUR WINNERS!

IN THE COLLEGES

Tau Bates having an impact at institutions of higher learning.

Carissa N. Eisler Ph.D.

California Epsilon '10

Carissa is a 2023 recipient of the Northrop Grumman Excellence in Teaching Award given by the UCLA School of Engineering. An alumna, she joined UCLA in 2019 and is now an assistant professor of chemical and biomolecular eng'g. Carissa was cited for being "at the forefront of bringing innovative educational techniques to help enhance students' learning experience."

Azim Eskandarian Ph.D.

District of Columbia Gamma '82

Azim was named dean and endowed chair of the Virginia Commonwealth University College of Engineering, effective August 1. Since 2015, he has served as department head and professor of mechanical eng'g at Virginia Tech. His research focuses on robotics and autonomous and dynamical systems and two of his three mechanical engineering degrees are from George Washington University.

Samara L. Firebaugh Ph.D.

New Jersey Delta '95

Samara was selected as the new academic dean and provost for the United States Naval Academy, where she's been serving as associate provost for academic affairs since 2020. In this position, she will be responsible for the entire academic program for the Brigade of Midshipmen. In 2022, Samara was awarded the Navy Superior Civilian Service Award.

SPOTLIGHT: H&H and Morgan State University Partnership— Hardesty and Hanover (H&H), a full-service infrastructure engineering firm, has announced a partnership with Morgan State University (MSU). Initially, H&H will provide financial support for engineering students by donating $10,000 to the MSU School of Engineering Work Experience Program. This will allow for 8-10 undergraduate engineering students to receive financial assistance in the coming year. Beyond funding, H&H and MSU are developing opportunities for students to be involved with H&H staff, including mentorship and classroom programs. Morgan State, located in Maryland, is the only HBCU Engineering School with both Tau Beta Pi and Chi Epsilon chapters.

University of Kentucky Team Researches Fiber Reinforced Polymer Composites— A team at the University of Kentucky (UK) dubbed "CatStrong" and led by **Issam E. Harik, Ph.D.,** *MI E '77*, are trying to determine if discarded human hair can be used to help repair bridges and buildings across Kentucky and beyond. Dr. Harik, a professor of civil engineering, has led this group of students, since 1994, in researching the deployment of fiber reinforced polymer composites, or FRP, in bridges and buildings. Now with help from a researcher at the Kentucky Transportation Center, they are investigating how to make the concrete construction process more sustainable. The strength and benefits of using human hair are undeniable as it "has an average strength of 30 kilopounds per square inch," Dr. Karik explained.

Alec D. Gallimore Ph.D.

New York Gamma '86

Alec began serving as Duke University's Provost and Chief Academic Officer in July. He's led University of Michigan's College of Engineering as dean since 2016, founded and directs UofM's Plasmadynamics and Electric Propulsion Lab, and is an aerospace and applied physicist. Alec is a recipient of the Stuhlinger Medal, the highest honor in the field of electric propulsion.

Kenneth R. Lutchen Ph.D.

Virginia Alpha '77

Kenneth assumed the position of provost *ad interim* and chief academic officer at Boston University (BU) on July 1. He has served as the BU Dean of Engineering since 2006 and is also a professor of biomedical engineering. Kenneth has published 150+ peer-reviewed journal articles cited nearly 9,000 times and his research uncovers the mechanisms that cause lung disease.

Elise F. Morgan Ph.D.

California Gamma '96

Elise was recently named *ad interim* dean of the Boston University College of Engineering, where she is also a professor of engineering design and innovation, associate dean for research and faculty development, and director of the Center for Multiscale and Translational Mechanobiology. Her bachelor's degree in mechanical engineering is from Stanford University.

Jim Pfaendtner Ph.D.

Washington Alpha '01

Jim was named dean at North Carolina State University College of Engineering, effective August 1. He had been at the University of Washington since 2009, where he most recently served as department chair of chemical engineering, and his research lab helped develop new methods to expand capabilities of molecular simulation. Jim earned a B.S degree from Georgia Tech.

David J. Russomanno Ph.D.

Indiana Zeta '86

David was appointed executive vice president for academic affairs and provost at the University of Memphis. Since 2010, he has served as dean of the Purdue School of Engineering and Technology at Indiana University — Purdue Univ. Indianapolis and as a tenured professor. David joined ΤΒΠ in 2015 as an eminent engineer and has M.S. and Ph.D. degrees from the Univ. of South Carolina.

Christopher A. Schuh Ph.D.

Illinois Alpha '97

Christopher has been named the dean of Northwestern University's School of Engineering and Applied Science. Most recently, he was a professor of materials science & eng'g at MIT where he served as head of the department from 2011-20. His research is focused on structural metallurgy, and before joining MIT, Christopher held a postdoctoral fellowship at Lawrence Livermore National Lab.

FACILITIES: UNR to Establish the Nevada Center for Water Resiliency—A grant proposal from two University of Nevada, Reno, (UNR) associate professors has led to a $4 million grant from the U.S. Army Engineer Research and Development Center. The new Nevada Center will organize under the university's existing Nevada Water Innovation Institute and focus on research and test new technologies in water treatment, with an eye on potable water (drinking water) reuse from a variety of water sources. The center will be led by Sage Hiibel, Ph.D., (chemical & materials eng'g) and **Eric A. Marchand, Ph.D.,** *NV A '95*, (civil & environmental eng'g). Their proposal was divided into three phases and the establishment of the new center, which began in May, is the first phase.

New Engineering and Research Building—In June, Prairie View A&M University (PVAMU) opened its new Engineering Classroom and Research Building. This is the sixth building to be added to the College of Engineering (COE) complex and the building, ENCARB, has 106,000 square feet dedicated to classroom instruction and specialized labs. The lab spaces support multidisciplinary research in space exploration, data analytics and AI, robotics, structural analysis, 3-D manufacturing, and more. The remaining third of the facility provides dedicated research lab space for faculty and graduate students. The PVAMU COE is in its 75th year of existence and this is the first new facility in nearly two decades. In addition, there are plans to build a large auditorium and additional research space.

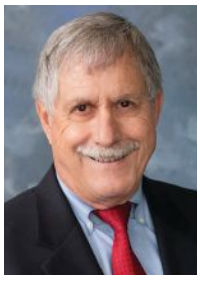
Justin Schwartz Ph.D.

Illinois Alpha '85

Justin is executive vice president and provost at Pennsylvania State University after serving in an interim capacity since August 2022. Previously, he was dean of Penn State's College of Engineering. Justin is a recognized leader in the interdisciplinary field of applied superconductivity and is co-founder and CEO of Lupine Materials and Technology Inc., an optical fiber sensors company.

John W. Steadman Ph.D., P.E.

Wyoming Alpha '64



John received the 2023 Engineering and Physical Sciences Hall of Fame Award presented by the University of Wyoming (UW) College of Engineering & Physical Sciences and the WY Alpha Chapter. He recently retired as engineering dean at the Univ. of South Alabama, previously worked on astronaut life support systems for General Dynamics, and taught/served as an eng'g department chair at UW.

Paul J. Tikalsky Ph.D., P.E.

Wisconsin Alpha '84

Paul was selected by the U.S. Dept. of State and the Fulbright Foreign Scholarship Board to receive a Fulbright Specialist Program Award. He is Oklahoma State University College of Engineering, Architecture, and Technology dean and will complete a project at Namangan Inst. of Engineering and Tech. in Uzbekistan aiming to exchange knowledge & establish partnerships in the field of eng'g education.

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

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

Recent talks include:

- **Anita Gale**, *WA A '73*
  Creating the Infrastructure for Business to Occur in Space
- **Michael Dickey, Ph.D.,** *GA A '99*
  How Liquid Metals will Contribute to our Future
- **Gary Brown,** *CA A '91*
  The Challenges of Getting Silicon into Customers' Hands: Perspectives from the Technical Marketing Front Lines
- **Lilia Abron, Ph.D., P.E.,** *DC A '68*
  Social Entrepreneurship's Impact on Converting Sanitation Services into a Capital Market

Tau Bates:

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

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

Upcoming Fall speakers:

- October 8, 2023 @ 4 p.m. ET
  Abraham Atte, *KS A '20*
  Beyond the Skyline: Navigating the Challenges of Urban Mobility
- November 12, 2023 @ 7 p.m. ET
  Paul Gross, *MI G '83*
  The Scientific Truth about Global Warming
- December 10, 2023 @ 4 p.m. ET
  Henry Louie, *MI Z '02*
  Ending Energy Poverty through Off-Grid Solar Power

The interesting, inspiring speakers will get you thinking.
A full roster of previous speakers can be found here: *www.tbp.org/?TBPtalks*
Send an email to *tbp.talks@tbp.org* to get on the Tau Bate Talks email list!

TAU BATE TALKS

The Tau Beta Pi Engineering Honor Society Speaker Series

Letters continued from page 3.

Mission and Vision

I am very disappointed that an entire page of reader's letters was dedicated to giving these viewpoints a platform, but I will take this as an opportunity to show exactly why diversity, equity, and inclusion are values that Tau Beta Pi should be embracing and uplifting.

Clearly these individuals have forgotten the vision and mission of ΤΒΠ, which emphasizes recognizing not only scholastic achievement, but also exemplary character, leadership, professionalism, lifelong learning, and to "foster a spirit of liberal culture in engineering colleges." These are directly taken from the ΤΒΠ website and were conferred as we were sworn in.

The mission is not establishing excellence as superiority or maintaining the status quo. The Association's goal has always been to foster engineers of the future who help trailblaze and lead their fellow engineer siblings for a better world. What part of staunch resistance against the advancement of alternative energy sources or developing better and more stable housing infrastructure falls into advancing excellence in engineering or developing technology?

I will agree that there are no equal outcomes for everyone, because we can clearly see that not every individual in this country is given the same chances to achieve excellence. For example, the hurdles that a queer person of color from an impoverished community that lacks resources to develop high-level mathematics courses in high school, who has to work a part-time job to make ends meet because they were evicted for their identity, will have a far higher mountain to climb in order to get to the same starting line than a Caucasian student who had already completed and received course credit for calculus I and II and has a secure family that is able to provide for their education, fees, and housing. This is exactly why resources such as the ΤΒΠ Fellowship and Scholarship programs exist: to recognize the amount of hard work these individuals have committed to being incredible engineers. By implying that we should not be rewarding the individuals who have to work doubly hard, we will only be gate keeping potentially bright minds from contributing new and innovative ideas.

Minds that have seen more of the world can provide alternative perspectives and enlighten others on what the world is lacking. Absolute shame on you all who have forgotten what "noblesse oblige" means. You, who have had the opportunity to be recognized for your achievements, are now complacent and unwilling to be a part of guiding the future engineers, because of your close-mindedness of who could be an excellent engineer.

I implore you to re-evaluate your values.

Maggie Chiu, *CA AB '20*

DEI Reducing Barriers

When I was a student in the '70s, it was a rare person who studied engineering as anything but a white male student. After decades of effort in industry and academia, diversity and inclusion programs have reduced the once formidable barriers that prevented the latent members of our profession such as those excellent people who are now common in the "Who's Who" highlights and the ΤΒΠ Fellows articles. While some wish to hit the snooze button and return to the exclusionary sleep of the past, I am delighted to see a wide range of brilliant minds entering our profession. Those who wrap themselves in trigger words and pat slogans only do our profession a disservice. The world needs all the skills, experiences, talent, and imagination that all engineers can bring to solve today's problems.

A.G. Kegel, *IN A '77*

Importance of DEI

I recently read the letters in the Spring issue and want to say that I'm proud that Tau Beta Pi is recognizing the importance and necessity for DEI in an engineering space. There are so many reasons to consider DEI as an engineer; the education of our students, the accessibility and ethics of our designs, the career mobility of our workforce, and the ability to develop ΤΒΠ members across identities. Thank you for the work you are all doing and if there is anything I can do to help, please let me know.

It pains me that some of our current members fail to see the opportunities DEI work gives the world, but I am filled with hope each year as future engineers choose to advocate for others and prove that the world can be better.

Christian P. Newkirk, *OK A '23*

Equity and Social Justice

Wow, I read some of the comments in the Summer issue and it makes me wonder why some engineers want to stick their heads in the ground and deny the realities of history. I can understand their apprehension, but to try to pit engineering excellence against social justice doesn't make sense.

I applaud your efforts to inform and address engineering's role and opportunities to improve engineering excellence by casting a wider net that, in the future, will include all inhabitants of the planet, all genders, races, economies, thinking and philosophies. For the future: "Engineering for the benefit of humanity." Keep up the good work!

Robert B. Hauck, *PA Θ '72*

DEI Reducing Barriers

When catching up with a fellow former Oklahoma Alpha Chapter president, I became distraught when our discussion turned to the hateful letters in the last edition of the magazine.

As one of the 2022 Convention DEI Committee members, I thought the conception of the committee and the ideals were quite clear and logical.

As engineers, it is our duty to uphold the highest standards, which includes finding and raising the best voices, ideas, and perspectives. Many of those voices are from demographics that are historically underrepresented, and thus have a higher barrier of entry to engineering. There is no special preference to any engineer — academic excellence and exemplary character are still the requirements for invitation and admission into our society. There is only a focus on ensuring those minds are aware of the opportunities that they have.

Engineering in an echo chamber is the cause of stagnation and complacency. The thought that so many Tau Bates with "exemplary character" are indifferent towards, or even encouraging, of such a thing is distressing. Tau Beta Pi should focus on ensuring the proud legacy of engineering stays vibrant, diverse, and excellent.

Alexandria "Rose" Thomas, *OK A '23*

Letters continue on page 44.

CHAPTER ETERNAL

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

NY X

New York Xi '63
Henry Petroski, Ph.D., P.E.
June 14, 2023
He was a professor of engineering at Duke University, an author of several books examining engineering, and a writer of op-eds for the New York Times *and articles in* The Bent.

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

ALABAMA

ALPHA AL Α

Nall Jr., Joseph Leslie, *'49*, June 23, 2023.
Cook, Harry Eugene, *'51*, April 14, 2017.
Riley, Charles E., *'55*, December 4, 2018.
Cameron, Roy L., *'56*, June 19, 2018.
Laster, Marion Lynn, *'56*, June 14, 2020.
Akridge, Charles Max, *'60*, January 15, 2013.
Hale, Robert Adams, *'62*, no details.
Saxon, James B., *'65*, December 21, 2022.

BETA AL Β

Bess, William Ernest, *'46*, Dec. 13, 2016.
Low, William Lewis, *'51*, July 2, 2021.
Spivey, William Tolbert, *'56*, March 29, 2022.
Baird Jr., James Adam, *'58*, Feb. 26, 2022.
Roth, Philip Anthony, *'58*, June 15, 2014.
Ward, John Daniel, *'58*, February 15, 2022.
Groover, Roy Edward, *'59*, February 27, 2014.
Gachet, Thomas Hugh, *'60*, August 24, 2022.

DELTA AL Δ

Audeh, Nadeem Fawzi, *'57*, October 17, 2022.

ARIZONA

ALPHA AZ Α

Isaacs, Leslie Thomas, *'50*, July 27, 2019.
Penner, Paul H., *'50*, January 1, 2017.
Griswold, Frederick D., *'51*, April 26, 2021.
McLear, Robert Lawrence, *'59*, Nov. 1, 2020.

BETA AZ Β

Gupta, Someshwar C., *'57*, July 23, 2017.

ARKANSAS

ALPHA AR Α

Blevins, Harold Ray, *'57*, January 24, 2022.
Sandage, Charles Otis, *'58*, Nov. 16, 2022.
Barron, Robert Clayton, *'59*, Sept. 22, 2022.
Bennett, Richard Leo, *'59*, April 25, 2022.
Kaufman, Theodore Phillip, *'59*, Dec 18, 2015.

CALIFORNIA

ALPHA CA Α

Lambert, Ward Emerson, *'49*, Jan. 4, 2020.
Roberts, Nian Stevenson, *'50*, May 17, 2020.
Back, Lloyd, *'59*, March 21, 2022.
Threefoot, Philip S., *'60*, August 22, 2022.
Pennisi Jr., Frank Joseph, *'92*, no details.

BETA CA Β

Mac-Rostie, Wayne, *'42*, August 30, 2016.
Chiang, Ti-Ming, *'92*, January 6, 2007.

GAMMA CA Γ

Hart, Richard T., *'50*, March 31, 2023.
Treaster, Eugene C., *'55*, October 21, 2021.
Bomben, John Louis, *'60*, Nov. 27, 2022.

DELTA CA Δ

Singleton, Earl Louis, *'51*, July 20, 2017.
Barton, Don Chester, *'57*, February 4, 2022.
Lee, Don Nguey, *'58*, March 13, 2012.

EPSILON CA Ε

Rahe, George Anthony, *'57*, January 26, 2012.
Bowers, William James, *'58*, Nov. 24, 2022.
Olson, Franklin John, *'58*, April 16, 2016.
Holmes, Jack Kenneth, *'60*, April 5, 2023.
Wakamoto, Charles Yoshio, *'60*, April 5, 2022.

ETA CA Η

Elkins, Perry Eugene, *'59*, March 18, 2015.

THETA CA Θ

Brodnax, Charles Troy, *'60*, April 12, 2023.

IOTA CA Ι

Roth, Gerhard Baldur, *'67*, Sept. 20, 2021.
Thomsen, Jonathan W., *'69*, June 13, 2023.

LAMBDA CA Λ

Mukherjee, Amiya K., *'54*, Sept. 11, 2021.

MU CA Μ

Fewell, Thomas Joseph, *'72*, April 18, 2023.

OMICRON CA Ο

Pilecki, Boleslaw, *'75*, December 8, 2016.

COLORADO

ALPHA CO Α

Tuttle, Jerry William, *'57*, October 28, 2021.

BETA CO Β

Williams, Nolan Harold, *'42*, Nov. 15, 2007.
Paquette, Walter Joseph, *'51*, Jan. 4, 2020.
Morgan, James Irving, *'55*, February 10, 2023.
Peterson, Max Eugene, *'57*, May 22, 2019.
Blair, Richard Frederick, *'59*, Nov. 26, 2011.
Navickas, Stanley Joseph, *'60*, Oct. 16, 2022.

GAMMA CO Γ

Rowe, James, *'54*, April 17, 2023.
Whissen, Robert Eugene, *'56*, May 9, 2017.
Wasmundt, Donald Frank, *'57*, March 3, 2018.

CONNECTICUT

ALPHA CT Α

Springborn, Reynolds, *'50*, May 28, 2023.
Brush, Donald Kennedy, *'51*, January 1, 2019.
Wells III, Schuyler Carl, *'56*, Sept. 29, 2019.

BETA CT Β

Nicola, Renato Nathan, *'49*, June 1, 1978.
Solecki, Roman, *'50*, July 29, 2017.
Pedersen, Robert Norman, *'51*, July 25, 2021.
Scoville Jr., Andrew E., *'52*, March 21, 2020.
Southall, Kenneth, *'52*, July 29, 2018.
Willerford, Theodore C., *'52*, Nov. 23, 2016.
Ashford, Charles Robert, *'54*, Nov. 11, 2015.
Corvari, John, *'56*, March 16, 2017.
Ridgeway, Hallas Hazard, *'56*, Feb. 28, 2020.
Assard, Gerald Leo, *'59*, December 9, 2020.
Foltz Jr., Floyd, *'59*, October 18, 2001.
Lubin, Barry Thomas, *'59*, May 12, 2018.
Autorino, Anthony D., *'60*, January 25, 2019.
Kostoss, Joseph Martin, *'64*, June 15, 2019.

DELAWARE

ALPHA DE Α

Tybout, Richard A., *'43*, March 18, 2022. ***Cent.***

DISTRICT OF COLUMBIA

ALPHA DC Α

Moore Jr., Arthur Franklin, *'56*, June 3, 2016.

FLORIDA

ALPHA FL Α

Brauns, Fred, *'58*, no details.
Fried, Martin Michael, *'73*, no details.

BETA FL Β

Cullmann, Frederick Earl, *'65*, Nov. 1, 1992.

GEORGIA

ALPHA GA Α

Ingram Jr., Benjamin M., *'43*, Jan. 10, 2017.
MacDonnell, Richard J., *'46*, July 15, 2021.
Hollis, Ardell O'Connor, *'47*, May 20, 2008.
Hobbs, Linder C., *'48*, February 7, 2014.
Carroll, James Eugene, *'50*, Aug. 23, 2022.
Crutcher, William C., *'50*, April 2, 2021.
Hutton, Robert Newton, *'51*, Oct. 11, 2021.
Nance, Taylor Edwin, *'51*, October 30, 2021.
Belardi, Richard Joseph, *'53*, Dec. 1, 2022.
Stancil, Robert Thomas, *'53*, Sept. 21, 2020.
Hicks, Herbert Gosa, *'54*, January 6, 2018.
Krohn, Charles Anthony, *'55*, no details.
Tilghman, Cooper R., *'55*, April 29, 2013.
Barnett, Robert U., *'58*, Feb. 23, 2007.
Presson Jr., Banks Reid, *'58*, April 3, 2005.
Smith, Lester Robert, *'58*, July 22, 2020.

ILLINOIS

ALPHA IL Α

Shadle, Paul W., *'45*, April 1, 2023. ***Cent.***
Lindstrom, Robert Engh, *'50*, May 4, 2013.
Loewe, Richard T., *'50*, April 29, 2015.
Vance Jr., Paul A., *'51*, August 26, 2015.
Ritt, Jack Arthur, *'52*, January 15, 2022.
Babel, Henry Wolfgang, *'55*, Nov. 7, 2015.
Quantock, Charles W., *'56*, Sept. 14, 2021.
Bermes, Richard W., *'58*, Feb. 14, 2017.
Ahlberg, Harold Lee, *'60*, June 18, 2020.
Bronson, John A., *'60*, October 8, 2018.
Lynk Jr., Charles Nelson, *'60*, Oct. 2, 2021.
Davis, Stephen Robert, *'63*, no details.
Balow, Frank A., *'94*, no details.

BETA IL Β

Thomson, Douglas H., *'59*, June 19, 2014.

GAMMA IL Γ

Mitchell, Ned E., *'47*, January 21, 2009.
Durnal, Robert G., *'49*, March 16, 2020.
Yamasaki, James, *'49*, January 23, 2013.
Goodell, Robert Sewall, *'53*, April 23, 2020.

DELTA IL Δ

Kraatz, Roland Lee, *'65*, no details.
Epp, Larry W., *'84*, August 10, 2021.

INDIANA

ALPHA IN Α

Branner Jr., Frank M., *'42*, June 29, 2017.
Monack, Donald A., *'46*, April 8, 2021.
Burkart, Edward C., *'48*, Sept. 4, 2018.
Shewmaker, Bruce P., *'48*, Oct. 29, 2017.
Brahm, Charles B., *'49*, April 14, 2021.
Gray, Dean Lowell, *'51*, August 12, 2019.
Spradlin, Kirt Melone, *'51*, June 14, 2020.
Cohen, Gerald Allen, *'52*, October 1, 2014.
Stanwood, Jay Wesley, *'52*, April 12, 2023.
Yoder, Robert Fetzer, *'52*, Jan. 21, 2015.
Evans, Merrill Edwin, *'53*, Jan. 26, 2023.
Brouillette, Eugene C., *'54*, May 2, 2021.
Stoltz, Richard A., *'54*, Sept. 17, 2022.
Ford, Dale Charles, *'56*, July 19, 2020.
Hodson, Charles Henry, *'56*, Nov. 20, 2020.
Robinson II, C. B., *'56*, May 9, 2017.
Burkhard, James V., *'57*, August 16, 2006.
Kalina, Francis W., *'58*, June 14, 2017.
Bolman, Robert Paul, *'59*, Feb. 16, 2023.
Van Putte, Douglas A., *'59*, April 4, 2021.
Shook, Edgar Graham, *'60*, Feb. 14, 2020.
Zagotta, Robert Ernest, *'60*, Dec. 9, 2014.
Shortle Jr., George E., *'62*, April 18, 2023.
Austgen, Martin James, *'64*, Jan. 16, 2021.

GAMMA IN Γ

Cannata, Frederic John, *'58*, Jan. 31, 2022.
Daughton, John William, *'58*, May 8, 2016.
Solomito Jr., Milo, *'59*, October 23, 2022.

IOWA

ALPHA IA Α

Zack, Rolyn James, *'44*, July 21, 2015.
Burnet, George, *'48*, January 13, 2023.
Hertzberg, Lowell, *'48*, December 5, 2014.
Hierseman, Wayne Ruel, *'50*, Jan. 27, 2022.
Klindworth, John, *'50*, October 6, 2014.
Ewen, Richard Lee, *'52*, March 21, 2020.
Johnson, Frederick H., *'53*, May 8, 2021.
Knobbe, Louis Joseph, *'53*, Jan. 2, 2023.
Henderson, Jerald M., *'56*, June 10, 2016.
Adams, Clark Francis, *'58*, August 6, 2017.
Hoversten, Estil Vernon, *'58*, Feb. 4, 2021.
Smith, Larry Eugene, *'58*, Nov. 29, 2022.
Sellew, Roger Franklin, *'59*, April 15, 2023.
Muhlenbruch, Gilbert R., *'60*, Jan. 28, 2021.
Venteicher, Leroy Paul, *'60*, Oct. 30, 2019.
Witte, Robert Fred, *'60*, October 3, 2005.
Carroll, Charles B., *'64*, Feb. 23, 2018.

BETA IA Β

Luecke, Gerald, *'50*, January 26, 2020.
Rathjen, Keith Richard, *'56*, Aug. 27, 2021.
McSwiggin, Thomas G., *'61*, May 17, 2023.

KANSAS

ALPHA KS Α

Banker, Robert Fitch, *'49*, May 16, 2023.
Lewis, Herbert Dunham, *'50*, Nov. 9, 2020.
Miller, Robert Edward, *'52*, Feb. 19, 2022.
Werenicke, Kenneth G., *'54*, Sept. 1, 2022.
Chang, Donald M-Y, *'56*, April 18, 2007.
Hayman, Layton Wayne, *'59*, Jan. 1, 2020.
Lane, Stephen Russell, *'75*, Aug. 28, 2021.

KENTUCKY

ALPHA KY Α

Aspley, Robert Luther, *'51*, May 10, 2013.
Gatlin, Richard Henry, *'60*, March 16, 2022.
Rose, George William, *'60*, Jan. 31, 2021.

BETA KY Β

Gold, Alan Weber, *'54*, January 19, 2021.

LOUISIANA

ALPHA LA Α

Coleman, Gerald C., *'56*, Feb. 19, 2018.
Braden Jr., Milton W., *'58*, Oct. 16, 2017.
Drexel, Ralph Edward, *'58*, May 16, 2022.
Graham, Walker Watson, *'58*, Jan. 26, 2022.
Chapoton Jr., Charles W., *'60*, Dec. 2, 2022.
Hooper, Harney E., *'60*, July 28, 2018.
Gray, William Mulroy, *'77*, no details.

BETA LA Β

Bernstein, Richard L., *'65*, Sept. 7, 2022.

GAMMA LA Γ

Edwards, John Ward, *'58*, no details.
Toney, Jewell, *'59*, March 24, 2019.
Toney Jr., Robert Lee, *'60*, Nov. 4, 2021.
Madden, Jerry Mack, *'66*, July 1, 2022.

MAINE

ALPHA ME Α

Greenwood, George W., *'51*, no details.
Pease, Richard Ray, *'53*, Feb. 10, 2008.
Douglass Jr., David H., *'55*, Feb. 7, 2023.
Kolouch, Robert Joseph, *'58*, May 3, 2017.

MARYLAND

ALPHA MD Α

Kennedy, Edward Rodger, *'53*, no details.

BETA MD Β

Siegel, Raymond Henry, *'51*, Feb. 5, 2023.
Shanklin, Donald W., *'60*, Sept. 30, 2014.
Newton Jr., John Willard, *'61*, May 16, 2023.
Durkin, Richard Sean, *'68*, April 22, 2023.

MASSACHUSETTS

ALPHA MA Α

Sarli, Vito Joseph, *'52*, December 22, 2018.

BETA MA Β

Perley, Richmond, *'49*, October 3, 2018.
Baker, Marvin L., *'51*, April 6, 2023.
Gooch, Robert Sheafe, *'51*, July 3, 2005.
Kinzinger, Walter Carl, *'51*, June 5, 2023.
Brady Jr., John Patrick, *'53*, Jan. 2, 2013.
Anslow, Robert Edward, *'54*, March 9, 2017.
Schwarz, Eddie Joe, *'54*, April 7, 2023.
Sirkin, Arthur Leonard, *'56*, Feb. 19, 2021.
Grettenberg, Thomas L., *'57*, May 5, 2008.
Cluck, Harold Douglas, *'58*, Sept. 20, 2018.
Schlenker, Roy Frank, *'59*, Dec. 15, 2023.
Clive, Colin George, *'60*, March 7, 2022.

DELTA MA Δ

Robbins, Theodore C., *'56*, Jan. 9, 2018.

EPSILON MA Ε

O'Donnell, John Joseph, *'56*, Oct. 12, 2022.

ZETA MA Ζ

Hathaway, Richmond W., *'52*, Jan. 27, 2016.
Walker Jr., William E., *'57*, Feb. 15, 2023.
Price, Richard Maxwell, *'58*, Sept. 30, 2020.
Augstkalns, Valdis A., *'61*, Jan. 11, 2021.
Butler, Douglas John, *'67*, Dec. 23, 2022.

THETA MA Θ

Chesley, Wayne, *'88*, September 12, 2021.

MICHIGAN

ALPHA MI Α

Sayers, Richard Gerard, *'50*, May 26, 2019.
Jedynak, Leo, *'54*, January 16, 2018.
Reisbig, Ronald L., *'60*, June 4, 2017.
Fehsenfeld, John Allen, *'63*, Sept. 27, 2020.

BETA MI Β

Allen, Jerry Rensslear, *'51*, Dec. 15, 2020.
Scott, Kenneth John, *'55*, May 20, 2018.

GAMMA MI Γ

Smith, Richard Herbert, *'51*, Oct. 11, 2020.
Erf, Robert Knapp, *'53*, March 21, 2016.
Fancher, Paul Strimple, *'53*, Nov. 5, 2021.
Gillette, Jack Schroeder, *'53*, Oct. 22, 2013.
Highstrete, Bruce A., *'53*, March 14, 2012.
Angus, John Cotton, *'56*, February 20, 2023.
Thomas, David Charles, *'56*, June 1, 2023.
Ness, Thomas Eugene, *'59*, Feb. 9, 2013.
Bontekoe, Eldert August, *'75*, no details.

EPSILON MI Ε

Love, Sol M., *'41*, February 20, 2021. ***Cent.***

ZETA MI Ζ

Andon, Jerar, *'50*, no details.
Meyers, David Melvin, *'88*, Jan. 11, 2023.

MINNESOTA

ALPHA MN Α

Goldstein, Richard Jax, *'48*, March 6, 2023.
Heilig, Louis Frank, *'48*, October 29, 2004.
Wenzel, James Gotilieb, *'48*, Oct. 26, 2022.
Marpe, Donald Edward, *'57*, June 9, 2023.
Rubbert, Paul Edward, *'59*, Dec. 23, 2020.

MISSISSIPPI

ALPHA MS Α

Harvey, Joseph M., *'49*, June 29, 2013.
McCain Jr., William D., *'56*, Sept. 20, 2019.
Olivier, Jean Rene, *'56*, January 11, 2023.
Riley Jr., Grady Franklin, *'56*, no details.
Hight, Hermon Hawkins, *'57*, Jan. 14, 2022.
Simmons, Reginald F., *'57*, Feb. 5, 2014.
Lominick, James M., *'60*, Jan. 2, 2015.

MISSOURI

ALPHA MO Α

Feng, Chuan Chung, *'45,* May 29, 2019.

BETA MO Β

Berkey, Vernon G., *'50*, April 13, 2023.
Rutz, Warren William, *'50*, Oct. 29, 2021.
Giboney, John Roger, *'58*, Oct. 26, 1960.
Hahn, James Henry, *'59*, May 24, 2023.
Anderson, William A., *'60*, Sept. 6, 2015.

GAMMA MO Γ

Thomas, Arthur, *'50*, May 30, 2023.
Thompson III, Parke, *'53*, January 10, 2018.
Rehg, Larry Maurice, *'59*, Oct. 25, 2021.

MONTANA

ALPHA MT Α

Stuart, Gilbert Edwin, *'87*, no details.

NEBRASKA

ALPHA NE Α

Stafford, Bruce Hollen, *'43*, Feb. 19, 2017.
Jones, Nolan Thomas, *'51*, July 14, 2015.

NEW JERSEY

ALPHA NJ Α

Hopper, James William, *'48*, Dec. 11, 2015.
Davis, Willard Frew, *'51*, June 20, 2012.
Eckel, Eugene Joseph, *'51*, Nov. 15, 2016.
Haass, Walter Paul, *'52*, Nov. 23, 2022.

BETA NJ Β

Maurer, Arthur Kent, *'51*, Dec. 8, 2021.

GAMMA NJ Γ

Livermore, Robert Alan, *'55*, July 6, 2022.
Kretchmar, Paul Richard, *'57*, Dec. 4, 2022.
Wojcik, James Francis, *'60*, Aug. 16, 2021.
Tehve, Toomas, *'64*, June 22, 2021.
Ellerbusch, Fred, *'73*, no details.

CHAPTER ETERNAL

Continued

TX A

Texas Alpha '54

Mo-Shing Chen, Ph.D., P.E.

May 1, 2023

A world-renowned power engineering educator & researcher, he spent 40+ years at UT Arlington founding their Energy Systems Research Center and received the 1984 IEEE Centennial Medal.

NEW MEXICO

BETA NM Β

Keogh, William Patrick, *'74*, July 4, 2021.

NEW YORK

ALPHA NY Α

Frisch, Ivan Thomas, *'58*, January 28, 2023.
Korn, Peter, *'65*, May 7, 2023.

BETA NY Β

Wendt, Ronald Philip, *'48*, October 1, 2017.
Poppe, Frederick B., *'49*, April 26, 2016.
Welna, Henry Joseph, *'51*, Oct.10, 2015.
Birdseye, David Edwin, *'54*, Jan. 26, 2022.
Yonko, Michael, *'55*, February 5, 2023.

GAMMA NY Γ

Campbell, George Stuart, *'47*, Oct. 15, 2022.
Baynes, Richard Calvin, *'50*, Jan. 26, 2013.
Haroutiounian, Aram, *'50*, April 5, 2023.
Korten, Robert, *'50*, March 17, 2019.
Lassen, Richard H., *'50*, March 16, 2013.
Hamlin, Richard J., *'51*, February 21, 2018.
Grauten, Henry S., *'54*, Sept. 2, 2015.
Selleck, Franklin George, *'55*, April 1, 2014.
Kunitz, Paul Robert, *'56*, Nov. 6, 2022.
Gilligan, Thomas James, *'57*, Feb. 14, 2012.
Serra, Raymond Alfred, *'57*, April 14, 2023.
Swigart, Rudolph J., *'57*, March 26, 2015.
Haslett, Robert Andrew, *'58*, no details.

DELTA NY Δ

Abraham Jr., Leonard G., *'49*, no details.
Hesse Jr., Joseph P., *'51*, June 4, 2018.
Spencer, Peter Dudley, *'52*, Feb. 23, 2018.
Edwards Jr., George D., *'55*, June 8, 2023.
Midler Jr., Michael, *'59*, Feb. 12, 2023.

EPSILON NY Ε

Brolin, Stephen Joseph, *'57*, Oct. 29, 2022.

THETA NY Θ

Dorf, Richard C., *'55*, October 22, 2020.
Michalek, Donna Jean, *'85*, April 26, 2012.

IOTA NY Ι

Broderick, William C., *'48*, Feb. 9, 2005.
Kay, Ira William, *'62*, August 7, 2016.

KAPPA NY Κ

Shapiro, Sidney, *'53*, September 15, 2022.
McGurk, Leon Hugh, *'59*, Feb. 8, 2018.

LAMBDA NY Λ

Ryan, William, *'62*, June 8, 2023.

NU NY Ν

Kopp, Carl G., *'63*, April 16, 2023.

XI NY Ξ

Petroski, Henry, *'63*, June 14, 2023.

NORTH CAROLINA

ALPHA NC Α

Cox, Myron Keith, *'49*, September 16, 1996.
Crotts, Marcus Bowman, *'53*, June 8, 2019.
Alspaugh, James B., *'54*, Dec. 11, 2017.
Smith, Allie M., *'56*, November 21, 2021.
Laughon, Kermit O., *'61*, May 7, 2023.

GAMMA NC Γ

Litle, William Albert, *'56*, March 16, 2018.

NORTH DAKOTA

ALPHA ND Α

Brezden, Carl, *'53*, January 30, 2012.
Duerre, Kenneth Harold, *'58*, no details.
Starkey, Alden Reed, *'66*, Nov. 10, 2020.

BETA ND Β

Snortland, Robert K., *'57*, Aug. 15, 2022.

OHIO

ALPHA OH Α

Kumagai, Joy Yasuo, *'52*, July 7, 2014.
Gurev, Harold Samuel, *'57*, Jan. 2, 2022.
Tuppeny Jr., William H., *'58*, Feb. 16, 2016.

GAMMA OH Γ

Birle, John David, *'62*, February 9, 2020.

DELTA OH Δ

Zajac, Theodore Stanley, *'52*, Sept. 30, 2018.

EPSILON OH Ε

Sramek, Dennis Henry, *'71*, July 24, 2022.

ETA OH Η

Stolberg, Carl Gene, *'57*, April 19, 2018.
DePriest, C. David, *'74*, April 25, 2022.

THETA OH Θ

Rall, Richard Maurice, *'56*, July 3, 2021.

IOTA OH Ι

Barth, Herbert G., *'61*, March 4, 2023.

OKLAHOMA

ALPHA OK Α

Martin Jr., Ewell Butler, *'50*, Oct. 28, 2003.
Garriott, Owen K., *'53*, April 15, 2019.
Loeffler, Robert I., *'53*, April 16, 2013.
Williamson Jr., Roy C., *'56*, June 6, 2023.

OREGON

ALPHA OR Α

Devlin, Joseph Thomas, *'50*, Aug. 6, 2021.
Laursen, Robert Boyd, *'50*, Nov. 9, 2020.
Sheldahl Jr., John O., *'57*, Jan. 10, 2023.

PENNSYLVANIA

ALPHA PA Α

Malone, Maurice Orrie, *'52*, Sept. 8, 2018.
Rakowski, Charles John, *'56*, May 15, 2021.
Hartzell, Lyndon Gene, *'67*, June 5, 2023.

BETA PA Β

Kaegi, Emil Miles, *'54*, July 13, 2022.
Hartman, William R., *'59*, Oct. 29, 2013.
Brown, Ronald Willard, *'63*, Dec. 1, 2022.

GAMMA PA Γ

Gresh, Philip Alexander, *'56*, Jan. 27, 2020.
Zakowicz Jr., William P., *'56*, Oct. 2, 2021.

EPSILON PA Ε

Bolton, Benjamin A., *'50*, June 10, 2018.

ZETA PA Ζ

Haffner, Harris Insinger, *'49*, May 1, 2022.
Jacob, David Sassoon, *'58*, July 11, 2019.

ETA PA Η

Ellis Jr., Ira Thomas, *'56*, July 18, 2021.
Schubauer, James W., *'56*, May 3, 2023.
Kressler, Robert Ray, *'60*, March 23, 1976.

RHODE ISLAND

ALPHA RI Α

Brown Jr., Paul Francis, *'54*, Aug. 30, 2020.

BETA RI Β

Serdjenian, Mihran, *'50*, no details.

SOUTH CAROLINA

ALPHA SC Α

Leiby, Richard Gene, *'49*, Nov. 14, 2020.
Bryan, James A., *'59*, May 17, 2023.
League Jr., W. G. Sam, *'85*, May 4, 2023.

BETA SC Β

Shull Jr., Daniel Sandel, *'51*, May 17, 2023.
Segui, William Thornton, *'60*, Dec. 20, 2021.

GAMMA SC Γ

Bryant, Furnie Smith, *'52*, May 31, 2019.
Deal Sr., Richard Lee, *'59*, May 28, 2020.

TENNESSEE

ALPHA TN Α

Mowery, David Keith, *'57*, July 15, 2006.
Thompson, Zack, *'57*, May 8, 2014.
Stone, William C., *'58*, August 14, 2021.
Mitchell, William Heiskell, *'59*, Oct. 9, 2016.
Whitten, James R., *'59*, April 21, 2023.

GAMMA TN Γ

Clark Jr., Charles H., *'50*, Feb. 11, 2008.
Nixon, Robert Ferrell, *'55*, March 19, 2020.
McDaris, Harry L., *'56*, October 2, 2012.

DELTA TN Δ

Glaser, Donald Leigh, *'59*, Feb. 16, 2022.

TEXAS

ALPHA TX Α

Harbison, Wallace F., *'49*, May 18, 2014.
Nipper, Jack Thomas, *'50*, August 12, 2020.
Pattillos, William Lee, *'50*, May 20, 2017.
Tomlinson, Hugh Theron, *'50*, Aug. 14, 2014.
Smith Jr., Howard L., *'51*, March 13, 2023.
Donghi, Louis Victor, *'52*, no details.
Drews, Marvin Alex, *'52*, June 18, 2014.
Hines, Edward Lee, *'52*, July 15, 2017.
King Jr., James Robert, *'52*, Sept. 26, 2014.
Breen, John E., *'53*, February 14, 2023.
Cooksey, James M., *'53*, April 19, 2011.
Fenter, Felix West, *'53*, April 1, 2023.
Shelman, Cecil B., *'53*, Feb. 15, 2015.
Chen, Mo-Shing, *'54*, May 1, 2023.
Pape, Galen William, *'54*, January 3, 2019.
Rundell Jr., Clarence A., *'54*, June 11, 2020.
Bomar, Frank W., *'55*, April 17, 2021.
Ramsey Jr., Thomas, *'55*, March 17, 2022.
Vandigriff, John Edward, *'57*, Nov. 18, 2022.
Matthys, Ronald D., *'60*, Sept. 18, 2012.

BETA TX Β

Cleveland, Austin R., *'50*, March 14, 2022.
Bucy Jr., J. Fred, *'51*, May 20, 2021.
Cannon, William Lewis, *'52*, Sept. 16, 2022.
Hill, Jimmie Clyde, *'52*, April 5, 2015.
Pritchard Jr., Blanchard, *'52*, Oct. 6, 2004.
Medlin, Jimmy Dale, *'54*, June 27, 2017.
Cox, Dale Taylor, *'55*, June 13, 2020.
Becker, Lewis Eugene, *'57*, May 27, 2012.

BETA TX B
Climer, Frank Allen, *'57*, March 16, 2015.
Snead Jr., Joe Long, *'57*, Sept. 9, 2009.
Greer, Ralph Dell, *'60*, April 27, 2020.
Maddox, Jesse T., *'60*, March 20, 2019.
Reis, Levern Anthony, *'60*, Aug. 24, 2011.

GAMMA TX Γ
Stetter, Walter James, *'50*, July 16, 2021.
Turpin Jr., Jack Allan, *'52*, Dec. 21, 2019.
Cotten, Dennis Neel, *'53*, Sept. 16, 2017.
Daggett, Dan Hamilton, *'53*, Feb. 15, 2023.
Dameris, Nick Theo, *'53*, Nov. 24, 2014.
Davies, William Allen, *'53*, Nov. 9, 2018.
Eubanks, Lloyd Stanley, *'53*, Dec. 6, 2015.
Hedick Jr., George A., *'54*, March 14, 2023.
Johnson, Robert Keith, *'55*, Nov. 16, 2021.
Cunningham, Robert E., *'58*, Dec. 30, 2022.
Little, Doyle Edgar, *'59*, March 11, 2018.
Mitchell, Robert H., *'59*, Feb. 27, 2019.
Turner, Malcolm Monroe, *'59*, Dec. 28, 2021.

DELTA TX Δ
Rodenberger, Charles A., *'48*, April 2, 2022.
Shields, Billy Johnson, *'49*, July 28, 2018.
Bobkoff, Kenneth Bruce, *'50*, Feb. 3, 2018.
Humphries, Floyd, *'50*, November 14, 2017.
Sullins, Ted Francis, *'50*, April 25, 2021.
Hamilton, Marvin Joe, *'51*, Nov. 12, 2016.
McIver, Jes David, *'51*, March 30, 2023.
Rogers, Donald Lee, *'51*, January 23, 2020.
Hatcher, Hayden Edward, *'52*, Jan. 23, 2003.
Honeycutt, Baxter D., *'52*, March 22, 2014.
Crabtree, Willie Aaron, *'53*, Feb. 6, 2013.
Henderson, Thomas E., *'53*, June 7, 2015.
Page, Donald Egbert, *'53*, June 16, 2012.
Bilhartz, James Rohn, *'54*, Nov. 12, 2013.
Fling, George Kelley, *'54*, Dec. 13, 2022.
McAlister, Joe Bill, *'54*, December 3, 2022.
Rother Jr., Ted August, *'54*, Jan. 18, 2023.
Holt, Ralph Burton, *'55*, February 7, 2008.
Watson, Clifford A., *'55*, July 18, 2015.
Adney, Eugene Moize, *'56*, October 9, 2019.
Drake, Patrick Homer, *'56*, Feb. 19, 2016.
Goodman, Robert C., *'56*, March 22, 2023.
Parnell, David C., *'56*, January 14, 2022.
Steele, Charles Richard, *'56*, Dec. 9, 2022.
Sutton, Hugh C., *'56*, December 4, 2019.
Arnold, Marion Denson, *'58*, March 4, 2010.
Brown, Jon Hurton, *'58*, January 25, 2021.
Brown, Morris Albert, *'58*, Sept. 22, 2011.
Grossman, Ernest W., *'58*, Jan. 8, 2013.
Munnerlyn, James H., *'58*, Dec. 14, 2012.
Garrison, Larry Gene, *'59*, Aug. 29, 2020.
Nichols, Jerry Lynn, *'59*, May 26, 2013.
Reuscher, Jon Arthur, *'59*, March 18, 2014.
Orthwein, Norman C., *'60*, Aug. 24, 2019.
Bolton, William Barry, *'71*, May 1, 2023.

EPSILON TX E
Sites, Ernest Scott, *'81*, August 9, 2022.

ETA TX H
Seath, Donald Dwight, *'54*, May 3, 2011.
Pape, Elinor S., *'60*, October 21, 2022.
Flores-Morfin, Jesus, *'90*, July 1, 2016.

IOTA TX I
Goforth, Ramon Earl, *'55*, October 28, 2020.
Harris, E. Douglas, *'83*, February 7, 2023.

UTAH

ALPHA UT A
Udall, Lawrence Mariger, *'47*, Oct. 5, 2011.
Losee, Ferril Andrew, *'53*, March 28, 2012.
Harris, Ronney D., *'54*, April 24, 2023.

VERMONT

BETA VT B
Mutty, Peter Crowther, *'54*, Nov. 8, 2019.

VIRGINIA

ALPHA VA A
Kennedy Jr., Granville S., *'54*, Nov. 11, 2018.
Nester, Ernest Elwood, *'60*, March 25, 2013.

BETA VA B
Shaffer, James Alvin, *'49*, April 1, 2021.
Harmon, Raymond Gene, *'51*, July 13, 1993.
Snider, Frederick Willard, *'59*, July 21, 2014.
Crim, Richard Barclay, *'60*, Dec. 30, 2017.
Chapman, James E., *'62*, August 7, 2012.

GAMMA VA Γ
Harris, John Adams, *'88*, April 21, 2022.

WASHINGTON

ALPHA WA A
Linquist, Robert Lansing, *'49*, July 16, 2016.
Haase, Richard Herman, *'50*, no details.
Yutani, Nobuo, *'52*, January 31, 2022.

BETA WA B
Stephens, Robert Wilson, *'43*, Dec. 14, 2021.
Flint, Duane Leslie, *'52*, April 2, 2015.
Guy, Norris Campbell, *'55*, Aug. 29, 2013.
Ballard, Donald Albert, *'79*, Jan. 16, 2023.

WEST VIRGINIA

ALPHA WV A
Deakins, Ralph Richard, *'58*, Dec. 29, 2020.

BETA WV B
Nelson, Leonard Carl, *'43*, August 23, 2017.
Payne, Henry E., *'57*, June 27, 2008.
Felner, John H., *'93*, no details.

WISCONSIN

ALPHA WI A
Blumenfeld, John F., *'45*, Sept. 17, 2019.
Gausewitz, Richard Lord, *'46*, July 10, 2014.
Cattoi, Robert Louis, *'50*, January 8, 2022.
Ritchie, Duane Russell, *'60*, Jan. 20, 2019.
Wishau, Kenneth Joseph, *'60*, July 8, 2022.
Uicker Jr., John J., *'61*, April 25, 2023.
Lutz, Anne Louise, *'74*, April 24, 2023.

BETA WI B
Kam, Clifford Y. K., *'51*, February 24, 2016.
Erftmier, Roger Alan, *'63*, June 3, 2023.

WYOMING

ALPHA WY A
Tribble, Donald Dennis, *'48*, Feb. 3, 2015.

ASSOCIATION BRIEFS

First in-person meeting of the Southwest Florida Alumni Chapter.

The Milwaukee Area (WI) Alumni Chapter members after a round of family friendly mini-golf on July 26.

ALUMNI ACTIVITY:

SOUTHWEST FLORIDA ALUMNI CHAPTER

On July 29, members of the Southwest Florida Alumni Chapter held their first ever in-person meeting at Coconut Jack's Waterfront Grille in Bonita Springs, FL.

The image above, taken from the dock at the back of the restaurant, includes from left to right: Dave E. Day, P.E., *CA H '81*, Angela M. Forster, *CA AB '13*, Rudy C. Drechsler, *NY I '64*, and Joe G. Llamas, *OH B '65*.

A special thanks to Dave for submitting the image, summary, and for serving as the alumni chapter president. He is hopeful the chapter will attract more attendees at future gatherings.

If you are interested in learning more about the Southwest Florida Alumni Chapter, send an email to: *daveday91@hotmail.com*

ASSOCIATION OFFICIALS RECOGNITION

In August, the Tau Beta Pi Executive Council approved the following Association Officials to be recognized at this year's Convention in Atlanta, GA.

District Director Volunteer Service Recognition:

David J. Cowan Jr., P.E., FL E '14 — 6 Years
Raymond P. LeBeau, Ph.D., P.E., VA A '90 — 6 Years
Jon M. Sonsteby, PA B '95 — 6 Years
Lara L. Spinelli, P.E., NJ G '14 — 6 Years
Jose E. Suarez, LA E '10 — 6 Years

Engineering Futures Facilitators Volunteer Service Recognition:

Richard Della Rovere, NJ G '10 — 12 Years
Ellen S. Styles, AL D '85 — 12 Years
Yvan A. Boucher, MI G '08 — 6 Years
Christie R. Hasbrouck, IN E '16 — 6 Years
Wayne B. Paugh, LLM, J.D., FL G '93 — 6 Years
Angadbir S. Sabherwal, IA A '16 — 6 Years

CHAPTER COMMUNITY SERVICE & ACTIVITY HIGHLIGHTS

The Kansas Gamma Chapter at Kansas State University participated in two Adopt-A-Highway cleanups earlier this year. In total, 95 bags of trash were removed by the chapter volunteers from U.S. Highway 24. A special thanks to chapter president **Nicholas R. Divilbiss,** *KS G '24*, for sending in this image.

In May, New Mexico State University was pleased to once again proudly display a Bent monument on its campus — thanks to the generosity of alumnus **Kenneth L. Martin,** *NM A '83*. However, the process took considerable effort and work from numerous NM Alpha Chapter members. Construction for the Bent monument was executed by ΤΒΠ members along with much appreciated assistance from Aggies Without Limits. Several polishing events were held, concrete was poured for the foundation and base, the base was unmolded, and decorative tile installed. "They (NM Alpha members) procured the appropriate permissions from campus administration for the installation," said **Juanita G. Miller, P.E.,** *NM A '86*, college of engineering safety specialist and NM Alpha Chief Advisor. The installation was included on the university's website and Ms. Miller graciously shared the image below.

"The Bent is an important symbol that brings visibility and helps to get students involved in a professional organization. It represents the history of the engineering organization," Martin said.

from page 25

Fall Problems *Continued*

5: Got Change

In how many different ways is it possible to make change for a dollar bill, using pennies, nickels, dimes, quarters, and half dollars?

—**R.W. Rowland,** *MD B '51*

BONUS:

A glorious Saturday in June found the employees in our factory at Ascot. Alf, Bert, Charlie, Duggie, Ernie, Fred, and George had with them their wives who are called, not respectively, Agnes, Beatrice, Clarissa, Daisy, Ermyntrude, Flossie, and Gertie.

The wives are wearing, again not respectively, most elegant hats, which are florally decorated with Aspidistras, Begonias, Crocuses, Dahlias, Edelweiss, Fuchsias, and Gentians.

Each lady's husband and flower have different initial letters which are not the same as the initial letter of the lady's name.

Each of the 14 people either always tells the truth or never does. Of each married couple one member and one only is a liar.

The men are all speechless with emotion and fatigue and their wives do the talking, as follows:

AGNES: 1. When asked whether Gertie was wearing a Fuchsia hat, George said No.

2. When asked whether Ernie's wife was wearing a Begonia hat, Duggie said Yes.

3. When asked whether Beatrice was wearing a Fuchsia hat, Clarissa said Yes.

BEATRICE: 1. Alf is not married to Ermyntrude.

2. When asked whether Fred was married to Gertie, Clarissa's husband said Yes.

3. When asked whether George's wife was wearing a Fuchsia hat, Fred said Yes.

CLARISSA: 1. Daisy is wearing a Begonia hat.

2. My husband is George.

3. Ermyntrude's husband is a liar.

DAISY: 1. When asked whether Duggie was married to Clarissa, Alf said Yes.

2. Ernie is a liar.

3. Fred's wife is wearing a Crocus hat.

ERMYNTRUDE: 1. Alf always tells the truth.

2. Charlie's wife is not wearing an Edelweiss hat.

3. When asked whether she was Ernie's wife, Clarissa said No.

FLOSSIE: 1. Duggie's wife is wearing an Aspidistra hat.

2. When asked whether Daisy was Bert's wife, my husband said No.

GERTIE: 1. When asked whether Flossie was wearing a Begonia hat, Bert said Yes.

2. Bert's wife is wearing an Aspidistra hat.

Fill in the following table:

Husband	Wife	Hat
Alf		
Bert		
Charlie		
Duggie		
Ernie		
Fred		
George		

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

COMPUTER BONUS:

A circular prime is one in which all cyclic permutations of its digits are prime. For example, 1193 is a circular prime because 1931, 9311, and 3119 are prime. Find the largest circular prime less than 1,000,000.

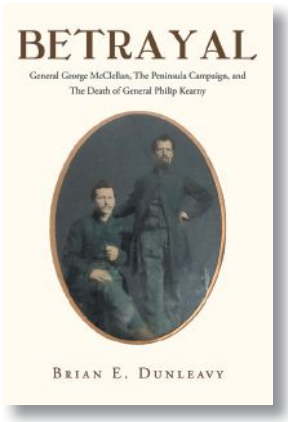
—*Prime Numbers, the Most Mysterious Figures in Math*
by David Wells

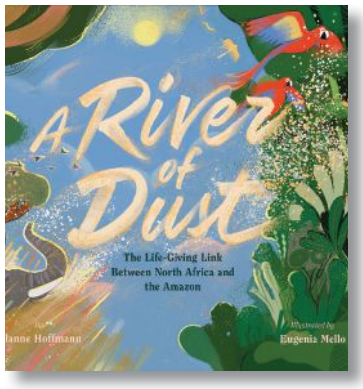
Email your answers (plain text only) to any or all of the Fall Brain Ticklers to *BrainTicklers@tbp.org* or by postal mail to **Dylan Lane, Tau Beta Pi, P.O. Box 2697, Knoxville, TN 37901-2697**. The method of solution is not necessary. The Computer Bonus is not graded. Where possible, exact answers are preferable to approximations. The cutoff date for entries to the Fall column is the appearance of the Winter *Bent* which typically arrives in early January (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 **J.C. Rasbold,** *OH A '83;* **J.R. Stribling,** *CA A '92;* **G.M. Gerken,** *CA H '11;* and the columnist for this issue,

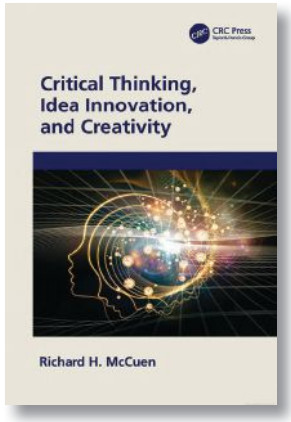
— **F.J. Tydeman,** *CA Δ '73*

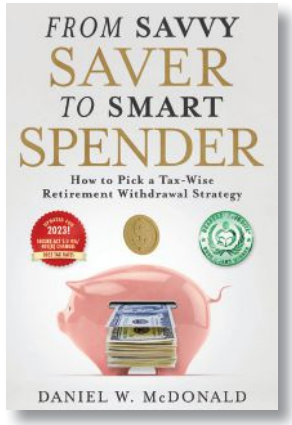
Authors

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!









Brian E. Dunleavy
Massachusetts Zeta '66

Betrayal

A historical read, Brian's book reveals the stunning tale of how General George McClellan's personality traits and flaws as a soldier and general, paired with his political beliefs, made a deadly combination that nearly caused Lincoln to lose the fight to keep the Union together. All net proceeds will be donated by the author to charity — Children of Ukraine via UNICEF.

Jilanne F. Hoffmann, Ph.D.
Illinois Delta '85

A River of Dust: The Life-Changing Link Between North Africa and the Amazon

In this nonfiction picture book, a Junior Library Guild Gold Selection, Jillian writes about the North African river of dust and how it provides nutrients to the Amazon rain forest. It includes NASA's Earth Observation Satellites and how scientists use computer models to predict the effects of climate change on dust and weather patterns.

Richard H. McCuen, Ph.D.
Maryland Beta '67

Critical Thinking, Idea Innovation, and Creativity

Published in 2023, this investigation of critical thinking is knowledge-based, educational material using fundamental concepts of critical and creative thinking in the solution of complex problems. These methods are applied to leadership, research, and decision making. Rick is a professor emeritus of civil & environmental engineering at the University of Maryland.

Daniel W. McDonald
Minnesota Alpha '82

From Savvy Saver to Smart Spender

Dan, a semi-retired intellectual property lawyer and AARP Tax-Aide volunteer, shows how to reduce income taxes on withdrawals from tax-deferred retirement accounts. His book received a 2022 Book Award from *Readers Favorite*. He earned an EE degree from the Univ. of Minnesota, is a ΤΒΠ Fellow (1982), and was recognized for his work as a District 11 Director (1995-98).

STAY CONNECTED

Follow us on social media and tag us, so we can see your ΤΒΠ images using **#taubetapi**.

INSTAGRAM: instagram.com/taubetapiofficial/

WORDPRESS BLOG: taubetapiathq.wordpress.com/

FACEBOOK: facebook.com/TauBetaPiHQ/

TWITTER: twitter.com/TauBetaPi

LINKEDIN: linkedin.com/groups/101390/

YOUTUBE: youtube.com/c/TheTauBetaPiAssociationInc

Letters continued from page 35.

Equity and Social Justice

I wish to express my support for the focus on equity and social justice in the Spring issue, even if it offended the writers of letters published in the summer issue. One turned his objection into a wide-ranging grievance list dismissing topics that appeared nowhere in the Spring issue, yet do seem potentially worthy of coverage in the context of their impact on engineers' work or studies. For example, I suspect that most class of 2023 engineers, who on average will live well into the late 21st century, consider global warming more than a mere "distraction."

Another implied that increasing ΤΒΠ membership from underrepresented groups would amount to "awarding everyone a participation trophy." Although he's correct that honor societies are for recognizing outstanding academic outcomes, surely we should acknowledge that such outcomes are more difficult for those who didn't have the benefit of a stable family and well-funded elementary/secondary schools. As a profession known for creativity, we should be capable of finding effective ways to encourage and assist more students toward outcomes deserving of membership, without the lowering of standards the letter writer feared.

A third writer disapproved of social justice as an engineering goal. However, very early in the article, he complained about three quite clear examples that were given of the danger of failing to account for a technology's potential for unequal impact across different groups. If engineering is indeed problem solving, then to believe that good engineering shouldn't prioritize social justice is to misunderstand engineering itself.

Dallas M. Lea Jr., Ph.D., *VA Α '88*

Association Diversity Goals

Thank you for the informative articles about the Diversity, Equity & Inclusion Committee in our organization. It seems perfectly logical and rational to me that if there is equality of opportunity, the diversity of the ΤΒΠ membership would approximate the diversity of the population in general. However, because a diverse membership was certainly not the case in the past, such as when I was inducted, it is reasonable that ΤΒΠ consider ways to achieve this goal.

I would expect that thoughtful people would have a range of opinions on the proper course of action, but I do not understand how anyone could disagree with the overall goal, which can certainly be achieved without sacrificing our organization's dedication to *excellence in engineering*. I am proud that ΤΒΠ has formed this committee and I think dragging a potentially beneficial discussion of DEI down into current political rhetoric is unproductive and misleading, and it does a disservice to serious readers.

Dennis D. Hickman, *IA Α '71*

Presumed DEI Distractions

Apparently, the Spring 2023 issue contained an article on DEI. I either failed to read it or I read it and mentally filed it the way I do many of the articles in the magazine. However, a few readers had strong objections to the message in that article and that the DEI subject matter had little or no place in the journal of an engineering honor society.

I consider one of the most critical qualities that engineers and scientists must use is the power of *observation*. On that basis, I find it remarkable that "global warming" was included on a list of "distractions." Like evolution, you don't have to believe in global warming; you just have to look. Doing a little study on temperature and chemistry trends, timing of changes in those trends, and likely effects of significant warming and resulting climate change to the entire earth shows that global warming is far from a distraction. Global warming has already affected agriculture, immigration, and war. The U.S. military has warned of the dangers of global warming, especially how rising sea levels will affect the U.S. Navy.

Energy independence was listed as an "*Instead Of*," but energy independence, both from other nations and from the finite amounts of what might be buried in the earth's soil, can be addressed very significantly by green energy. In addition, green energy will slow or stop the damaging effects that carbon dioxide and methane releases have on global warming. Green energy technologies are and will continue to be a powerful economic engine for the entire world. The United States has the choice of leading the green energy technology revolution (as it has led on many other technologies during its nearly 250 year existence) or it can wait for others to lead and be left behind.

Parents and school boards were listed as a distraction while education of our children was listed as an "*Instead Of*." Those two items belong on the same list; not on opposite lists. The entire world is getting smarter.

If politicization of curricula is driven by parental whining rather than by a drive to teach truth, facts, logic, and methods for decision-making, we won't be getting smarter; quite the opposite. Tau Bates should clearly recognize those things.

I consider DEI activities to be analogous to a seasoning on a meal - while DEI should clearly not be a driver for businesses or schools, it is still important. It must always be remembered that the most healthy ecosystems, from the most basic collections of microorganisms to sophisticated societies, will be the most diverse.

George J. Licina, *IL Α '72*

Reasons for Volunteering

My life changed forever seven years ago, so I must emphasize the benefits of Councillor Mike Peterson's first two reasons for volunteering — sense of purpose and sense of community. My wife died from Progressive Supranuclear Palsy (PSP), an atypical Parkinsonism Disease. Our 52 years of building a life together came to an end and as I grieved, I struggled to understand the meaning of my life. Volunteering answered this question for me, and two examples are: CurePSP is an extraordinary organization and I now co-facilitate their CT Support Group, am a peer supporter, and a member of their Community Advisory and Advocacy Committee, whereby I help others by sharing my experience as a PSP caregiver.

Also, as a mentor for SCORE (a resource to the SBA) I assist small business owners in our community by using my engineering problem-solving skills. Volunteering has helped me move forward and given me purpose and a community of very close friends; it will too for your readers if and when they experience a life-changing event.

Volunteering and helping others has really helped me after the death of my wife and I also volunteer at two additional organizations. I joined the Board of Directors for NutmegTV, a community TV station, and to Mr. Peterson's point #10, it certainly got me out of my comfort zone as I knew nothing about the media and how it works; it has been quite an education for me.

In addition, my minister asked me to start and facilitate our church bereavement support group, and this has been as helpful to me as it has been to the members of the group.

I can't say enough about volunteering, and it sure beats playing golf 4-5 times a week (I am a lousy golfer so maybe that is why).

Allen M. Nixon, *NJ Β '62*

Married to Mr. Water

My husband, **William H. Blackmer,** *CA A '54*, graduated from UC Berkeley and USC with advanced degrees in civil engineering in the '50s. His entire career was devoted to bringing and purifying drinking water for communities in the West, most notably in Las Vegas and Alaska.

He passed in February after a nearly 30-year retirement, but to the end, he was always interested in the water situation here. We have lived in Utah for the past 20+ years and when we moved he said that Utah was about 20 years behind in their water conservation efforts. He had helped Las Vegas solve some of their water issues many years before it became a serious problem. As your article so aptly pointed out, the drought isn't going away, even though here in Utah we had a record snowfall this past winter. We are all pleased with that, of course, but some of us know it's like putting a bandaid on a much larger injury. Sadly, the general population lags far behind in their understanding and compliance with water-saving measures. Here in Utah, we are fortunate to have the Jordan Valley Water Conservancy District to help us implement water saving measures for landscaping and within our homes through training programs.

I am writing to tell you that I loved reading every sentence in your article. I actually read it out loud, hoping that Bill could hear it from heaven. If he was still living, I know we would have read it aloud and discussed it at length. I was impressed at your thoroughness in explaining the various water-purification and storage measures various large cities in the West are implementing. The pictures, too, were helpful. I had no idea, even though I'm married to ***Mr. Water***. Thank you for your research and for this article. I wish everyone in these surrounding states could read this.

Janet Blackmer

Drought Caption Correction

A correction is warranted to the caption for the photo at the top left of page 9 from the "Drought and the Reengineering of the American West" article by Alan S. Brown in the Summer issue.

The company that successfully used a tunnel boring machine to tunnel under Lake Mead should be identified as Vegas Tunnel Constructors, a joint venture of Impregilo and S.A. Healy. This joint venture was later modified to be Salini Impregilo and S.A. Healy. The intake tunnel project that allows water withdrawals from Lake Mead below the dead pool lake elevation was completed in 2015.

Marcus R. Jensen, P.E., *CA Ξ '82*

Oersted

Just a note to say how much I enjoyed the article on Hans Christian Oersted by my old colleague and buddy from many educational organizations back before we both retired.

The history of Dr. Oersted and the Denmark origins was fascinating and fit well with my engineering and academic career and our extensive travel.

I have enjoyed every one of Lyle's articles in the magazine, as a mechanical/chemical engineer, the ones out of my field and in electrical engineering have been particularly illuminating, if you forgive the unintended pun.

Ronald S. Kane, Ph.D., P.E. (ret.), *NY H '65*

The Bent magazine Letters Policy

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

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

ALUMNI NOTES

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

ALABAMA ALPHA '09

Jayme M. Allgood

Jayme was recognized by the American Institute of Aeronautics and Astronautics Greater Huntsville Chapter with the Professional of the Year Award. She works at Dynamic Concepts, Inc., at NASA's Marshall Space Flight Center, focused on making a positive impact on the Artemis' Space Launch System.

CALIFORNIA ETA '99

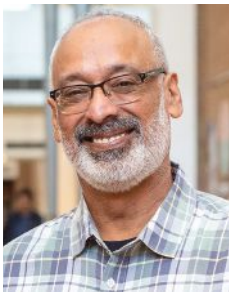
Ramak Asgari

Ramak is a WE FY 23 Engaged Advocate Award recipient from the Society of Women Engineers, honoring those with a background in engineering who contribute to the advancement or acceptance of women in engineering. She's an artificial intelligence/machine learning staff engineer at Lockheed Martin Space.

FLORIDA GAMMA '06

Peter E. Pisasale P.E.

Peter was presented the 2023 Engineer of the Year Award by the Rhode Island Society of Professional Engineers. The award recognizes technical excellence, exemplifying the highest ethical standards and leadership. He is program operations lead for Raytheon Technologies and has two M.S. eng'g degrees.



FLORIDA ZETA '87

Vikram "Vik" Verma

Vik joined SecureAuth, next-gen authentication, as chairman of the Board of Directors. He is former CEO of Savi Technology, Inc., and 8x8, Inc., and served as Lockheed's President of strategic venture development. Vik, a ΤΒΠ Fellow, has eight patents and was named "Technology Pioneer" by the World Economic Forum.

IOWA ALPHA '12

Carl J. Kirpes Ph.D., P.E.

Carl was elected an officer of the Iowa State University Alumni Association Board of Directors. He graduated from ISU with a B.S. in mechanical & industrial eng'g; M.S. in systems eng'g; and Ph.D. in industrial eng'g. Carl is president and managing partner at KT Pacer, a feed transportation solutions company.

MASSACHUSETTS BETA '63

Robert E. Efimba Sc.D., P.E.

Bob was honored with a 2023 Chief A.A. Ibegbulam Award — Lifetime of Distinguished Service from his alma mater, King's College, Lagos. He was recognized for accomplishments in research, teaching, and mentoring, and as an advocate for diversity and the inclusion of African Americans in engineering and academia.

MICHIGAN EPSILON '00

Colleen Hill-Stramsak P.E.

Colleen recently joined the Macomb (MI) County Department of Roads as a traffic safety engineer, spending the past 20+ years working for Hubbell, Roth & Clark. She serves as a MI Epsilon Chapter Advisor, secretary for the ΤΒΠ Southeastern Michigan Alumni Chapter, and has two eng'g degrees from Wayne State Univ.

TEXAS DELTA '83

Jill B. Almaguer P.E.

Jill was invited to serve on the Texas A&M University College of Engineering Advisory Council and was awarded Fellow Grade in the Society of Women Engineers, an honor conferred on SWE members with at least 20 years of membership. She also helped found the Aggie Women Engineers Network with the A&M COE.

VERMONT ALPHA '73

Nelson R. Lara Ph.D.

Nelson, at 73, played a lead role in his first film, "Amor del Negrito," that premiered Dec. 14, 2022, at a major New York City Broadway theater. He also earned a Six Star Medal for completing international marathons, has written four books, and directs a postdoctoral research center & program in Venezuela.

NO IMAGE AVAILABLE

WEST VIRGINIA ALPHA '51

Francis Yarnall

Francis will be inducted into the Fort Hill Hall of Fame (MD) in September. After earning his mechanical engineering degree, he worked at Westinghouse Atomic Research Center developing reactors and control systems for the Nuclear Navy as well as the first Breeder Reactor in Shippingport, PA.

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

2023 Astronaut Scholars

The Astronaut Scholarship Foundation (ASF) has announced the 2023 Astronaut Scholar Class. This year ASF awarded 68 scholarships to students from 46 different universities across the nation. Astronaut Scholarships are awarded to students in their junior and senior year of college studying science, technology, engineering, or mathematics with the intent to pursue research or advance their field upon completion of their final degree. Astronaut Scholars are among the best and brightest minds in STEM who show initiative, creativity, and excellence in their chosen field.

Scholarships are valued at approximately $15,000 and Astronaut Scholars have the chance to become part of a community that includes the program's alumni and astronauts as well as leaders in academia, technical research, and industry. Below is a list of Tau Bates selected as 2023 Astronaut Scholars.

2023 TAU BATE ASTRONAUT SCHOLARS:

- **Rachael N. Coates,** *LA A '24* - chemical engineering
- **Nitish Dashora,** *CA A '24* - electrical engineering & computer science
- **Annika M. DeVol,** *SC A '24* - materials science & engineering
- **Mihiri A. Fernando,** *CO Z '24* - systems engineering
- **Ayden J. Kemp,** *AL A '24* - aerospace engineering
- **Luke Liang,** *OH X '24* - computer engineering
- **Braden T. Moore,** *IL A '24* - nuclear plasma & radiological engineering
- **Erick E. Rocher,** *MD A '24* - biomedical engineering
- **Cailyn C. Smith,** *CO A '25* - computer science
- **Hamilton M. Young,** *OK A '24* - biomedical engineering

Member Highlights

FLORIDA DELTA '22

André Childs

André is a graduate research assistant in the Physics Department at the University of Central Florida. He was recently profiled in the publication *Diverse* for being an award-winning Ph.D. candidate in materials science and engineering. The article mentions that André's vita includes an impressive list of research accomplishments, including published work on fabrication and optimization techniques for the polymer Kapton for use in biomedical research experiments involving cell growth and impedance. One of his proudest and highest honors, though, was receiving the first place Physics Teaching GTA Award in fall 2017, noting that none of his students dropped his physics classes.

WASHINGTON ALPHA '00

Sailesh "Si" Katara

Si founded Tapp Finance in 2023 and is also the CEO of the early stage FinTech startup that offers an app specifically designed for "buy and hold investors." An accomplished technology leader, he has 25+ years of experience developing technologies, improving efficiency, and streamlining processes. Si was previously a co-founder and president of HeadLight (2005-22), providing visual-based inspection technology to infrastructure construction. He earned his bachelor's degree in computer engineering from the University of Washington and has a certificate in entrepreneurial and small business operations from Babson College in Massachusetts.

CONSTITUTIONAL RATIFICATION RESULTS

2021-22 Constitution Amendments

The 2022 Convention approved two amendments to the Constitution of Tau Beta Pi and sent it to the chapters for ratification.

In accord with the Association's amending procedure, with 305 chapters (255 collegiate and 50 alumni) eligible to vote, 229 or more affirmative chapter votes are required to ratify an amendment, and 77 or more negative votes are required to defeat it.

Headquarters received 85 valid ballots by the original voting deadline of April 1, 2023. The Executive Council extended the deadline to June 1, 2023, during which an additional 129 valid ballots were received. Including an additional 4 ballots received after the June 1 deadline, but prior to the June 9 Executive Council meeting, a total of 218 ballots were received.

The Council **acted on June 9 and voted in favor of the first amendment** on behalf of those chapters submitting. **The ratified amendment is effective now.** The **second amendment was defeated by vote of the chapters.**

AMENDMENT	OUTCOME
1. Add the position of the Director of the District Program as an official Program Director after two 3-year trial periods. (Const. Art. XI, Sec. 5)	Unresolved by chapter vote; 162 affirmative, 56 negative.
2. Allow the trustee and the TAC to invest in Private Equity Funds by adding it as an allowable investment option. (Const. Art. XIII, Sec. 8)	Defeated by chapter vote; 125 affirmative, 93 negative.

Member Change of Address

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

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

THE BENEFITS OF MEMBERSHIP

See the complete list at: **www.tbp.org/memb/benefits.cfm**

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

LINKEDIN: Join 34,900 members in our official group for professional networking and career discussions (search: Tau Beta Pi Engineering Honor Society).

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

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

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

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

Need a Feature from a Back Issue?

You can find previous features from the magazine back to 1979 on our website. One month after each *Bent* is published, the features 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.

COLLEGIATE CHAPTERS

261 COLLEGIATE CHAPTERS
255 ACTIVE — 632,624 MEMBERS

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

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

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

ALUMNI CHAPTERS

81 ALUMNI CHAPTERS
50 ACTIVE

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

DISTRICT 1
Central CT, Hartford
Greater Boston Area, MA

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

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

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

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

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

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

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

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

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

DISTRICT 11
Ames, IA
Minnesota, Twin Cities, MN

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

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

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

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

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

Looking for a job or a graduate program?

Do not miss the Tau Beta Pi Virtual

RECRUITING FAIR

OCTOBER 4 & 5

10 a.m. to 5 p.m. ET

Free to all members!

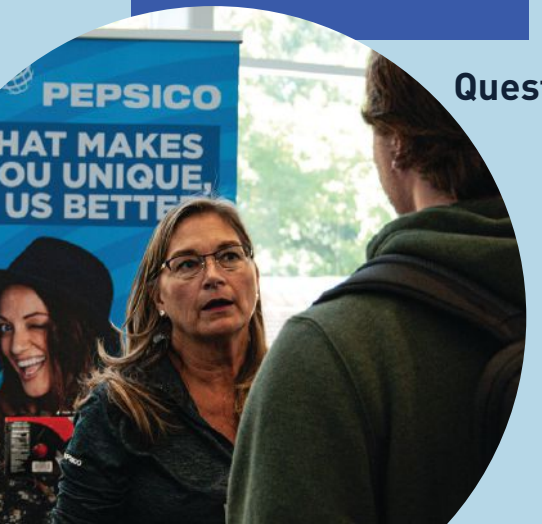
Start booking appointments September 18!

WWW.TBP.ORG/?RECRUIT

Meet recruiters from the top companies & graduate programs!

Find jobs ranging from:
INTERNSHIPS
ENTRY-LEVEL
FULL-TIME
EXPERIENCED

Upload your resume for recruiters to access!



Questions? Contact Pat McDaniel at: p.mcdaniel@tbp.org

Tau Beta Pi
The Engineering Honor Society