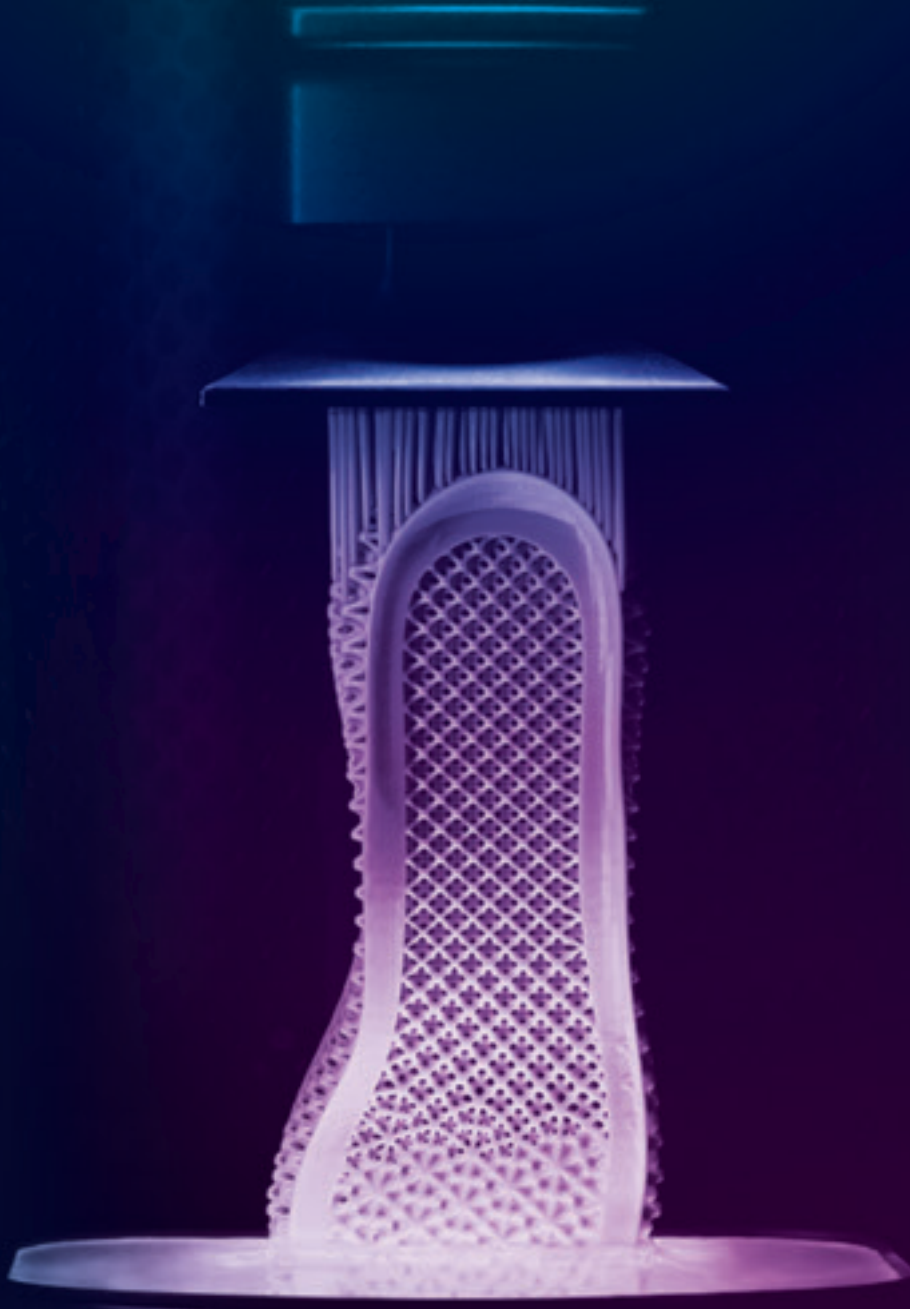


THE BENT

OF TAU BETA PI

The Engineering Honor Society

Fall 2019



**3D Printing Success
Awards & Scholars**

Chapter	Total Initiated	City Location
AL A	6,587	Auburn
AL B	3,720	Tuscaloosa
AL F	1,282	Birmingham
AL A	1,695	Huntsville
AL E	1,081	Mobile
AK A	594	Fairbanks
AZ A	3,715	Tucson
AZ B	3,167	Tempe
AZ F	718	Flagstaff
AZ A	169	Prescott
AR A	3,113	Fayetteville
CA A	8,054	Berkeley
CA B	2,543	Pasadena
CA F	4,367	Palo Alto
CA A	3,458	Los Angeles
CA E	4,079	Los Angeles
CA Z	1,524	Santa Clara
CA H	2,602	San Jose
CA O	2,666	Long Beach
CA I	1,814	Los Angeles
CA K	1,334	Northridge
CA A	3,257	Davis
CA M	2,502	San Luis Obispo
CA N	3,467	Pomona
CA E	2,008	San Diego
CA O	731	Los Angeles
CA P	285	Inglewood (inactive)
CA P	1,382	Fresno
CA S	1,511	Santa Barbara
CA T	1,603	Irvine
CA Y	2,555	Sacramento
CA O	548	Stockton
CA X	528	Fullerton
CA W	1,682	San Diego
CA Q	731	Claremont
CA AA	805	Chico
CA AB	409	Riverside
CA AF	348	San Francisco
CA AA	254	Santa Cruz
CA AE	165	San Diego
CO A	4,208	Golden
CO B	4,940	Boulder
CO G	331	Denver
CO A	1,706	Fort Collins
CO E	779	Denver
CO Z	1,245	USAFA Academy
CT A	2,079	New Haven
CT B	2,754	Storrs
CT F	403	West Hartford
DE A	2,581	Newark
DC A	1,453	Washington
DC B	1,131	Washington
DC G	1,190	Washington
FL A	5,508	Gainesville
FL B	2,117	Miami
FL F	2,740	Tampa
FL A	2,120	Orlando
FL E	1,285	Boca Raton
FL Z	1,180	Melbourne
FL H	1,129	Tallahassee
FL O	1,387	Miami
FL I	261	Daytona
GA A	8,828	Atlanta
GA B	434	Macon
ID A	1,423	Moscow
ID B	168	Pocatello
ID F	267	Boise
ID A	139	Idaho
IL A	10,275	Urbana
IL B	4,118	Chicago
IL F	3,245	Evanston
IL A	1,280	Peoria
IL E	1,288	Carbondale
IL Z	1,940	Chicago
IN A	12,129	West Lafayette
IN B	2,280	Terre Haute
IN G	2,855	South Euclid
IN A	1,030	Valparaiso
IN E	971	Angola
IN Z	107	Indianapolis
IA A	8,131	Ames
IA B	2,432	Iowa City
KS A	4,306	Lawrence
KS B	1,270	Wichita
KS F	2,857	Manhattan
KY A	3,974	Lexington
KY B	1,831	Louisville
KY F	166	Bowling Green
LA A	3,876	Baton Rouge
LA B	1,699	New Orleans
LA F	2,338	Ruston
LA A	1,520	Lafayette
LA E	535	New Orleans
ME A	2,926	Orono
MD A	2,845	Baltimore
MD B	4,306	College Park
MD F	1,859	Annapolis
MD A	699	Baltimore
MD E	456	Baltimore
MA A	5,052	Worcester
MA B	8,254	Cambridge
MA F	151	Cambridge (inactive)
MA A	2,828	Medford
MA E	4,535	Boston
MA Z	2,924	Amherst
MA H	1,874	Boston
MA O	1,473	Lowell
MA I	497	Springfield
MA A	4,769	East Lansing
MI B	4,449	Houghton
MI F	10,465	Ann Arbor
MI A	1,859	Detroit
MI E	2,341	Detroit
MI Z	3,397	Flint
MI H	1,818	Southfield
MI O	1,089	Rochester
MI I	883	Dearborn
MI K	1,131	Kalamazoo
MI A	242	Allendale

Chapter	Total Initiated	City Location
MN A	5,635	Minneapolis
MN B	669	Duluth
MS A	4,066	Starkville
MS B	1,251	Oxford
MO A	4,584	Columbia
MO B	7,444	Rolla
MO F	2,902	St. Louis
MO A	270	Kansas City
MO E	190	St. Louis
MT A	2,746	Bozeman
MT B	1,059	Butte
NE A	2,295	Lincoln
NV A	1,245	Reno
NV B	845	Las Vegas
NH A	1,947	Durham
NH B	393	Hanover
NJ A	3,260	Hoboken
NJ B	4,430	New Brunswick
NJ F	4,536	Newark
NJ A	2,087	Princeton
NJ E	461	Glassboro
NJ Z	182	Ewing
NM A	1,721	Las Cruces
NM B	1,670	Albuquerque
NM F	802	Socorro
NY A	4,076	New York
NY B	2,921	Syracuse
NY F	7,589	Troy
NY A	6,689	Ithaca
NY E	1,851	New York City (inactive)
NY Z	1,579	Brooklyn (inactive)
NY H	3,672	New York
NY O	3,717	Postdam
NY I	1,879	New York
NY K	1,657	Rochester
NY A	1,161	New York (inactive)
NY M	1,065	Schenectady
NY N	3,566	Buffalo
NY E	2,415	Riverdale
NY O	1,463	Stony Brook
NY I	1,566	Rochester
NY P	1,611	Brooklyn
NY S	508	Alfred
NY T	1,038	Binghamton
NY Y	380	West Point
NC A	6,234	Raleigh
NC B	110	Chapel Hill (inactive)
NC F	2,458	Durham
NC A	1,296	Charlotte
NC E	954	Greensboro
NC Z	134	Greenville
ND A	2,356	Fargo
ND B	1,154	Grand Forks
OH A	4,105	Cleveland
OH B	3,956	Cincinnati
OH F	6,752	Columbus
OH A	1,974	Athens
OH E	2,010	Cleveland
OH Z	2,175	Toledo
OH H	2,368	Wright-Patterson
OH O	1,765	Dayton
OH I	905	Ada
OH K	1,778	Akron
OH A	1,162	Youngstown
OH M	1,115	Dayton
OH N	266	Cedarville
OH E	301	Oxford
OK A	4,363	Norman
OK B	1,340	Tulsa
OK F	2,151	Stillwater
OR A	3,194	Corvallis
OR B	494	Portland
OR F	384	Portland
OR A	92	Klamath Falls
PA A	5,254	Bethlehem
PA B	8,518	University Park
PA F	3,388	Pittsburgh
PA A	2,813	Philadelphia
PA E	2,50	Easton
PA Z	3,580	Philadelphia
PA H	1,753	Lewisburg
PA O	2,249	Villanova
PA I	802	Chester
PA K	314	Swarthmore
PA A	2,215	Pittsburgh
PA M	166	Erie
PR A	3,841	San Juan
RI A	1,296	Providence
RI B	2,295	Kingston
SC A	4,584	Clemson
SC B	2,192	Columbia
SC F	1,143	Charleston
SD A	2,267	Rapid City
SD B	1,172	Brookings
TN A	5,509	Knoxville
TN B	2,862	Nashville
TN F	2,488	Cookeville
TN A	660	Memphis
TN E	1,058	Memphis
TN Z	694	Chattanooga
TX A	8,411	Austin
TX B	4,292	Lubbock
TX F	1,989	Houston
TX A	8,410	College Station
TX Z	2,746	Houston
TX H	1,354	Beaumont
TX H	3,287	Arlington
TX O	1,622	El Paso
TX I	948	Dallas
TX K	1,089	Prairie View
TX A	1,187	Kingsville
TX M	464	San Antonio
TX N	207	Edinburg
UT A	2,933	Salt Lake City
UT B	2,808	Provo
UT F	1,254	Logan
VT A	1,526	Burlington
VT B	580	Northfield
VA A	3,607	Charlottesville
VA B	5,570	Blacksburg

Chapter	Total Initiated	City Location
VA F	1,121	Norfolk
VA A	703	Lexington
VA E	431	Richmond
WA A	5,327	Seattle
WA B	3,627	Fullman
WA F	794	Seattle
WA A	520	Spokane
WV A	3,626	Montgomery
WV B	1,112	Montgomery
WI A	6,008	Madison
WI B	3,156	Milwaukee
WI F	1,339	Milwaukee
WI A	828	Milwaukee
WI E	885	Platteville
WY A	2,495	Laramie



Alumni Chapters (78)

- District 1**
 - Central Connecticut, Hartford
 - Greater Boston Area, MA
- District 2**
 - Buffalo, NY
 - Central Jersey, NJ
 - Long Island Suburban, NY
 - Newark, NJ
 - New York City, NY
 - New York Capital District, NY
 - Rochester, NY
 - Southern Tier, Binghamton, NY
- District 3**
 - Lehigh Valley, Bethlehem, PA
 - Philadelphia, PA
 - Pittsburgh, PA
 - Wilmington, DE
- District 4**
 - Baltimore, MD
 - 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 Florida, Orlando
 - Daytona Beach, FL
 - Gainesville, FL
 - Miami, FL
 - Midlands, Columbia, SC
 - Palm Beach/Broward, FL
 - Piedmont, Clemson, SC
 - Puerto Rico
 - 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 Michigan, Lansing
 - Cincinnati, OH
 - Columbus, OH
 - Dayton, OH
 - Flint, MI
 - Ohio's North Coast, Cleveland
 - Southeastern Michigan, Detroit
 - West Michigan, Grand Rapids
- District 8**
 - Chicago Area, IL
 - Central Illinois, Urbana-Champaign
 - Indianapolis, IN
 - Milwaukee Area, WI
- District 9**
 - 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 Valley, CA
 - San Francisco Bay Area, CA
 - San Francisco Peninsula, Palo Alto, CA
- District 16**
 - Los Angeles, CA
 - Orange County, CA
 - Greater San Diego, CA
 - Southern California

The Bent



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Liquid thermoset resin
with a laser at the bottom
to create the lattice
design for the Adidas®
Futurecraft 4D shoe.
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Tau Beta Pi was founded at Lehigh University, South Bethlehem, Pennsylvania, 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.

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The Tau Beta Pi
Association

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Tau Beta Pi Mission:

- Recognize academic and professional excellence rooted in personal integrity,
- Promote a well-rounded education essential for success,
- Provide opportunities for leadership development and promote lifelong learning,
- Cultivate a community of dedicated high achievers.

The Most Wonderful Time of the Year

For some of you reading this, it's back to school time. That time of year you get out of your summer mentality and back into your studies. Or, you may be sending someone you care about off to their college experience.

For several of you, summer is over and it is now time to get your lesson plans for the term together, meeting with those you advise, and preparing for papers to grade.

For others, it's time to start your new job. You've been on the job hunt and you've landed a sweet gig, moved across the country to your new digs, and a career is awaiting you.

For many of you, there are new seasons coming about. We all face changes we must embrace, and it isn't always easy.

The Association is also in a period of change. We are currently undergoing reviews of our policies and changing infrastructure. We are looking deeper at our finances for ways to optimize what we have and increase our returns. We are exploring options of how to make Tau Beta Pi endure for decades to come. Much of this work can't happen in a vacuum, as we rely on others to help implement our *Strategic Plan*.

But, the most important part of a Councillor's job will happen in the upcoming months. The Executive Council (EC) has been working hard all year, with late WebEx calls and all-day meetings. We have struggled about wording and enlightened each other with our viewpoints. All that work leads up to *the most wonderful time of the year: Convention Season!*

Convention: Have you been?

There are many of you reading this who have yet to attend a TBPI Convention. So, I thought I would highlight reasons for you to come and what to look forward to, either for this year in Columbus, OH, next year in Atlanta, GA, or at a future location.

Make changes and give the Officials work to do

Convention is the supreme governing body of Tau Beta Pi. Delegates vote on items that have an impact on how the Association operates, including granting new chapters, electing the Executive Council, and making changes to the Constitution and Bylaws of the Association.

The delegates at Convention serve on Committees that can make recommendations to the EC, providing items to debate all year. The EC will resolve these items and implement the changes, or we will return to the next Convention to deliver the results of our work. I would love to say the Association is perfect, and no changes are needed, but your delegates (alumni and collegiate) will have opportunities to help us prioritize what you think is important.

Honor member achievements

There are banquets at Convention, most with a special guest speaker. During these banquets, we honor Distin-



guished Alumni, an Outstanding Advisor and Mentor, Laureates, and excellent collegiate chapter achievement. At Convention, attendees have a chance to see a Model Initiation and tour a host chapter's campus. These are all events you do not want to miss.

Grow the Association and give back

Those looking for opportunities can visit the Corporate, Government, and Graduate School Recruiting Fair. There, one can learn about university graduate programs, meet with prospective employers about internships and full-time employment, and speak with some of our partners offering member benefits. Those who are in the work force can

collaborate with your employers to attract the country's top engineering talent at the recruiting fair.

There are also opportunities to learn from alumni through the Professional Development Sessions offered during Convention. For those with a desire to share their wisdom with the next generation of engineers, proposals are accepted to present at a future Convention.

Create and grow bonds between us; meet HQ staff

Arguably the best part of Convention, for me, is seeing people from previous years. Familiar faces make the Convention experience that much more rewarding. Also, the process of working with others on a Committee or on a common goal fosters valuable networking.

Several TBPI HQ staff attend Convention. They will be there to assist you, sell merchandise, run the Recruiting Fair, and register you. They also may stop by your District Meeting. Be on the lookout for them and be sure to give them a hearty "thank you!" or a High Five.

Convention makes you want to come back next year

Through everything mentioned above, there are ways we can improve the Association's biggest, and most expensive, collaboration. The EC and HQ staff want to grow Convention and make it ultimately free to delegates, but also self-sustaining. That's where you come in.

Share with us what you want to see. Let us know the value proposition of a Convention and what would make you want to come back again, or even for the first time. What can we offer to make more alumni and collegiate chapter members want to come as non-voting delegates? What sponsorship opportunities can we add? We are listening to your ideas and carefully considering what we can do with the time and money to give people what they want.

Send me your ideas at skingmonroe@tbp.org. And when you see me at Convention, please say "Hello!" I'll be grateful to meet you.

Stephan L. King-Monroe, Michigan Epsilon '08
Treasurer



The 114th Convention of Tau Beta Pi will take place October 10-12 in Columbus, Ohio, at the Columbus Airport Marriott. This year's hosts are the Ohio Gamma, Delta, & Iota Chapters. All Tau Bates are invited to attend. The deadline to register was September 1.

Highlights of this year's Convention include: recognizing 50 years of women in TBP; new Engineering Futures and Professional Development Sessions, and several banquet speakers.

On Friday, the Corporate and Graduate School Recruiting Fair provides an opportunity for attendees to meet with companies, government agencies, and schools. This year, there is an online portal for all students, whether attending Convention or not, to upload their resumes for the recruiters to review. Upload resumes at www.tbp.org/resumes. You do not need to register online if you will only be attending the Fair.

Saturday's activities will shift to the campus of The Ohio State University for meetings, a model initiation, and a group photo at The Numbers Garden.

Voting delegates will be charged with electing new council members to serve on the TBP Executive Council for three-year terms.

Please contact TBP HQ, if you have any questions about attending Convention. The schedule and business summary is posted online at www.tbp.org/conv/2019/conv.cfm.

Image left was created for this year's Convention by Krishna M. Sadasivam, TN A '95. The Association holds a long-standing tradition of commissioning a cartoon image that represents each host city.

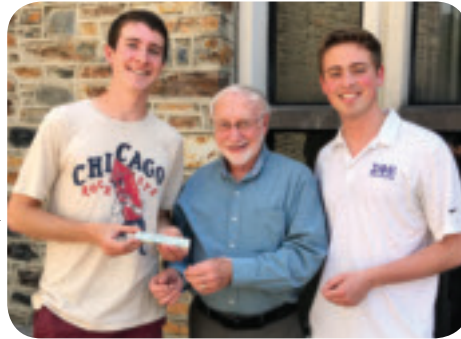
**We hope to see
YOU
in Columbus!**



At left are HQ staff, TBP alumna volunteers, and a student Convention leader at the 2018 Convention. Photo taken by Kiffer Creveling, UT A '13, official Convention photographer.

Speaking of Slide Rules...

While visiting the North Carolina Gamma Chapter at Duke University, District 4 Director Russ Werneth mentioned to Nate Watson, *NC Γ '19*, and Charlie Pearlman, *NC Γ '19*, (pictured) that his interest in teaching began many years ago when he taught a slide rule class to members of the Maryland Beta Chapter at the University of Maryland. Charlie immediately pulled his slide rule from his backpack!



Russ Werneth, MD B '64

The Struggle: Women's Badge

I was pleased to read "Women's Badge to Full Membership" in the Spring 2019 issue of *The Bent*. It is certainly an important subject in today's society where more women are taking positions in engineering than ever before. For example, the 2022 graduating class at George Washington University is 48 percent women.

I am a GWU graduate and was a member of Sigma Tau (ΣΤ). I felt a little smug about Sigma Tau's progressiveness after reading the biography of Marjorie A. Franklin, *KS A '57*. She was the first woman member of ΣΤ in 1954 and transitioned to TBPI in 1969. One of my classmates in 1957 was a young woman who also was inducted into ΣΤ. Her name was Barbara Seahorn (now Crim) and she went on to work for the Tennessee Valley Authority and then the National Institute of Health. Barbara is now happily retired with her husband Howell, who was also a GWU engineering grad.

After talking to Barbara about this article, we both recalled that neither of us had heard of the merger of the two societies in 1974 or were notified of the opportunity to transfer our membership to TBPI. At some point, I realized that ΣΤ was gone, learned of the merger, and the chance to establish TBPI membership, which I did. Barbara was busy raising her young children and never tracked down the chance.

I am also glad that ΣΤ is still remembered with a TBPI Scholarship.

Orron Kee, C.S.P., DC Γ '57

TBPI Membership Card Received

Thank you! Years ago when Bob Nagel visited Purdue, I asked him why TBPI did not have a wallet-size membership card. He said he would consider the idea, but thought it would be cost prohibitive. Now, here we are 50 years later and I finally have one in my wallet—alongside my state P.E. license and state contractor's licence cards. Also, never knew I had a member number.

Karl Weigand Jr., P.E., IN A '66

Trashed! Zero Waste

This is only the second time I have written to *The Bent* in 50 years. Trudy Bell's article is very interesting, thorough, and timely. One thing she didn't delve into is the importance of minimizing the distance between "cradle to cradle." Transportation of waste to reuse/recycle facilities can be an expensive component in the overall economic equation. Conducting all of this in as compact a geographic area as possible will be important for viability of single-stream waste processing for usable feed stock.

Southern California, where I live, covers thousands of square miles and is home to more than 23 million people producing maybe 7 percent of U.S. waste. The area of SoCal is about 1.8 percent of the continental U.S. and most of it is sparsely populated, providing space where a large multipurpose complex could be located. Much of the infrastructure already exists here and is used for similar purposes.

What is missing is the processing to usable feed stocks that Trudy describes in her fine article. Consolidating and processing this waste here locally would be an example of containing the "cradle to cradle" to a compact geographic area. Count me in for participation in a feasibility study.

Thank you for an excellent magazine and connection to the Honor Society.

Ken Boshart, MA E '70

I really enjoyed reading your *Bent* article. I learned a lot from it, but it has led to a couple of questions:

1. Should I be putting only plastics 1 and 2 in my recyclable container and trashing the other plastics?
2. Many restaurants and grocery stores are no longer using plastic containers for left-overs or at the salad bar. Instead, they are using cardboard containers. Do those containers get recycled or trashed?
3. Must I remove paper labels on water bottles before putting the plastic bottles in the recycling container?

Jerry Mendel, Ph.D., NY Z '59

[Response from author **Trudy Bell**:

These are great questions! Generally speaking, if a cardboard container or other recyclable container gets grease-stained or soiled with food, it is no longer recyclable. But that may depend on the recycling facilities in the particular municipal area.

Same for which plastics that can be recycled. The most authoritative answer you can get is from your own local recycling facility. In many communities, information is available on the company's website and distributed to households annually, with instructions about what items can be included in the recycling and what items must be put into the trash. Sometimes what is acceptable is very broad.

(Continued on page 5)

HEADQUARTERS NEWS

At Tau Beta Pi Headquarters—Knoxville, Tennessee

David Roberts has retired as editor of *The Bent* magazine. He joined TBPi in 2008 as editorial assistant, having previously spent 24 years as an international desk photo editor at The Associated Press in London. In 2018 he became the first non-member of TBPi to become editor of *The Bent* since the magazine was first published in 1906.

In addition, Malinda Wood has joined the team at HQ as a marketing and communications specialist. She has a bachelor's degree in communications from the University of Tennessee, Knoxville and has employed those skills in many industries including advertising, newspapers, and financial services prior to joining the staff at TBPi. Malinda will be working on expanding the Association's reach of social media, updating publicity materials, and serving as editor of *The Bulletin*, our quarterly on-line publication for students.

Current communications specialist Dylan Lane has assumed editorial responsibilities of *The Bent* as assistant editor while continuing other communications and website duties.

More information about the TBP HQ staff is available on the website at www.tbp.org/about/hqStaffBios.cfm.



David S. Roberts



Malinda G. Wood



Dylan S. Lane

LETTERS continued

Trashed! Zero Waste

(Author's response continued from page 4)

Other times it's quite limited. For example, where I live they take only plastics 1 and 2, but only for beverage or laundry detergent containers. Other plastics 1 and 2 that contained other household substances (such as rubbing alcohol) are not recyclable.

In many single-stream operations it is not necessary to remove labels. Once again, however, you should check the local regulations. Removing labels is still likely required in the comparatively few communities that practice multi-stream recycling.

It is distressing that even three or four decades after recycling started, that so few items are genuinely recyclable. It's especially distressing since there is so much more individual single-use packaging. To the extent that you can minimize products in single-use packaging, and buy food as bulk products, perhaps even reusing your own containers, that would reduce your own footprint. It may not seem like much for a single shopping trip, but over the course of a year it would really mount up.]

"Trashed!" is a great article. It should be distributed to many more outlets than just the engineering community. This article reveals many facets of recycling that most of the general public does not understand. I was one of the first in our community to push my family to recycle—we had to take the recyclables to the separated bins at the high school. We need to recycle more of the limited resources that this Earth has given us.

I do have one bone to pick with Ms. Bell. She has ignored

the greatest recycling success in North America. The asphalt industry recycles over 73 million tons of asphalt pavement to make renewed asphalt pavement (RAP). This amount is over twice as much tonnage recycled as all the other household recyclables COMBINED. Approximately 75 to 80 percent of all asphalt pavement removed from our highways and runways is recycled. Recycling asphalt pavement also cuts down on the amount of virgin materials required to pave our country's highways. RAP can be used in percentages ranging from 15 to 50 percent in asphalt mixes and yield a product that is equal to or better than a 100 percent virgin mix. Recycling RAP is truly the greatest recycling success story in our country!

Michael Howes, PA H '75

[Response from author Trudy Bell: The answer to the reader's question is that the Chinese ban National Sword was directed at the problems plaguing single-stream municipal recycling from residential customers, so that wide public impact was the article's focus.

The reader, however, is right—industrial manufacturers and users have a higher percentage of recycling: not just asphalt (and some other petroleum products), but also steel, aluminum, corrugated cardboard boxes, etc. Even demolition of buildings can be done with impressive separation of materials—including (in some cases) rescuing of decorative woods for use as is in other buildings without intermediate destruction and reprocessing of the original material.

The topic of recycling is much broader than one 3000-word article can cover with some depth. Clearly, there is room for a wholly separate feature focused on the accomplishments—and the knotty challenges remaining—in industrial recycling.]

Show Up Tau Beta Pi on Pi Day, March 14

Join us in the Sixth Annual Tau Beta *Pi Day*

Wear your Bent or TBP apparel
Participate in a TBP activity
Post on social media with #TauBetaPiDay



www.tbp.org?PiDay



The
2019 Pi Day Challenge
was the most successful since the
initial challenge in 2016!

Recent graduates and other members were asked to be part of an online campaign to make a gift from 2/19-3/17/19.

Participants could receive a TBP phone wallet and insignia items while at the same time supporting their chapter in a chance to win \$100 toward a 2020 Pi Day activity. Those donating 10 Pi (\$31.42) received a phone wallet, those contributing 20 Pi (\$62.83) or greater received both a wallet and a Pi Day t-shirt or license plate frame, and those with gifts of 30 Pi (\$94.25) and above received all three items. All members donating 20 Pi or greater were also eligible to enter a drawing for two \$50 gift cards.

There were 136 (up from 98) participants in the Challenge, 125 of whom made gifts of 20 Pi and above! Pi Day t-shirts went to 110 donors and 56 received license plate frames. The total gross amount raised in the Challenge was \$11,565.76, up from \$7,601.56 in 2018. For receiving the most participation from their alumni, AZ Alpha will receive \$100 for their 2020 Pi Day activities.

The winners of the gift cards are David O. Crockett, TX K '91, and Grayson E. McNair, VA A '62.

Many thanks for supporting Tau Beta Pi and Pi Day in 2019! The names of all donors who made a gift to TBP from 5/1-7/31/2019 appear in the AGP report on pages 30-35.

Chapter Challenge



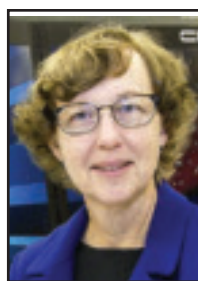
Nick Holonyak Jr., Ph.D., *Illinois Alpha '50*, will have the micro and nanotechnology laboratory named in his honor at the University of Illinois at Urbana-Champaign. Holonyak is an alumnus and Emeritus professor at UIUC. He invented the world's first practical light-emitting diode (LED), and he and his students demonstrated the first quantum well laser, which enabled modern fiber optics communication. He worked for Bell Labs and GE before joining the UIUC faculty.



Carl P. Tilmann, Ph.D., *Indiana Epsilon '87*, has been named an American Society of Mechanical Engineering fellow. Tilmann is principal scientist with the Air Force Research Laboratory Aerospace Systems Directorate, aerospace vehicles division. He is a world leader in aerospace vehicle technologies and directly contributed to the development of aerodynamic simulations and experiments, advanced air vehicle concepts, aerodynamic flow control, and aero-structural interactions.

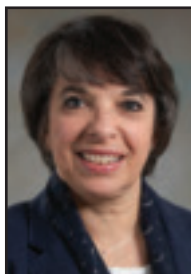


Henry Samuelli, Ph.D., *California Epsilon '75*, and his wife have pledged a \$100 million donation to UCLA to be given over 10 years. The donation was made through the couple's Samuelli Foundation and will go toward the expansion of the engineering school, named in his honor. Samuelli co-founded Broadcom and now serves as the company's chairman. His three degrees are from UCLA in electrical engineering.



Katherine A. Yelick, Ph.D., *Massachusetts Beta '82*, has been elected as an American Association for the Advancement of Science fellow. Yelick is a professor of electrical engineering and computer science at UC Berkeley. She was honored "for significant research contributions to programming languages, compilers and parallel computing, and for exceptional service to the computing research community." Her leadership at the national level has significantly influenced scientific research on behalf of the U.S. Department of Energy.

In June, the American Society for Engineering Education (ASEE) announced nine Fellows for 2019, five of whom are Tau Bates and pictured below with short bios (left to right; top to bottom).



Lisa C. Benson, Ph.D., *Vermont Alpha '82*, founding member of Clemson University's engineering & science education department with a dual appointment in the bioengineering department. She is a professor and alumna of Clemson.

Angela R. Bielefeldt, Ph.D., P.E., *Iowa Alpha '92*, civil, environmental & architectural engineering department professor at the University of Colorado Boulder. Her research concentration is in sustainable water and engineering education.

Lisa C. Bullard, Ph.D., *North Carolina Alpha '86*, alumni distinguished professor and director of undergraduate studies in the department of chemical and biomolecular engineering at NC State University. She was a president of the NC Alpha Chapter of Tau Beta Pi.

Ann D. Christy, Ph.D., *Ohio Gamma '83*, professor of food, agriculture, and biological engineering as well as engineering education at Ohio State University. She collaborates with the environmental consulting industry.

John L. Falconer, Ph.D., *Maryland Alpha '67*, chemical and biological engineering and president's teaching scholar at the University of Colorado Boulder. He has 19 patents in areas including atomic molecular deposition.



Executive Council Meetings

The Executive Council met in Milwaukee, WI, August 23, 2018

The Council approved the appointments of District Director Tonya J. Whitehead, *MI E '17*, to the ICE Committee to a term ending 6/30/20; William W. Provett, *NJ G '69*, as a District 4 Director to a term ending 6/30/19; Andrew J. Doyka, *TN G '17*, as a District 6 Director to a term ending 6/30/19; and adjusted Kelly J. Hammar's, *IA A '89*, term as Director of the District Program to end 8/31/18. The Council moved to appoint J.P. Blackford, *DC G '95*, as the Director of the District Program to a term commencing 9/01/18, and ending 6/30/19.

President Holl reported on her trip to Headquarters and that she met with each staff member. Executive Director Gomulinski updated the Council on the implication of a recent Supreme Court case that may affect sales tax collection on sales and supplies; the audit will be available for review by Convention; Director Gomulinski will serve as a board member for ACHS through February 2019; and two new items, including a cell phone wallet and a membership certificate frame, are available on the TBPI store.

The Executive Council reviewed the report from Director of Engineering Futures; postponed review of the Q4 Financial Report until the October meeting; approved sending the sample chapter bylaws to the Petitions Committee; approved sending the resolution to set the size of the Executive Council to the Resolutions Committee; approved sending the proposed change to the Constitution regarding program eligibility to the Program Review Committee; approved sending the proposed change regarding graduate student eligibility to the Constitution and Bylaws Committee; approved sending the proposed changes related to Council nominations to the Constitution and Bylaws Committee; approved the Chapter Endowment Initiative Policy.

The Council reviewed the Marketing Task Force report and the May TAC meeting report.

See the Executive Council Directory on page 53

Executive Councillor Rachel K. Alexander, *CA U '15*, at the 2018 Convention in Denver, CO.

The Executive Council met in Denver, CO, October 12-13, 2018

Jared Schulze and Vishrut Iyengar, representatives from PPI, presented details on changes to the partnership with TBPI.

The Council reviewed responsibilities for the 2018 Convention and plans for the Association Officials Meeting; recommendations from the Financial Committee; the preliminary petition from The University of Arkansas at Little Rock which was approved.

The Council approved the creation of the title of Executive Director Emeritus. Members of the Finance Committee discussed a proposal to provide to the Financial Affairs Committee to raise initiation fees by \$20 in 2019 and the Council approved.

The Executive Council met by WebEx on December 1, 2018

The Council approved the following appointments: Amy C. Kurr, *IA A '18*, as an Engineering Futures Facilitator-in-Training to a term ending 6/30/20; Christopher C. McComb, *CA R '12*, as an Engineering Futures Facilitator-in-Training to a term ending 6/30/20; Russell W. Pierce, *WA A '70*, as an Engineering Futures Facilitator and also as an Emeritus Adjunct Engineering Futures Facilitator to a term ending 12/31/21.

The Council discussed the 2019 meeting schedule; three in-person events will be held in February, June, and October with monthly WebEx meetings in between. The proposed cities include San Francisco, Minneapolis, and Columbus. Executive Director Gomulinski is directed to provide an analysis and The Council will determine the location.



The Executive Council met by WebEx on January 19, 2019

The Council approved the following appointments: Joseph P. Blackford, *DC G '95*, as an Engineering Futures Facilitator to a term ending 6/30/21; Kaleia Kramer, *AZ B '16*, as a District 1 Director to a term ending 6/30/21; Lauren H. Logan, *OH D '10*, as a District 7 Director to a term ending 6/30/21.

President Paugh stated his goals for The Council for 2019: The Strategic Plan will be a point of focus throughout the year; Councillors should take advantage of their geographic location to reach members throughout the country; new Councillor recruitment; and reaching out to organizations outside of membership. President Paugh is reaching out to members of the U.S. Congress to potentially have a sitting Senator speak at Convention.

The Executive Council met in Knoxville, TN, February 9-10, 2019

The Council approved the following reappointments to the Editorial Board: James D. Froula, *TN A '67*, to a term ending 6/30/19; John W. Prados, *TN A '54*, to a term ending 6/30/20; and Lyle D. Feisel, *IA A '61*, to a term ending 6/30/21. The Council approved the following appointments to the Fellowship Board: reappoint Solange D. Fantozzi, *FL A '95*, to a term ending 6/30/21; appoint LeVern W. Faidley, *IA A '67*, to a term ending 6/30/19; and appoint Abigail M. Richards, *WA B '99*, to a term ending 6/30/19. The following awards were approved for service on the Fellowship Board: Distinguished Service to Charles W. Caldwell, *CA A '64*, for 6 years and a Resolution of Appreciation to Margaret M. Darrow, *AK A '02*, for 4 years.

The Council appointed Vice President Smith to serve as the EC representative on the inspection visit to the University of Arkansas, Little Rock. The Council voted to award an Arminta S. and Robert B. Bower Fellowship and establish the Brandt Fellowship Fund and the 2018 Swanson Charitable Gift Annuity Fund.

The New Mexico Alpha Chapter probation was cancelled and the Pennsylvania Iota Chapter was placed on probation. Knoxville, TN, was approved as the 2021 Convention site.

President Paugh thanked the Council for dedicating their time to the commitment of TBII; restated his goals for 2019 and beyond; encouraged the Councillors to actively participate in the fundraising of the Association and that they all



Executive Council President Wayne B. Paugh, LL.M., JD, FL G '93, at the 2018 Convention in Denver, CO.

serve as the primary ambassadors of the Association. Mr. Paugh reviewed items he has been working on: development of a fundraising letter; improving donor communications; growing the donor base to increase the current pool of donors; recent success by reaching out to local chapters, communicating the accomplishments of renowned members, and reaching out to national legislators. Mr. Paugh encouraged a “call to action” to newer members to encourage active, lifelong membership.

Vice President Smith discussed the Great Smoky Mountains Alumni Chapter and upcoming improvements, the ongoing recruiting process for the Council, and noted one official nomination. Treasurer King-Monroe provided the Treasurer’s Report and stated he was optimistic for the financial stability of the Association. Councillor Pierce inquired about a committee/task force charged with work on the Strategic Plan and recommended having a discussion of the Strategic Plan at every Council meeting.

Director Gomulinski delivered his Executive Director’s Report. The Chapter Endowment Initiative Database is up to date and includes live information for how investments are tracking; the ongoing server replacement process reached a milestone with the first of four primary servers now upgraded; TBII will be able to maintain its status as a non-private foundation; and reviewed the FY19 Q2 Report for the Council.

The Council approved the FY18 audit and Crowe to be the auditing firm 2019-21; Councillor G. Youssef directed Director Gomulinski to review the cost of having the May TAC meeting moved to align with the June EC meeting. A summary of the Governance Committee was presented and the committee will be developing a policy infrastructure and format for all Association policies.

Executive Council Meetings continue on page 53.

TBPI-McDonald Mentor 2019

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 for their contributions to their field and the greater community.



Martha C. Mitchell, Ph.D. New Mexico State University

Martha C. Mitchell, Ph.D., *Wisconsin Alpha '89*, is the 2019 TBPI-McDonald Mentor. She is a professor in the department of chemical and materials engineering at New Mexico State University (NMSU).

Dr. Mitchell will be honored on October 11, 2019, at the 114th annual Convention in Columbus, Ohio. Tau Beta Pi President Wayne B. Paugh, LL.M., JD, will present \$1,000, an engraved medallion, and pin to Mitchell. Another \$1,000 grant will be presented to the TBPI NM Alpha Chapter for nominating her.

Established in 2005 by Marion and Capers W. McDonald, NC Γ '74, and the Association, the McDonald Mentor Award recognizes engineering educators or professionals in industry, government, or service organizations who have shown true concern for the individual, supporting an environment for developing talents, and who have earned respect and recognition for contributions to their field and to the greater community.

Dr. Mitchell received a B.S. in chemical engineering from the University of Wisconsin-Madison in 1989 and a Ph.D. in chemical engineering in 1996 from the University of Minnesota-Minneapolis. She began her career at New Mexico State University as an assistant professor in the department of chemical engineering in 1996. During her tenure, Dr. Mitchell was promoted to full professor, chemical engineering department chair, and associate dean for research for the college of engineering.

In addition to her outstanding professional accomplishments, Dr. Mitchell has been a great advocate and mentor for both students and junior faculty at NMSU. Her nomination packet for this award contained many personal accounts of how Dr. Mitchell's mentoring has been invaluable to both students and faculty members.

From the student perspective, "Dr. Mitchell readily meets with any student to discuss research projects/activities, also providing feedback on the student's original research proposals and creation of

standard operating protocols. She makes time to meet students who need additional help whenever it is most convenient for the student.

Dr. Mitchell challenges all of the engineering students to reach higher and to go beyond learning the basics. Already recognized as a stellar mentor at the university level, she received the Outstanding Mentor Award, NMSU Teaching Academy (2015) and the Robert Davis Professorship (2008-11)." Additionally, Dr. Mitchell helped secure funding for individual undergraduate students who would otherwise drop-out due to financial constraints.

From the faculty perspective, "Dr. Mitchell has helped mentor many of the highly accomplished faculty in CHME as well as in other departments. She knows the power of an effective mentoring relationship and has codified it at our campus." She is the principal investigator on the mentoring component of an NSF funded program, by which "the educational experiences of the S-STEM Scholars are enhanced through various cohort activities that promote academic challenge, mentoring relationships, workforce preparedness, and professional excellence."

"Dr. Mitchell is a person who will go above and beyond to ensure the faculty and students are well prepared both mentally and academically to excel in the engineering field. She consistently adjusts her own teaching approach so that it's effective in reaching all students. Many of the faculty she mentored from over fifteen years ago still consider her their strongest advocate in the industry and a true friend."

For her remarkable career and commitment to mentoring, we honor Dr. Martha C. Mitchell as the 2019 TBPI-McDonald Mentor.



The Tau Beta Pi Outstanding Advisor has been named every year 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.



Kurt P. Rouser, Ph.D. Oklahoma State University

Kurt P. Rouser, USAF (ret.), Ph.D., *Ohio Eta '11*, an assistant professor at Oklahoma State University (OSU), is the 2019 TBPI Outstanding Advisor.

He will be honored on October 11, 2019,

at the 114th annual Convention in Columbus, Ohio, where Tau Beta Pi President Wayne B. Paugh, LL.M., JD, will present \$1,000 and a commemorative plaque to Dr. Rouser. Another \$1,000 grant will be presented to the Oklahoma State University College of Engineering, Architecture, and Technology's discretionary fund.

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

Dr. Rouser has a track record of success leading and revitalizing Tau Beta Pi chapters.

Upon joining OSU in 2016 as a mechanical and aerospace engineering assistant professor, Dr. Rouser accepted the position of OK Gamma Chapter Chief Advisor and got to work. His impact immediately improved membership, provided support for chapter initiatives, and secured alumni involvement and donations for the struggling chapter.

Previously, Lt. Col. Rouser was an assistant professor at the U.S. Air Force Academy (USAFA) before retiring from active duty and starting his tenure-track position at OSU. While at USAFA, he served for three years as CO Zeta Chapter Chief Advisor.

Under his leadership, two TBPI alumni chapters have been chartered; Pikes Peak (CO) in 2013 and Pioneer (OK) in 2017. He still serves as president of the Pioneer Chapter in Oklahoma and led the Pikes Peak Chapter in Colorado until his relocation.

Dr. Rouser has guided each of these chapters, alumni and collegiate, to fulfill the mission of the Association with a focus on recognizing scholastic and professional achievement, exemplary character, and promoting the engineering profession.

At OSU, the chapter reports evidence of his work in the form of an honorable mention for the 2018 TBPI Most Improved Membership Award. The OK Gamma Chapter has also hosted a District Conference, worked on and secured a project to have a Bent monument installed on campus, and hosted two alumni panel Q&A sessions.

At USAFA, Dr. Rouser increased membership acceptance rate to nearly 100 percent and initiated more than 200 students, alumni, and eminent engineers, including a former NASA astronaut. With his encouragement and assistance, the CO Zeta Chapter submitted several nominations for TBPI awards leading to one Laureate, two Distinguished Alumni, and two McDonald Mentor awards.

He has orchestrated other activities, including *TBPI Day* events, socials, and volunteer work at both the OK Beta and OK Gamma Chapters.

Dr. Rouser routinely attends TBPI Conventions and presented a Professional Development Session in 2018 sharing his motivation and experience as a chapter advisor.

Dr. Rouser is also a natural teacher and mentor having received a USAFA Faculty of the Year Award in 2014 and currently advising more than 20 undergraduate and six graduate research assistants.

For his "sustained service," commitment to promoting excellence, and support of the Association and its ideals, Dr. Rouser is the 2019 Tau Beta Pi Outstanding Advisor.

TBPI Laureates 2019

Four Laureates have been selected in the 38th 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. This year's Laureates join 111 other outstanding Tau Bates to be cited since the program began in 1982. The Laureates will be honored with other 2019 Association award winners at the 114th annual Convention in Columbus, Ohio.

Casey Main



Casey Main, Indiana Delta '19, has been named a 2019 TBPI Laureate for her diverse achievements. She recently graduated with a bachelor's degree in mechanical engineering and is a dedicated swimmer, natural leader, and enthusiastic volunteer.

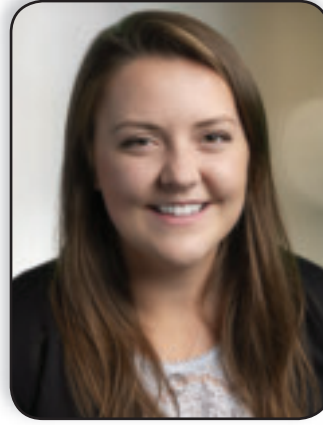
Main is a four-year member of the Valparaiso University Div. 1 women's swim team. Her nomination stated how she has helped improve the team culture as an academic and athletic leader. As a result, the team was named a Scholar All-America team by the College Swimming and Diving Coaches Association in 2019.

She served as an active leader in her chapter of Kappa Kappa Gamma sorority as president and vice president of standards. Main was also able to create positive change in the local community through volunteer activities with KKG.

In addition, Main co-founded the Council of Engineering Inclusion and Equity to encourage student engagement of all members of the college of engineering community by valuing their differences. She was recognized with the Claire Duncan Memorial Award "for improvement in the college of engineering at the 2018 Engineers' Day banquet."

She is an active member of the IN Delta Chapter and is a 2018 TBPI Scholar. Her love of liberal culture through leadership and community service has had a lasting impact on each group she's participated in. These diverse achievements are a testament to her bravery, commitment to inclusion, and role model status.

Kendra Noneman



Kendra K. Noneman, Idaho Gamma '20, has been named a 2019 TBPI Laureate for her athletic achievements. She is a senior at Boise State University majoring in materials science & engineering with an applied mathematics minor. Her contributions as a student-athlete reach far beyond her success on the track.

Noneman is a weight and hammer thrower for the Div. 1 track & field team. She reached the finals at the Mountain West championships for two consecutive seasons and had a personal best throw of 18.28 meters in 2019.

What sets Noneman apart is both a commitment to academic success and her leadership roles among student-athlete peers. When BSU's track team was without a coach for a few months, she stepped up as team manager, "filming teammate practices to help everyone continue to improve."

Her nomination cites the breadth of activities in which she participates: judging 4-H competitions, STEM projects for children with disabilities, and recruitment for the college of engineering.

Noneman serves as ID Gamma Chapter president, is a 2019 TBPI Scholar, and leads her chapter's *TBPI Day* event on campus.

Her ability to maintain a stellar GPA, being named an NSF scholar recipient, participating in research, and involvement in community service make her an example among other student-athletes. This commitment breeds success, motivates those around her, and deserves recognition.



Rose Ridder



Rose C. Ridder, *Pennsylvania Kappa '20*, has been named a 2019 TBI Laureate for her diverse achievements. A double major in engineering and cognitive science, she is engaged in community development and service locally and internationally while also a leader for on-campus organizations and programs.

Over the past year, Ridder has implemented a project in Northern Thailand fostering science engagement and education. The project worked with 70 students and 20 teachers to improve access to resources in rural Thai schools.

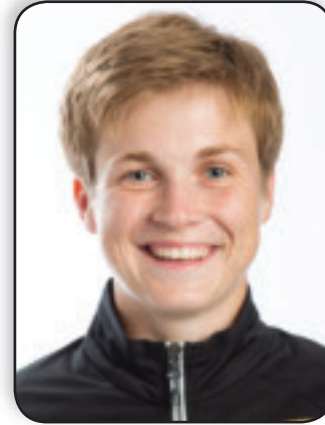
In the Swarthmore College community, she serves as a residential assistant, orientation leader, and captain of the rugby team. Ridder also works with the Lang Center for Civic and Social Engagement in promoting social entrepreneurship and innovation on campus and around the world.

Ridder was named a Lang Opportunity Scholar her sophomore year and developed a water project to engage middle school students in the STEM fields. This project was expanded and implemented across Thailand.

She serves as PA Kappa Chapter president and has plans to grow the chapter, better engage members, and increase campus visibility.

Ridder was cited as “the embodiment of liberal culture lived daily, with a deep sense of empathy, and a passion for social justice.” She is an accomplished leader dedicated to helping others with a focus on promoting science and engineering.

Kelli Swenson



Kelli L. Swenson, *Wisconsin Gamma '19*, has been named a 2019 TBI Laureate for her athletic achievements. She is a civil engineering graduate with a perfect GPA and a memorable legacy as a soccer player student-athlete.

Swenson joined the varsity soccer team as a freshman walk-on at University of Wisconsin-Milwaukee. She was inserted at halftime of the fourth game of her career and went on to start the next 73 consecutive games as a defender.

Swenson finishes her career extremely decorated with academic and athletic awards, including:

- *First ever repeat Horizon League Defensive Player of the Year*
- *Academic All-American First Team*
- *#76 top 100 D1 women's soccer players list*
- *GEICO Horizon League Fall Scholar-Athlete*

The individual honors are impressive, but according to her nomination, her “greatest collegiate moment” came, when as a senior team captain, she scored the game winning goal propelling her soccer team to an NCAA Tournament appearance.

She is also a member of the UWM student athlete advisory committee connecting student-athletes, the athletic department, and the campus community. Swenson has participated in undergraduate pavement research and is a member of ASCE.

Aptly being characterized as “humble, focused, and well-prepared,” Swenson’s well-rounded experience in the classroom and on the field has prepared her for a successful career in engineering and beyond.

TBPI Distinguished Alumni 2019

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. Each will be recognized at the 2019 Convention.

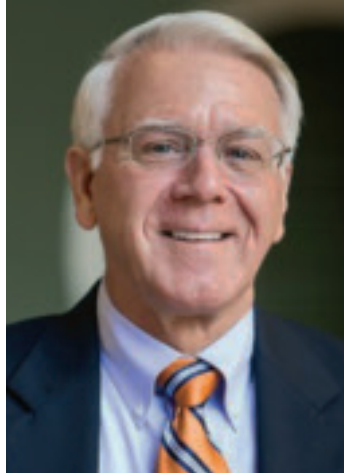
Wayne T. Davis, Ph.D.

IN RECOGNITION OF OUTSTANDING LIFETIME ACHIEVEMENTS, **Wayne T. Davis, Ph.D.**, *Tennessee Alpha '73*, has been named a 2019 TBPI Distinguished Alumnus.

Dr. Davis is being honored for contributions in teaching, research, industry, and leadership roles at the University of Tennessee, Knoxville (UTK). He recently retired from a 45-year career at UTK with the final 14 months as interim Chancellor.

As a first-generation college student, Dr. Davis holds a bachelor's degree in physics from Pfeiffer College (now Pfeiffer Univ.), a master's in physics from Clemson University, and from UTK both a master's in environmental engineering and a Ph.D. in civil engineering.

Over a span of 40 years, Dr. Davis was cited in 216 publications and 88 refereed publications, including books, and completed 70 consulting projects for government agencies and private companies. His research led to three patents pertaining to air pollution and filtration.



Dr. Davis served on several boards and was appointed by two governors to the Tennessee State Air Pollution Control Board for three terms and served as the board's vice-chair for three years.

He began teaching at UTK as an instructor of environmental engineering. His senior level classes focused on air quality/ pollution control and waste/ hazardous waste management.

Dr. Davis served as college of engineering dean for nearly ten years (2009-18) and previously served as assistant dean and associate dean of the UTK Graduate School.

Under his guidance, the UTK College of Engineering increased undergraduate enrollment by 60 percent and graduate enrollment grew 36 percent with a 116 percent jump in Ph.D. students. In addition, new faculty positions increased by 42 percent and he led the design and opening of several new engineering facilities on campus.

Congratulations to Dean Davis on his distinguished career and commitment to engineering education.

David L. Ford Jr., Ph.D.

FOR OUTSTANDING LIFETIME ACHIEVEMENTS, **David L. Ford, Jr., Ph.D.**, *Iowa Alpha '67*, is recognized as a 2019 TBPI Distinguished Alumnus. He is Emeritus Professor of organizational studies at the University of Texas at Dallas and owns a management consulting firm.

Dr. Ford fosters a spirit of liberal culture through his civic, education, and professional contributions as more than an aerospace industrial engineer.

In 1962, he graduated as valedictorian of a segregated high school in the Forth Worth, TX, area. He has earned degrees from Iowa State University and University of Wisconsin-Madison, also taught at Purdue University, and was a visiting researcher at UCLA and Yale.

Dr. Ford retired from UT Dallas in 2017 and is founder of the Management Faculty of Color Association, focused on professional development of under-



represented minorities in management faculty. He mentors students at Dallas' Hamilton Park Pacesetter Middle School, serves as a patient advocate for Dallas' Alzheimer's Association, and facilitates groups for the Central Eurasia Leadership Alliance and the Middle East Leadership Academy.

Upon his retirement, the *North Dallas Gazette* wrote, "For 20 years, Dr. Ford was the only African-American professor at UT Dallas business school... He worked diligently to recruit more African-American professors and students."

Two educational organizations credit Dr. Ford's 25 years of leadership and participation as the reason behind the growth of Ph.D. business degrees for African-Americans and other minorities.

His career accomplishments in diversity and productivity set him apart as a leader and engineer who has excelled professionally and in his community.



William E. Jennings

IN RECOGNITION OF OUTSTANDING LIFETIME ACHIEVEMENTS, **William E. Jennings**, *Georgia Alpha '85*, is a 2019 TBPI Distinguished Alumnus. “Bill” is CTO and vice president of engineering at FarmX and an inventor of key Internet traffic products.

He helped invent, create, or led a team to bring computing solutions to the world by developing the backbone of the Internet, GPS, and cellular technology.

Mr. Jennings has a bachelor's degree in electrical engineering from Georgia Institute of Technology.

If you use Windows, surf the Internet, use a cell phone, or have your computer time set automatically, you benefit from innovations that Mr. Jennings helped create. Today, 80 percent of Internet traffic depends on products that Mr. Jennings conceived and led teams to build.

Mr. Jennings invented the first network processor that combined the capabilities of a microprocessor with high-speed communication required to process the data necessary to make high-speed Internet a reality.

Mr. Jennings is an active member of the Anita Borg Institute, a community that works with women



technologists in over 50 countries and partners with leading academic institutions and Fortune 500 companies. He serves as speaker, panelist, mentors university students, and in 2018 was inducted into the Silicon Valley Engineering Council's Hall of Fame.

Mr. Jennings is also an active assistant scoutmaster of Troup 581 (Saratoga) and was given the 2019 Boy Scouts of America Distinguished Eagle Scout Award.

For more than three decades, Mr. Jennings' professional endeavors enabled a stronger capability for world communications. At FarmX, he is developing advancements in water conservation and increasing profit for commercial farmers in California

by developing sensors, networks, and algorithms to reduce expenses/increase yields. His water saving technology is scalable to meet other needs as the company he helped found expands internationally. In today's world of machine learning, we often forget the technology and leading engineers who built the core foundation to make these and future technologies possible. Bill Jennings is such an engineer.

Abdallah H. Yabroudi

FOR OUTSTANDING LIFETIME ACHIEVEMENTS, **Abdallah H. Yabroudi**, *New York Beta '78*, is recognized as a 2019 TBPI Distinguished Alumnus. As CEO and managing director of Dubai Contracting Company, he uses his company's success and experience to engage and encourage students at his alma mater.

Mr. Yabroudi graduated from Syracuse University with a B.S. in civil engineering and an M.S. in industrial engineering. After graduation, he returned to Dubai, United Arab Emirates (UAE) in the Middle East, to work for the construction company founded by his father in 1962, Dubai Contracting Company (DCC).

Under his leadership, DCC has experienced unprecedented growth, is recognized as a leading contracting company in the UAE, and has received numerous honors. The Rolex Tower, constructed by DCC, was selected as a finalist in the 2011 council on tall buildings and urban habitat program and DCC was named Construction Company of the Year at the 2008 Arabian Business Achievement Awards ceremony.



In 2018, Syracuse named Mr. Yabroudi as one of the winners of the George Arents Award, the university's highest alumni honor, recognizing those who have excelled and made outstanding contributions to their fields.

His professional achievements, while significant, are magnified by the far-reaching benefits of the DCC Syracuse University Lebanese American University internship program. The program, implemented in 2008, embodies Mr. Yabroudi's and DCC's commitment to education through supporting student growth as future leaders in the construction sector.

Early stage investment in engineering students allows DCC to make future contributions to the construction industry in the UAE. The internship is designed to educate and inform students on the operations and physical realities of construction firms in the UAE. The program also encourages cultural understanding between groups of students with 100+ having graduated from this program, which offers a global perspective on engineering.

Printing Success Stories in 3D

By: Alan S. Brown

Additive manufacturing has been around for 30 years, but faster machines, lower costs, and a string of successes have made engineers take notice.

ADDITIVE MANUFACTURING HAS ARRIVED. Not that it was ever gone. Engineers have been making solid parts from digital models for more than 30 years. But when makers latched onto it several years ago—promising a 3D-printed future of everything from spare parts to entire automobiles—it seemingly exploded on the scene.

That rosy future will not bloom so fast. But don't let the hype get in the way of 3D printing's solid achievements, especially over the past few years.

Over the past five years, engineers, designers, and manufacturers sat in the driver's seat. While additive was once used mostly for prototypes, it is now appearing on factory floors and in products ranging from aircraft, rockets, and satellites to medical implants, automobiles, and, surprisingly, sneakers.

The surge of additive manufacturing shows in the numbers. According to Terry Wohlers, a consultant who has tracked the industry for more than 20 years, revenue from additive products and services is projected to reach \$15.8 billion worldwide in the 2020s.

That is not much compared with conventional manufacturing, but additive is growing fast. Wohlers expects 3D revenue to more than double to \$35.6 billion by 2024. And metal additive manufacturing is rising even faster, more than 40 percent annually for the past five years.

More importantly, though, additive manufacturing is scoring wins where it counts.

This year, for example, Adidas® expects to make and sell more than 1 million of its 4D sneakers, which feature 3D printed lattice soles. Stryker recently opened a \$400 million factory in Ireland to print knee, hip, and spinal implants.

GE expects to ramp up to 40,000 to 50,000 printed fuel nozzles annually for its new LEAP jet engine. Boeing has more than 70,000 3D parts flying. Meanwhile, Relativity Space opened a facility to 3D print an entire launch rocket.

Changes

Despite these successes, engineers have good reason to be skeptical. Additive manufacturing is almost always the most expensive way to make parts. The process is slow—metal parts can take days—costly, and used expensive, proprietary materials whose properties did not reach the standards of conventional metals and resins. Consistency varied even between machines made by the same manufacturer. Parts, which are built layer by layer, were usually weaker along the z-axis.

A lot has changed over the past few years. Patents have expired and new companies have entered the market. The result has been an explosion of innovation.

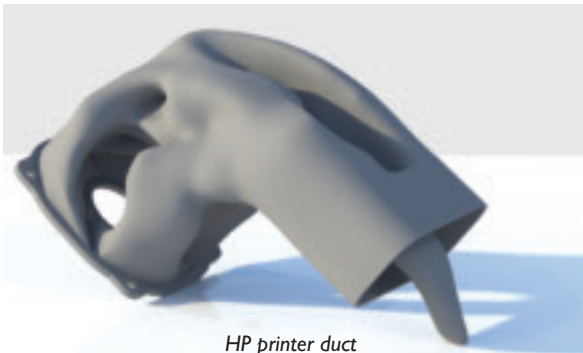
“We have more capability with hardware than we did before,” Wohlers said. “In materials, we’re seeing companies opening up their machines and allowing you to use third party materials, which is good for customers. Software companies now are beginning to catch up with those hardware capabilities, though they have always been a bit behind.”

“Probably the biggest change, though, is the respect that it’s getting and that it deserves. With that comes investment at the corporate level.”

Corporations are paying attention because additive manufacturing brings a lot to the table. Its economics often work for short production runs of hundreds to several thousand parts. While individual printers are not as fast as injection molding or die casting, they are much faster than waiting weeks or months for a vendor to complete a mold for those processes. This makes it possible for companies to beat competitors to the market with new or upgraded designs, then switch to a less expensive production method later if it is successful.

Additive manufacturing also excels at making complex parts for no more than a simpler print. By building parts layer by layer, it can reproduce just about anything an engineer can model in CAD. It can, for example, print twisting organic brackets that are stronger and weigh less than the massive parts they replace. Or build complex ductwork to optimize flow, lattice-strengthened walls to reduce weight, and conformal passageways to remove heat from a curved surface.

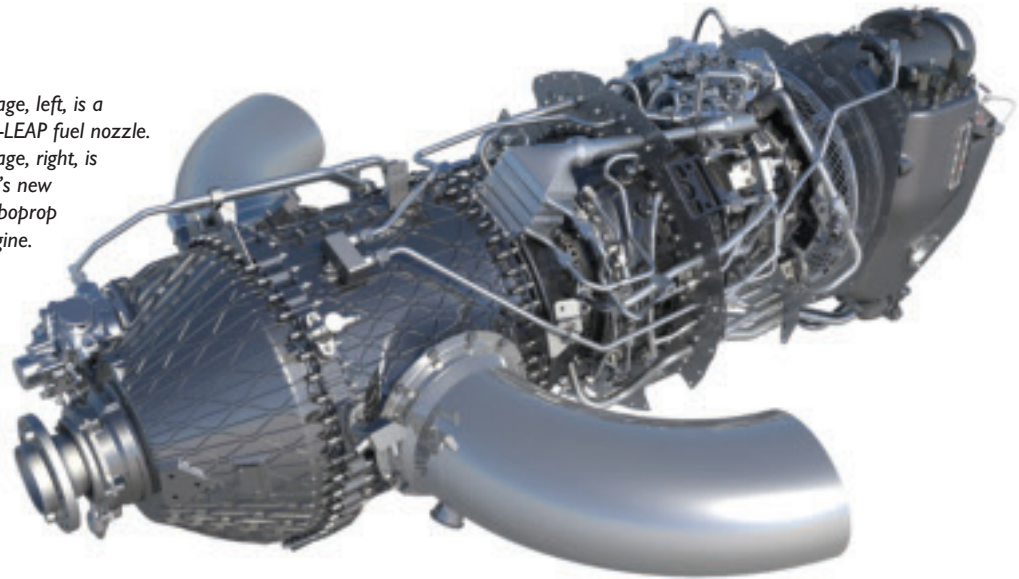
Those changes can make a big difference in product performance. Hewlett-Packard, for example, redesigned the duct that cools the printheads in its Fusion 3D printer. The asymmetrical organic shape optimizes air flow, removing heat so efficiently that the printer now runs 15 percent faster. And it costs 10 percent less to print than the part it replaced.



HP printer duct



Image, left, is a GE-LEAP fuel nozzle. Image, right, is GE's new turboprop engine.



Use Cases

The growing number of high-profile use cases also stimulated interest in 3D printing by showing managers and engineers how additive could be used to gain competitive advantage.

If there was any single application that opened management's eyes, it was the fuel nozzles for the GE Aviation-Safran Aircraft LEAP jet engine used on single-aisle passenger jets.

The fuel nozzles disperse fuel into the hot combustor so that it burns evenly and efficiently. The original nozzle did that by brazing and welding 20 parts into 24 intricate interior passages.

GE redesigned the nozzle to take advantage of additive manufacturing's ability to make complex structures. The final design consolidated the 20 parts into a single structure.

This consolidation eliminated a series of complex assembly operations and simplified inventory. It slashed weight by 25 percent, and saved tens of thousands of dollars in fuel costs over the lifespan of an aircraft. The nozzle is also five times more durable than the original, since it has no welds for the hot combustor gases to corrode.

The nozzle was certified three years ago. Meanwhile, GE has been applying additive manufacturing to other engine parts, from sensor housings, heat exchangers, particle separator, and even blades.

GE's new turboprop engine takes that to another level.

"We consolidated what would have been 855 parts in a conventional engine design into 12 parts," said Steven Taub, managing director of GE Ventures, which invests in additive and other technology companies.

"That means it performs better in terms of actually mixing gases, heat transfer, and things like that. It's lighter because there are fewer parts, like fasteners, flanges, and other things that add weight. It's more durable because nozzles tend to fail at the joints and it has none. And it takes a huge amount of complexity out of the supply chain."

The big, complicated parts take days to print and need machining afterwards, Taub said.

"But you can still produce them faster than conventional components because you're just making one part," Taub said. "And you don't have to source all these different forgings and castings and do all kinds of complicated assembly steps.

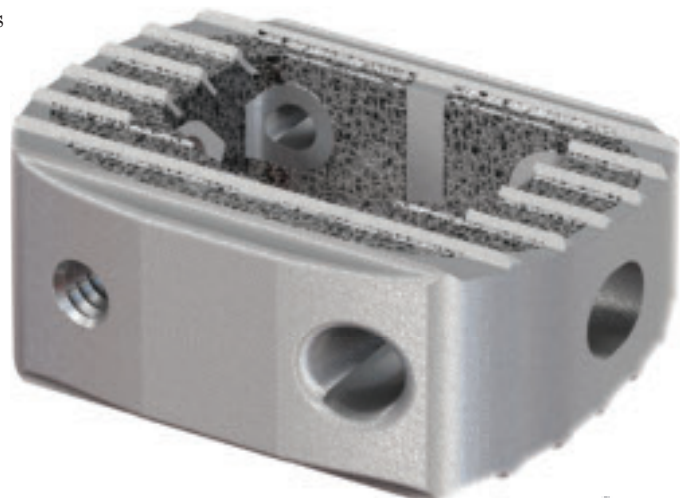
That eliminates all kinds of inventory worries and quality control issues. You turn what might have been 20 or 30 suppliers into one. It's actually something we've done in house. It's a massive reconfiguration, not only of how we design things but of how we make things."

Another landmark application was Stryker's 3D printed titanium Triathlon knees, Tritanium spinal cages (for spinal fusion), and Trident hips.

In the past, surgeons cemented knee implants onto bone. Over time, however, the body degraded the adhesive and the knee grew unstable. To overcome this problem, implant makers wanted to modify the implants' surfaces so bone would grow into it, anchoring it in place.

After investigating several processes, Stryker turned to additive manufacturing, Lewis Mullen, Stryker's manager of additive manufacturing, said. The process enabled Stryker to optimize pore size and distribution, creating a roughened surface that resembled the natural bone around it. This encouraged bone cells to grow into the implant.

The part was a triumph, though it took years to ensure 3D printing consistency and repeatability, Mullen said.



A Stryker Tritanium implant. More images and details on page 21.

Factory Floor

Additive manufacturing has also excelled in factories, where engineers use the process to build jigs, fixtures, tools, enclosures, and replacement parts to solve production problems.

"This is 3D printing's killer app," said Greg Mark, founder of Markforged, which builds composite and metal 3D printers.

For 30 years, he said, 3D printing was "trapped in plastic," which was not strong enough for industrial use. By adding carbon or Kevlar fiber to plastic or using metal, engineers can now make parts they can use in a factory.

Mark and his team have spent a lot of time walking factory lines and can point to examples.

"We have a coordinate measuring machine fixture out there where you put a piston in it, clamp it down, and the CMM scans it," he said. "That fixture would cost \$1,300 if the engineer designed it, but they can print it for \$40."

"So the engineer prints the first one, they start using it, and they're happy because they saved a bunch of money, and then he realizes that if he adds a chamfered edge where the piece comes in, it will load and unload much quicker."

"He doesn't have to ask his boss for a purchase order or an approval. He just prints another part for \$40 and now his throughput has gone up and his boss thinks he's a rock star. All these companies around the world are going through that learning in parallel. And that's why additive is taking off now."

This is true for both large and small companies.

At Boeing, Tracy Daly, production engineering chief for 747 and 767 airplanes, manages 15 innovation cells on the factory floor. They have 50 3D printers between them. If an engineer or technician has an idea for a part, he or she can quickly build it and see if it works.

One example is a brush used to apply sealant to certain parts of the airplane. The original brushes were hard to grip and fit into the crevices, Daly said. So workers created a set of adjustable brushes and scrapers designed for those specific locations.

Boeing also printed stretchable urethane gaskets to keep debris from entering casings and devices to lock down spring loaded doors and latches so they were not trip hazards. They were all small projects, but they sped production and improved quality and safety.

"We run a fail fast environment," Daly said. "We want to do it quickly, see if it works, and improve the design if needed."

Fast turnaround also matters to Bryan Rogers, a senior additive manufacturing engineer at Wilson Tool. Headquartered in White Bear Lake, MN, the company makes tooling for companies that do stamping, bending, punching, and tableting.

Its additive business serves the same customers, but faster, Rogers said. "If a customer has a job and needs

a short run tool, fabricating that tooling takes weeks. Additive gets tools out fast, so you're making parts and getting qualified in hours or days rather than weeks."

Like Wilson Tool, Centerline Engineered Solutions of Greenwood, SC, makes a variety of 3D tools and parts. One notable success was a carbon-reinforced nylon die to lance 14-gauge sheet metal. Machining would have cost \$1,400 and taken 10 days, but 3D printing cost only \$200 and took 1.25 days.

Centerline founder Phil Vickery, *SC A '92*, also believes additive manufacturing changes the way his shop operates.



Centerline 3D printed fixture/jig
www.centerline.com/additive-manufacturing

Many of the machinists and tradesmen were initially skeptical about 3D printing, he explained. The process was unusual for a machine shop and it produced composites rather than metal.

"We had to show them the advantages. Once you show it's reliable and easier, the buy-ins come. Employees now look for ways to 3D print," Vickery said.

That opened the door to innovation.

"The employees now come to me with ways to make a part or a process better or faster," Vickery said. "It enables more communication between technical people and workers. There's more push from the workers, more 'We can do it this way.' It encourages them to think of creative ways to solve problems."

Vickery's remarks are echoed by Daly, who trains both staff engineers and hourly workers in 3D printing. So far, Boeing's innovation cells have generated 80 invention disclosures and 600 ideas from hourly workers.

"Every mechanic that walks by that space is intrigued by the printer," Daly said. "They feel empowered to submit ideas and eager to make their jobs easier and more efficient."

Potential

Additive manufacturing's successes can be seductive. Boeing, Stryker, HP, and others have all demonstrated designs that improve performance and reduce assembly time. It's easy to think of a future of factory-printed parts.

Yet these applications have been intended for products whose production numbers run a few hundred or a few thousands units. At higher volumes, 3D printing is always more expensive than conventional processes.

However, this gap is narrowing, especially for products where additive manufacturing delivers a performance advantage.

Take for example, the lattice soles on Adidas' \$350 4D sneakers. The company plans to make one million of them in 2019. By varying the density of the lattice, Adidas® can optimize stability, support, cushioning, and comfort in a single insert, rather than bonding several parts into one midsole.

Adidas makes the soles using a process developed by Carbon, who claims it is 100 times faster than conventional 3D. It starts with a vat of liquid thermoset resin. A laser at the bottom projects the lattice design into the vat, where it partially solidifies the polymers.

As the emerging sole is pulled upwards, it enters an oxygenated region, which stops further solidification.

This ensures that the laser adds lattice only at the bottom. Carbon then heats the semi finished sole to solidify it completely.

Breaking the operation into two steps enables Carbon to run its 3D process faster (since it does not need a full cure) and then size relatively inexpensive ovens to meet the printers' highest speeds.

Desktop Metal and Markforged do something similar in metal printing. They deposit metal powders in a waxy binder, then heat the parts in an oven. The binder evaporates away and the parts shrink into a dense, final shape.

Managing that shrinkage would have been an enormous challenge, but industry had been doing something similar for decades. Powder injection molding shapes metal-binder material in molds, then sinters them.

Desktop Metal and Markforged built on its knowledge to manage shrinkage and other sintering issues.

More fast processes are on the way. One comes from Evolve Additive Solutions, a spinoff of 3D leader Stratasys. Instead of rastering a print pattern one line or curve at a time, Evolve prints the way a laser printer does, one complete layer of toner-like plastic particles at a time. The layers deposit on a tray, go to a heater, and then back to the printer.

CEO Steven Chillsyzyzn claims the process is up to 50 times faster than conventional 3D printing. He believes it will compete with injection molding on strength, feature detail, finish—and cost—for runs of several thousand parts.

Faster, cheaper processes will lead to more 3D printed products. Airbus and Boeing have already done that for interior parts. More encouraging, in 2017, BMW's i8 Roadster became the first car to use metal additive parts in production quantities of several thousand.



The Adidas® FutureCraft sole in production.



The metal 3D parts for the new BMW i8 Roadster.



The Adidas®
Futurecraft 4D shoe.

The aluminum part, which lifts, pushes, and pulls the convertible roof into a zigzag pattern, is stiffer and lighter than the design it replaced.

Other companies have begun to 3D print for spare parts. The leaders include Porsche, Daimler, Volvo, and Whirlpool. The reason, again, comes down to economics.

Companies that produce products also make extra parts for spare part inventory. German logistics giant DHL estimates that this excess and rarely used stock accounts for up to 20 percent of all warehouse space. That is just wasted money.

It is also a red flag for UPS, a global logistics company. But Alan Amling, the company's former vice president of strategy, sees a very different future.

It is a world where goods will be produced in lower quantities, more frequently, and closer to the point of consumption.

"That means there's going to be less storage and less shipping," Amling said. "So, UPS is trying to stay on the front end of this change and make sure we're part of the change as opposed to a victim of it."

That led UPS to invest in Fast Radius, a fast-turn-around job shop that combines additive with other machining technologies. UPS installed a Fast Radius 3D print center at Louisville, KY, and plans to build more production centers around the world.

Logistics is not the only place where 3D printers could prove disruptive.

"Digital printing will make it possible to green light new products, take more risks, go after niche markets, and do all sorts of things that you might not consider doing today," said Tim Simpson, who runs Penn State's Center for Innovative Processing-3D.

Take, for example, sneaker lattices. Many running stores already own treadmills that automatically analyze

running styles. Combine that with some accurate measurements and an algorithm would have everything it needed to design a user-specific sole.

The main thing Adidas would have to do to produce a use-specific sole is change the digital model running on its printers. It would enable the company to essentially turn a product—sneakers—into a higher-margined service that delivers customized performance.

Another way to gain competitive advantage is through continuous upgrades, changing hardware the way software companies now do when they perform online updates. That is essentially what HP did with its printer duct.

It originally assembled the part from six injection moldings. Switching to a one-part 3D duct shaved the price to \$20, from \$30, but did not change performance. Optimizing the part's flow improved printing times and also shaved another 10 percent off cost. Because there are no costly molds involved, HP could introduce the part immediately, setting a higher bar for competitive products.

There are so many possibilities. One day, 3D printers may make our spare parts and let us leapfrog our competitors. They may help build or customize products that were not economical in the past.

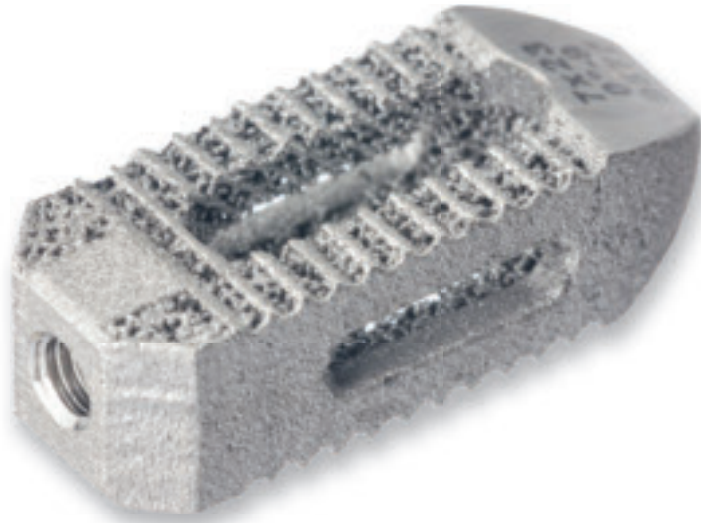
The future of additive manufacturing remains uncertain but alive with possibilities. And each success—from airplane engines and jigs and fixtures to sneakers and knee implants—provides another clue for creative engineers with problems to solve.

It is a technology that has certainly arrived.



Alan S. Brown has been an editor and freelance writer for more than 30 years and lives in Dayton, NJ. A member of the National Association of Science Writers and former co-chair of the Science Writers in New York, he graduated magna cum laude from New College at Hofstra University in 1974. He is an associate editor of *Mechanical Engineering* and contributes to a wide range of engineering and scientific publications.

Contact: insight01@verizon.net



This Stryker Tritanium Posterior Lumbar Cage is a hollow, rectangular implant that consists of a unique configuration of both solid and porous structures built using AMagine Technology, the proprietary approach to implant creation using additive manufacturing. It can accommodate a variety of patient anatomies.



The new BMW i8 Roadster with metal 3D printed parts. (11/2017) These parts lend the BMW i8 Roadster to combined fuel consumption of 117.6 l mpg (2,0 l/100 km); combined electricity consumption .2333 kWh/mile (14,5 kWh/100 km); & combined CO2 emissions 118.63 mpg (46 g/km). (Calculated in the EU test cycle, in combination with standard tires).

Reader's Poll

<https://www.surveymonkey.com/r/ZNPB3HK>

Does your company use 3D printing?

Yes or No

Have you used 3D printing, personally or professionally? Yes or No

Do you think 3D printing would make your job easier or more efficient? Yes or No

PEOPLE

Martin A. Abraham, Ph.D., *New York Gamma '82,*



has been named provost and academic vice president at Western Illinois University. He was professor of civil/environmental and chemical engineering at Youngstown State

University. Abraham joined YSU in 2007 as founding dean of the college of science, technology, engineering, and mathematics and also spent time as interim provost (2014-15). An AIChE and American Chemical Society fellow, he is the editor of *Environmental Progress and Sustainable Energy* and the *Encyclopedia of Sustainable Technologies*.

Stephanie G. Adams, Ph.D.,



Nebraska Alpha '89, has been named dean of the school of engineering and computer science at the University of Texas at Dallas. Previously, she was a professor of engineering manage-

ment and systems engineering and dean of the college of engineering and technology at Old Dominion University. Adams, a mechanical engineer, also serves as president of the American Society for Engineering Education (ASEE).

Teresa Abi-Nader Dahlberg, Ph.D.,



Pennsylvania Lambda '84, is the next provost and vice chancellor of academic affairs at Texas Christian University. She had been dean of the college of engineering and computer science

at Syracuse University since 2015. Previously, Dahlberg served as chief academic officer, dean, and professor of electrical engineering at The Cooper Union, and associate dean of the college of computing and informatics at the University of North Carolina.

Mohammad M. Dehghani, Ph.D.,P.E.,



Ohio Delta '80, has been appointed Chancellor of the Missouri University of Science and Technology. He was previously vice provost for research, innovation, and entrepreneurship at Ste-

vens Institute of Technology. The MS&T announcement noted Dehghani “is a mechanical engineer with a track record of building faculty research teams in collaboration with national laboratories and industry.”

Anette M. Karlsson, Ph.D.,



Ohio Epsilon '89, has been named Chancellor of Embry-Riddle Aeronautical University’s campus at Prescott, AZ. Since 2012, she has served

as dean and professor of the college of engineering at Cleveland State University. A fellow of the American Society of Mechanical Engineering, Karlsson earned her Ph.D. in mechanical & aerospace engineering at Rutgers University, within the area of applied mechanics. She completed her bachelor’s and master’s degrees at Linkoping University in Sweden.

Ozlem Kilic, Ph.D.,



District of Columbia Gamma '96, is the new associate dean for academic student affairs at the University of Tennessee, Knoxville. Kilic served as an associ-

ate dean in the school of engineering at The Catholic University of America and previously taught as an adjunct professor of electrical engineering at Virginia Tech and George Washington University, where she received her master’s and doctorate degrees.

Thomas L. Landers, Ph.D., *Texas Beta '72,*



stepped down in August as dean of the University of Oklahoma Gallogly College of Engineering. Landers was named dean in 2005 and has been with OU for 21 years. He plans

to continue being active professionally, including teaching enterprise engineering this fall for the Industrial and Systems Engineering School.

SPOTLIGHT

Public Interest Network

Crain’s New York Business reported recently that women lead five engineering schools in the New York City area: Columbia; the school of engineering at City College of New York; New York University; Stevens Institute of Technology’s school of engineering and science; and Vaughn College of Aeronautics and Technology.

According to Crain’s, “Increasing women’s leadership in tech education is an important pathway to increasing women’s presence in technology overall. Those wheels are beginning to turn—albeit slowly—as more women, both students and faculty, go into engineering and populate the academic leadership pipeline.”

A survey by the American Society for Engineering Education found that “63 women deans led the nation’s 368 engineering schools in January 2018. They represented 17% of engineering deans, up from 10% in 2010.”

ASEE’s figures indicate that “of the bachelor’s degrees awarded in 2017 in engineering, 21.9% were awarded to women, up from 18.1% in 2011.” At the master’s level, “women did slightly better, receiving 25.7% of the engineering degrees in 2017, up from 22.6% in 2011.”

FACILITIES

University of Arizona is in “the final stages of installing two high-speed wind tunnels to help researchers—and aerospace companies like Raytheon—solve the unique challenges of flying something at hypersonic speeds of Mach 5 or faster,” reported the *Arizona Daily Star*. The UA Aerospace and Mechanical Engineering building contains the Boundary-Layer Stability and Transition Laboratory that “features a new hypersonic wind tunnel capable of testing at air speeds of up to Mach 5—five times the speed of sound, or about 3,800 miles per hour.” In addition to basic research, the university is “looking to attract new work from industrial research clients.”

University of Tennessee, Knoxville’s nuclear engineering department now offers a minor in decommissioning, the first program of its kind at a U.S. university. UT said the goal was to prepare experts in the area of decommissioning nuclear power plants and environmental cleanup. “This is an area of work and research that will only grow in importance in coming years,” said **J. Wesley Hines, Ph.D.,** *Ohio Delta ’85*, head of the department. He added that they were well positioned to team with contractors at Oak Ridge National Laboratory.

University of Wyoming has launched what it calls North America’s largest, most technologically advanced center to train the petroleum engineers of the future with a new multimillion-dollar simulator suite. The university says Drilling Systems has worked with UW’s college of engineering and applied science to build the Drilling and Completions Simulation Laboratory. The new facility is part of the \$105 million engineering education and research building on the Laramie campus.

PEOPLE

Harold L. Martin Sr., Ph.D., *North Carolina Epsilon ’73*, is Chancellor at North Carolina Agricultural and Technical State University. He will provide the keynote speech during Operation Xcel 10th Anniversary Gala on September 12, 2019. In 2017, Martin was named America’s most influential HBCU leader by *HBCU Digest*. The Gala commemorates helping Triad youth in areas of academic enrichment and excellence.



Ryan A. Overton, Ph.D., P.E., *Tennessee Alpha ’08*, has become dean of the school of engineering and technology at Trine University. He was an associate professor and chair of the civil and environmental engineering department at Trine. Overton’s bachelor’s, master’s, and Ph.D. degrees are in civil engineering from the University of Tennessee. He also serves as Chief Advisor to the Indiana Epsilon Chapter.



Joseph C. Slater, Ph.D., P.E., *New York Nu ’89*, has been appointed dean of the college of engineering at Tennessee Technological University. He has served on the faculty for 26 years at Wright State University, most recently serving as chair of the department of mechanical and materials engineering and as an associate dean. Slater’s bachelor’s degree in aerospace engineering is from the University at Buffalo.



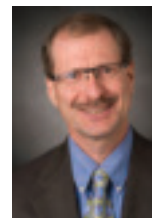
Dennis J. Tyner, Ph.D., *Massachusetts Epsilon ’85*, has been named as the first president of Ottawa University’s two-year-old residential campus in Surprise, AZ. He has led OUAZ as senior vice president and provost from its inception. Prior to joining OU in 2007, Tyner was dean of the school of engineering at Norwich University, where he received the 1997 TBPI Outstanding Advisor Award for service to Vermont Beta. He has also been a D13 Engineering Futures Facilitator.



Jennifer S. Wayne, Ph.D., *Virginia Beta ’83*, has been appointed head of Virginia Tech’s department of biomedical engineering and mechanics in the college of engineering. She has been a faculty member in the departments of biomedical engineering and orthopaedic surgery at Virginia Commonwealth University since 1991. Wayne spent more than 15 years as Chief Advisor to the Virginia Epsilon Chapter.



Douglas H. Werner, Ph.D., *Pennsylvania Beta ’90*, received the 2019 Chen-To Tai Distinguished Educator Award by the Institute of Electrical and Electronics Engineers (IEEE) Antennas and Propagation Society. Werner is chair professor of electrical engineering at Penn State University. He is also director of the computational electromagnetics and antennas research lab and holds 20 patents.



Tau Beta Pi Scholars 2019-20

THE FELLOWSHIP BOARD has announced the selection of 289 engineering students from 628 applicants for undergraduate study during the 2019-20 academic year. Most recipients will receive a cash award of \$2,000 for their senior year of engineering study and a few will receive \$1,000 for one semester. All TBP Scholarships are awarded on the competitive criteria of high scholarship, campus leadership and service, and promise of future contributions to the engineering profession. All scholars are members of the Association. These awards bring the total to 3,091 scholarships granted since the program began in 1998.

This year's recipients have chosen the following engineering curricula: 70 mechanical, 49 chemical, 37 electrical, 28 biomedical, 24 civil, 14 computer, 11 aerospace, 7 computer science, 6 bio and 6 industrial, 5 chemical & bio, and 4 each architecture, civil & environmental, environmental & materials. Other engineering fields of study include: aeronautical, bioelectrical, biological systems, biomolecular, biosystems, ceramic, computation & neural systems, electrical & biomedical, electrical & chemical, general, geological, metallurgical, operations research, petroleum, physics, structural, and design systems.

The following scholarships are named for members. 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 in 1982-97. The **Record Scholarships**, commemorate Leroy E. Record, *KS A '29*, whose generous bequest will provide earnings to support awards in perpetuity. The **Stabile Scholarships** are named for Vincent A. Stabile, *NY Λ '40*, whose gifts to the Association have permanently endowed scholarships. Henry M. Alford, *MS A '27*, left a bequest sufficient to permanently endow the **Alford Scholarships**. The **Althouse Scholarship** honors Ernest E. Althouse, *PA A '26*, who left a bequest in 2006. The **Bloomberg Scholarship** is named for Michael R. Bloomberg, *MD A '64*, whose gift has funded one award for 13 years. Marian K. and John H. Brems Jr., *MI Γ '46*, left a bequest to fund the **Brems Scholarships** in 2016. The **Boysen Scholarships** are named for Robert L. Boysen, *NJ B '63*, who made a gift to support a commuter student scholarship at a NJ or PA chapter of TBP. Ruth M.

and Cleveland L. Campbell, P.E., *IA A '47*, made gifts to permanently endow the **Campbell Scholarships**. The **Crouch Scholarship** supports students majoring in aerospace engineering, computer science, or cyber-warfare, and are named for Col. Dennis E. Crouch, USAF Ret., *MI Γ '62*. The **Dechman Scholarship** was established by David, *VA B '82*, Ken, and Jim Dechman, *TX A '89*, to honor their father, Don A. Dechman, *TX A '57*, on his 80th birthday. The **Dodson Scholarships** are sponsored by the late Charles R. Dodson, *MD B '30*, who made a gift to the Association in 1998. The **Faidley Scholarships** are named for LeVern W. Faidley, Ph.D., *IA A '67*. Charles O. Forge, *CA Γ '56*, left a bequest in 2010 to support the **Forge Scholarships**. James E. Halligan, Ph.D., *IA A '62*, made a gift to fund the **Halligan Scholarship**. The wife of Eddie L. Lyons, *CA Π '76*, made gifts in his memory to finance the **Lyons Scholarships**. Thomas L. Maniscalco, DEN, *NY E '67*, made gifts in memory of his parents, Frances and Joseph Maniscalco, for the **Maniscalco Scholarships** to be given to an engineering student at NJ B, NJ Γ & NY P. The **Schwaller Scholarship** commemorates Shawn R. Schwaller, *SD A '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 B '50*, who left a bequest in 2012. Glenn A. Skaggs, *MD B '57*, left a bequest in 2017 to permanently endow the **Skaggs Scholarship**. The three **Soden Scholarships** are named for Archie D. Soden, *CA Δ '51*, who made gifts to TBP to fund scholarships in perpetuity. The **Spirit of Apollo Scholarship** is supported by Philip H. Kitchens, *LA Γ '67*, to honor the legacy of the U.S. NASA *Apollo* program. Corporations sponsor the remaining scholarships. The Alabama Power Foundation, Inc., made a gift in 1995, to endow an **Alabama Power Scholarship**, awarded for the 16th time. The Bose Foundation made a gift in 2019 to sponsor the 13th **Bose Scholarship**. Awarded for the 11th year, the **GEICO Scholarship** is sponsored by GEICO Insurance. The Davis, Ford, Jennings & Yabroudi scholarships are named for the 2019 Distinguished Alumni. **The list of scholars follows and bios can be found here:** www.tbp.org/memb/Scholars19

RECIPIENT	CHAPTER	FIELD OF STUDY	SCHOLARSHIP
Sarah C. Adams	OH Z '20	Bioengineering	GEICO No. 65
Syeda Ali	IL Z '20	Electrical Engineering	Skaggs No. 2
Anson Allard	OH N '20	Computer Engineering	Nagel No. 51
Colin R. Anderson	UT B '21	Chemical Engineering	Dechman No. 5
Steven J. Armbruster	IN A '20	Chemical Engineering	Dodson No. 73
Prasidh Arora	OH Ξ '19	Computer Engineering	Stabile No. 790
Abraham O. Atte	KS A '20	Aerospace Engineering	Brems No. 8
Ye N. Aung	CA I '20	Electrical Engineering	Alford No. 16
Génesis Ayala De León	PR A '20	Electrical Engineering	Campbell No. 45
Daniel Ayoub	VA A '20	Computer and Electrical Engineering	Jennings No. 1
Sophia Azevedo	OR Δ '20	Mechanical Engineering	Record No. 1454
Alexander Baikovitz	PA Γ '20	Mechanical Engineering	Record No. 1455

RECIPIENT	CHAPTER	FIELD OF STUDY	SCHOLARSHIP
Spencer A. Baker	UT B '20	Mechanical Engineering	Record No. 1456
Aisha Balogun Mohammed	WY A '20	Computer Engineering	Record No. 1457
Victor M. Barboza Pereira	LA E '20	Mechanical Engineering	Record No. 1458
Katherine C. Bassett	IN Δ '20	Mechanical Engineering	Record No. 1459
Allison M. Bayro	IL Z '20	Bioengineering	Record No. 1460
Farzana Begum	NY Ξ '20	Chemical Engineering	Dodson No. 74
Ronghua Bei	CO A '20	Chemical Engineering	Dodson No. 75
Logan S. Bennett	UT B '20	Civil Engineering	Scribner No. 52
Sergio Bernabeu Penalba	MO E '20	Aerospace Engineering	Brems No. 9
Amar A. Bhardwaj	NY A '20	Chemical Engineering	Soden No. 12
Gina M. Blazanin	ND A '20	Civil Engineering	Stabile No. 771
Alexandra Bodrova	CA B '20	Mechanical Engineering	Forge No. 79
Connor J. Boland	NJ B '20	Chemical Engineering	Maniscalco No. 4
Amy L. Bordogna	NY Γ '20	Biomedical Engineering	Record No. 1461
Christopher Bosso	NY N '20	Electrical Engineering	Skaggs No. 3
Gabriel A. Braboy	IL A '19	Civil Engineering	Record No. 1507
Adam J. Broerman	CO B '20	Chemical & Biological Engineering	Record No. 1462
Elizabeth L. Brooks	CT A '20	Electrical Engineering	Record No. 1463
Brendon M. Brown	MI Γ '20	Chemical Engineering	Sickafoose No. 7
Sophia B. Brown	CA M '20	Chemical Engineering	Brems No. 10
Ann M. Brunton	AZ A '20	Biosystems Engineering	Record No. 1464
Olivia G. Butera	NJ A '20	Chemical Engineering	Soden No. 14
William C. Buttrey	TN A '20	Mechanical Engineering	Record No. 1465
Serena Buxton	CO B '20	Computer Science	Record No. 1466
Julia A. Cadman	VA B '20	Civil Engineering	Record No. 1467
Joanna L. Caldwell	AL E '20	Civil Engineering	Record No. 1468
Blake Capella	NJ Z '20	Electrical Engineering	Record No. 1469
Caitlin Carfano	DC Γ '20	Electrical Engineering	Alford No. 17
Randolff L. Carpenter Jr.	NJ Z '20	Biomedical Engineering	Boysen No. 3
Sophie K. Carson	CA M '20	Mechanical Engineering	Forge No. 80
Dominic A. Casalnuovo	LA B '20	Chemical Engineering	Soden No. 13
Camaryn E. Chambers	CA M '20	Mechanical Engineering	Forge No. 81
Soamiya A. Chavez	NM B '20	Mechanical Engineering	Record No. 1470
Emily Cheng	VA E '20	Biomedical Engineering	Record No. 1471
Yoon Sil Choi	DC Γ '20	Civil and Environmental Engineering	Scribner No. 53
Zachary L. Clements	SC A '20	Electrical Engineering	Record No. 1472
Leah M. Cole	OH N '20	Mechanical Engineering	Record No. 1473
Jacob K. Colling	MI Δ '20	Mechanical Engineering	Record No. 1474
Jacob P. Colton	UT B '20	Mechanical Engineering	Record No. 1475
Kara L. Combs	OH M '21	Industrial and Systems Engineering	Record No. 1476
Chloe D. Corder	WV A '20	Biomedical Engineering	Record No. 1477
Veronica K. Cortes	CA Ω '20	Engineering	Forge No. 82
Aaron M. Crawford	TN Z '20	Mechanical Engineering	Record No. 1478
Rowan W. Crowley	NY Y '20	Mechanical Engineering	Record No. 1479
Kexin Dai	CA Σ '20	Chemical Engineering	Forge No. 83
Anvi A. Dalal	AL Δ '20	Chemical Engineering	Record No. 1480
Lavonca L. Davis	PA Γ '20	Chemical Engineering	Record No. 1481
Cierra A. DellaRova	CO A '20	Materials and Metallurgical Engineering	Schwaller No. 9
David D. Depew	KS A '20	Mechanical Engineering	Record No. 1482
Ian DesJardin	NY N '20	Aerospace Engineering	Spirit of Apollo No. 6
Leah C. Diamantides	PA E '20	Electrical and Computer Engineering	Record No. 1483
Zhixuan Ding	CA N '20	Industrial Engineering	Forge No. 84
Laura E. Discavage	NY Π '21	Industrial Engineering	Record No. 1484
Rafealla Dkhar	MD E '19	Civil Engineering	Faidley No. 5
Kaley N. Dodd	TX Δ '20	Architectural Engineering	Record No. 1485
Melissa A. Douglas	DC A '20	Mechanical Engineering	Record No. 1486

RECIPIENT	CHAPTER	FIELD OF STUDY	SCHOLARSHIP
Danielle Dow	OR A '20	Industrial Engineering	Record No. 1487
Marc T. Duemmler	NC Δ '20	Mechanical Engineering	Record No. 1488
Khanh A. Duong	CA X '20	Mechanical Engineering	Faidley No. 6
Ryan J. Durkee	TN A '20	Mechanical Engineering	Davis No. 1
Logan Elers	SD A '20	Metallurgical Engineering	Record No. 1490
Aleczaider N. Escamilla	UT B '20	Civil and Environmental Engineering	Record No. 1491
Savannah S. Esteve	LA Γ '20	Biomedical Engineering	Record No. 1492
Abigail J. Farrin	ME A '20	Chemical Engineering	Record No. 1493
Anna H. Fasen	SD B '20	Mechanical Engineering	Record No. 1494
Asad Fayyaz	IN Δ '20	Electrical Engineering	Record No. 1495
Nathanael T. Fedor	AL E '19	Mechanical Engineering	Campbell No. 44
Jasper B.S. Feinberg	CT A '20	Mechanical Engineering	Record No. 1496
Jackson T. Fiddler	SD A '20	Mechanical Engineering	Record No. 1497
Danielle M. Fischer	NY Π '20	Electrical engineering	Althouse No. 11
Trevar K. Fiscus	AK A '20	Mechanical Engineering	Record No. 1498
Alexander I. Fogarasi	NY T '20	Biomedical Engineering	Record No. 1499
Tyler S. Fontenot	LA Γ '20	Electrical Engineering	Record No. 1500
Eric M. Fortier	TX B '19	Mechanical Engineering	Record No. 1501
Christopher M. Foster	NH A '20	Electrical Engineering	Stabile No. 792
David L. Fraley III	WI B '20	Biomedical Engineering	Stabile No. 793
Joshua S. Frei	UT B '19	Computer Engineering	Record No. 1502
Troy D. Fulton	TX Δ '20	Computer Science	Record No. 1503
Kevin Gagnon	SC B '20	Computer Science	Record No. 1504
Ananya Gangadhar	NY Δ '20	Environmental Engineering	Scribner No. 48
Krystian K. Ganko	NY A '20	Chemical Engineering	Record No. 1505
Callum M. Gannon	MT A '19	Mechanical Engineering	Record No. 1506
Danielle B. Gardner	PA E '20	Civil and Environmental Engineering	Record No. 1508
Jonathon I. Garrett	KS Γ '20	Computer Engineering	Record No. 1509
Kadi S. Gashlin	FL Δ '19	Aerospace Engineering	Record No. 1510
Nicholas P. Ges	NY Y '20	Electrical Engineering	Record No. 1512
Tej Goculdas	WI A '20	Chemical Engineering	Record No. 1513
Victoria F. Gomerdinger	CT A '20	Chemical Engineering	Record No. 1514
Rachel E. Greenland	AZ A '20	Mechanical Engineering	Stabile No. 794
Meredith D. Greer	CO A '20	Chemical Engineering	Record No. 1515
Brandon N. Gurrell	MI Z '20	Mechanical Engineering	Record No. 1516
Kaitlyn Hague	SD B '20	Civil Engineering	Record No. 1517
William R. Hale	NM Γ '20	Electrical and Chemical Engineering	Record No. 1518
Albert K. Hanan	PA Z '20	Architectural Engineering	Record No. 1519
Aubrey M. Hands	NM Γ '20	Chemical Engineering	Record No. 1520
Daniel L. Hannink	MT B '20	Mechanical Engineering	Stabile No. 795
Casey R. Hardin	IN E '20	Mechanical Engineering	Record No. 1521
Stacy M. Hayes	CO B '20	Computer Science	Record No. 1522
Frank J. He	CA Ψ '20	Biomedical Engineering	Forge No. 85
Lucas R. Henke	CO A '21	Electrical Engineering	Record No. 1523
Analyssa E. Hernandez	TX Λ '20	Environmental Engineering	Scribner No. 49
Nicholas S. Herring	AL E '20	Electrical Engineering	AL Power No. 16
Ariella L.S. Himelstein	NY H '20	Chemical Engineering	Record No. 1524
Jennifer L. Hoang	MS A '21	Civil and Environmental Engineering	Record No. 1525
Jeffrey C. Howard	OK Γ '20	Mechanical Engineering	Record No. 1526
Savannah L.S. Howie	AL E '20	Civil Engineering	Record No. 1527
Gordon M. Hulak	PA B '20	Mechanical Engineering	Record No. 1528
Mackinzie L. Hutchison	TN A '20	Chemical Engineering	Record No. 1529
Naomi N. Ingram	TX © '20	Mechanical Engineering	Record No. 1530
Benjamin M. Jensen	UT B '20	Electrical Engineering	Record No. 1531
Saem Jeon	PA Z '22	Electrical and Computer Engineering	Record No. 1532
Lukas G. Johansson	OH Δ '20	Chemical Engineering	Dodson No. 72

RECIPIENT	CHAPTER	FIELD OF STUDY	SCHOLARSHIP
Esther Jose	NY N '20	Industrial Engineering	Record No. 1533
Amanda E. Kaiser	WI E '19	Civil Engineering	Record No. 1511
Erik J. Karpinski	IL Δ '20	Mechanical Engineering	Stabile No. 791
Nicholas A. Kasner	IL A '20	Systems Engineering and Design	Nagel No. 52
Kathryn L. Keely	WY A '20	Mechanical Engineering	Record No. 1534
Ryan E. Kelly	TN A '20	Aerospace Engineering	Lyons No. 11
Dylan J. Kennedy	RI B '20	Computer Science	Record No. 1535
Dylan J. Kennedy	IL Γ '20	Biomedical Engineering	Record No. 1536
Jeremy F. Keys	KY A '20	Chemical Engineering	Record No. 1537
Alex King	MI Γ '19	Chemical Engineering	Record No. 1538
Katherine A. Kirk	ME A '20	Biomedical Engineering	Record No. 1540
Caleb A. Kotter	CO A '20	Mechanical Engineering	Record No. 1541
Samantha J. Kotze	NY Σ '20	Ceramic Engineering	Record No. 1542
Mary K. Kramer	SC B '20	Biomedical Engineering	Record No. 1543
Kami G. Kutsunai	OR Δ '20	Electrical & Renewable Energy Eng'g	Record No. 1544
Kaitlyn E. Laliberte	NH A '20	Electrical Engineering	Record No. 1545
Westley W. Lamphear	ME A '20	Civil Engineering	Record No. 1546
Molly L. Layne	WV A '20	Biomedical Engineering	Record No. 1547
Nicole S. Lee	CA A '21	Bioengineering	Forge No. 86
Aaron Lehman	OH Z '20	Bioengineering	Record No. 1548
Jackson T. Levine	LA B '20	Biomedical Engineering & Neuroscience	Record No. 1549
Maxwell A. Lewis	OK Γ '20	Electrical Engineering	Halligan No. 2
Kelly Li	CT A '20	Biomedical Engineering	Record No. 1550
Jiawei Liu	NY M '20	Mechanical Engineering	Record No. 1552
Xinming Liu	NY Δ '20	Operations Research & Information Eng'g	Record No. 1551
Carly K. Loving	OR A '20	Civil Engineering	Record No. 1553
Lorena J. Loving	CO A '19	Computer Science	Record No. 1539
Jennifer M. MacAulay	CA Ψ '20	Structural Engineering	Forge No. 87
Heather L. Macmurdo	IA A '21	Materials Engineering	Ford No. 1
Zakarie J. Macpherson	ID B '20	Mechanical Engineering	Record No. 1554
Madeleine A. Maltais	TX Λ '20	Civil Engineering	Record No. 1555
Hunter D. Mandernach	IA A '20	Civil Engineering	Record No. 1489
Luke F. Maraffi	MA E '19	Mechanical Engineering	Record No. 1556
Hannah-Rose M. Margavio	TN Z '20	Chemical Engineering	Record No. 1558
Kathryn Margetts	UT Γ '20	Civil Engineering	Record No. 1559
Marc A. Mascarenhas	SD A '20	Mechanical Engineering	Stabile No. 681
August J. McClenahan	NE A '20	Mechanical Engineering	Stabile No. 796
Evan C. McKinney	IA A '21	Computer Engineering	Campbell No. 47
Brian N. Merritt	UT B '21	Mechanical Engineering	Stabile No. 682
Anthony R. Messuri	OH Λ '20	Electrical Engineering	Stabile No. 683
Marie N. Messuri	OH Λ '20	Electrical Engineering	Stabile No. 684
Anna Metlushko	IL Z '20	Bioengineering	Stabile No. 685
Sabrina C. Mierswa	WI Δ '20	Biomolecular Engineering	Stabile No. 686
Ryley J. Miller	AZ B '20	Aerospace Engineering	Lyons No. 12
Scott A. Mionis	PA Γ '20	Electrical and Computer Engineering	Crouch No. 5
Bradley S. Moore	TN A '20	Biomedical Engineering	Stabile No. 687
Daniela Morales	TX © '21	Mechanical Engineering	Stabile No. 688
Dyllan C. Muller	LA B '20	Chemical Engineering	Stabile No. 689
Christopher P. Mulqueen	NJ Z '20	Mechanical Engineering	Stabile No. 690
Grant M. Musgrave	CO B '20	Chemical Engineering	Stabile No. 691
Mia V. Navarro	NM Γ '20	Chemical Engineering	Stabile No. 692
Evan A. Newell	TN A '20	Chemical and Biomolecular Engineering	Stabile No. 693
Alexander T. Nguyen	KY A '20	Computer Engineering	Stabile No. 695
Michelle H. Nguyen	VA E '20	Biomedical Engineering	Stabile No. 696
Thu H. Nguyen	LA Δ '20	Computer Engineering	Stabile No. 694
Jacob M. Nielson	CO B '20	Chemical Engineering	Stabile No. 697

RECIPIENT	CHAPTER	FIELD OF STUDY	SCHOLARSHIP
Denislav P. Nikolov	CA N '20	Mechanical Engineering	Forge No. 88
Jane W. Njihia	MD B '20	Chemical and Biomolecular Engineering	Dodson No. 71
Kendra K. Noneman	ID Γ '20	Materials Science and Engineering	Stabile No. 698
Panagiotis Oikonomou	NY A '20	Biomedical Engineering	Stabile No. 699
Brenden D. Olevson	SD B '20	Civil Engineering	Yabroudi No. 1
Heriberto A. Oliveros Guerra	MO Δ '20	Civil Engineering	Stabile No. 701
Jordan F. Owen	SC B '20	Chemical Engineering	Stabile No. 702
Peter H.S. Paik	NY P '20	Mechanical Engineering	Maniscalco No. 5
Annabelle A. Pan	CT A '20	Environmental Engineering	Scribner No. 50
Daniel L. Pederson	WI B '20	Bioelectrical Engineering	Stabile No. 703
Kai W. Pederson	WI A '20	Computer Engineering	Stabile No. 704
Alexander J. Pell	CA Λ '20	Chemical Engineering	Forge No. 89
Victoria R. Pellerito	MI H '20	Mechanical Engineering	Stabile No. 705
Kostadin Y. Pendev	IN Δ '20	Computer Engineering	Stabile No. 706
Hannah C. Peters	VA E '20	Biomedical Engineering	Stabile No. 707
Huy Pham	CA Y '20	Electrical Engineering	Forge No. 90
Gabrielle J. Phillips	KS Γ '20	Chemical Engineering	Stabile No. 708
Joseph J. Pinakidis	MI A '20	Mechanical Engineering	Stabile No. 709
Nikhil H. Poole	CA B '20	Electrical Engineering	Forge No. 91
Vanel B. Porter	LA Δ '20	Chemical Engineering and Chemistry	Stabile No. 710
Jared D. Posselt	NJ Z '20	Biomedical Engineering	Stabile No. 711
Ipsita Pradhan	SC B '20	Biomedical Engineering	Stabile No. 712
Cesar A. Prugue	UT B '20	Chemical Engineering	Stabile No. 713
Rachita Puri	OH Γ '20	Aerospace Engineering	Lyons No. 13
Nicole M. Ragone	NY Γ '20	Biomedical Engineering	Stabile No. 714
Karim M. Rajmohamed	PA A '20	Mechanical Engineering	Stabile No. 715
Mahmoud M. Ramadan	OH Δ '20	Chemical Engineering	Stabile No. 716
Rahul Rambhatla	NY Δ '20	Chemical Engineering	Stabile No. 717
Zachary J. Ranisate	ND A '19	Civil Engineering	Stabile No. 718
Ellen Rea	OH E '20	Mechanical Engineering	Stabile No. 719
Miguel A. Recabarren-Rodriguez	AZ Δ '20	Aerospace Engineering	Stabile No. 720
Carl Recine	CA M '20	Aerospace Engineering	Forge No. 92
Brian E. Rentsch	NJ Z '20	Computer Engineering	Boysen No. 4
Michael J. Ricci	OH K '21	Chemical Engineering	Stabile No. 721
Katelyn M. Ripley	MA E '20	Chemical Engineering	Stabile No. 722
Patrick J.L. Robichaud	WA B '20	Civil Engineering	Stabile No. 723
Samanta B. Rodriguez	FL Θ '20	Mechanical Engineering	Stabile No. 764
Connor G. Roos	VA A '20	Computer Engineering	Stabile No. 724
Blake D. Rose	WA A '20	Electrical Engineering	Stabile No. 725
Christopher T. Rossiter	OH N '20	Electrical Engineering	Stabile No. 726
Skyler M. Roth	WV A '20	Biomedical Engineering	Stabile No. 727
Caitlin Roundy	UT Γ '20	Civil Engineering	Stabile No. 728
Allison J. Rowe	IA B '20	Mechanical Engineering	Stabile No. 729
Aldo Rubio	TX Θ '20	Mechanical Engineering	Stabile No. 730
Liza A. Russell	IN A '20	Mechanical Engineering	Stabile No. 731
Matthew J. W. Ryan	CO B '20	Aerospace Engineering	Stabile No. 732
Samuel J. Ryckman	SD A '21	Mechanical Eng'g & Computer Science	Stabile No. 733
Gurmandeep K. Saggu	IL B '20	Architectural Engineering	Stabile No. 734
Anthony Salazar	NM Γ '20	Electrical Engineering	Stabile No. 735
Hossain M. Samei	AZ Δ '19	Aerospace Engineering	Lyons No. 10
Alysa M. San Filippo	AL E '20	Electrical and Computer Engineering	Stabile No. 736
Emily E. Sande	SD A '19	Civil Engineering	Record No. 1557
Trey S. Schmidt	KS Γ '20	Computer Engineering	Stabile No. 737
Nicole M. Serwinowski	AL B '20	Chemical Engineering	Stabile No. 738
Aadit P. Shah	MO Γ '19	Biomedical Engineering	Stabile No. 739
Ralph J. Sieja	MS A '20	Mechanical Engineering	Stabile No. 740

RECIPIENT	CHAPTER	FIELD OF STUDY	SCHOLARSHIP
Daniel E. Simmons	CO A '20	Chemical Engineering	Stabile No. 741
Ranjun A. Singh	SD A '21	Mechanical Engineering	Stabile No. 742
Rachel A. Sloan	PA E '20	Mechanical Engineering	Stabile No. 743
Michael S. Sloma	OH Z '20	Computer Science and Engineering	Stabile No. 744
Cassandra M. Smith	NY Γ '20	Aeronautical Engineering	Stabile No. 745
William A. Smith	AL Γ '20	Biomedical Engineering	Stabile No. 746
Talia J. Solomon	PA Γ '20	Chemical and Biomedical Engineering	Stabile No. 747
Sophie E. Soueid	TX H '20	Electrical Engineering	Stabile No. 748
Youssef Souryal	IN Z '19	Computer Engineering	Stabile No. 749
Victoria A. Stabile	NJ A '20	Chemical Engineering	Stabile No. 750
Nathan J. Stang	SD B '20	Mechanical Engineering	Stabile No. 751
Rachel M. Starkweather	NM B '20	Mechanical Engineering	Stabile No. 752
Michael D. Stevens	UT B '20	Civil Engineering	Stabile No. 753
Jaelyn R. Stiller	IA A '20	Industrial Engineering	Stabile No. 754
Lexington F. Stoyell	NY Θ '20	Electrical Engineering	Bloomberg No. 13
Katie M. Strohm	PA B '21	Architectural Engineering	Stabile No. 755
Madison L. Summers	OH B '20	Chemical Engineering	Stabile No. 756
Ray Sun	CA B '20	Electrical Engineering	Stabile No. 757
Shuofei Sun	NY T '20	Biomedical Engineering	Stabile No. 758
Leann R.M. Tengowski	LA Γ '20	Biomedical Engineering	Stabile No. 759
Joshua S. Tomczak	MN B '19	Civil Engineering	Stabile No. 760
Julia M. Towne	ME A '20	Biomedical Engineering	Stabile No. 761
Natalie J. Turco	NY Σ '20	Mechanical Engineering and Chemistry	Stabile No. 762
Michael Ustes	MI I '20	Mechanical & Manufacturing Engineering	Stabile No. 763
Brooklyn K. Vanderwolde	SD B '20	Mechanical Engineering	Stabile No. 765
Evan O. Vesper	OH A '21	Electrical and Biomedical Engineering	Stabile No. 766
Eli J. Vettel	ND B '20	Electrical Engineering	Stabile No. 767
Erica K. Wagner	MA E '20	Bioengineering	Stabile No. 769
Stephanie Wagner	PA E '20	Chemical Engineering	Stabile No. 768
Sarah R.M. Wakumoto	CO Δ '20	Chemical and Biological Engineering	Stabile No. 770
Sahana C. Walter	WI A '20	Chemical Engineering	Nagel No. 53
Emily A. Walz	ND B '19	Mechanical Engineering	Stabile No. 772
Kathryn V. Wegman	OH K '20	Electrical Engineering	Stabile No. 774
Tyler J. Weinstein	PA Λ '20	Chemical Engineering	Stabile No. 775
Jonathan D. Weiss	CT A '20	Biomedical Engineering	Stabile No. 776
Regan M. Wess	SD A '20	Geological Engineering	Stabile No. 777
Clarissa C. Westover	UT B '20	Chemical Engineering	Stabile No. 778
Andrew S. White	PA B '20	Mechanical Engineering	Stabile No. 779
Carolyn M. White	IA A '21	Biological Systems Engineering	Stabile No. 780
Zachary E. Williams	DC Γ '20	Biomedical Engineering	Stabile No. 781
Maureen A. Winter	NE A '20	Mechanical Engineering	Stabile No. 782
Lok Yee J. Wong	NY Δ '20	Environmental Engineering	Scribner No. 51
Alexander E. Wurm	NY Δ '20	Chemical Engineering	Stabile No. 783
Hannah K. Wyatt	OH Θ '19	Mechanical Engineering	Stabile No. 784
Megan A. Yamoah	MA A '20	Physics and Electrical Engineering	Bose No. 13
Justin T. Yarbrough	MO A '20	Mechanical Engineering	Stabile No. 785
Christopher J. Yerkins	OH B '20	Mechanical Engineering	Stabile No. 786
Gina Young	UT B '20	Civil Engineering	Stabile No. 788
Seth T. Young	AL E '21	Electrical and Computer Engineering	Stabile No. 787
Jillian S. Zamorski	NY Θ '20	Mechanical Engineering	Stabile No. 789
Hanwen Zhang	CA B '20	Computation & Neural Systems Eng'g	Campbell No. 46
Jonathan W. Zheng	VA A '20	Chemical Engineering	Stabile No. 773
Daniel Y. Zhu	WY A '20	Electrical Engineering & Molecular Biology	Stabile No. 700

2019 Alumni Giving Program May-July Contributors

The names of 1,826 Tau Beta Pi alumni and others who made donations to the Association in the 2019 Alumni Giving Program appear in two separate sections on the following pages. Their gifts totaling \$313,203 arrived between May 1 and July 31, 2019. Names preceded by SPEC denote gifts from non-members. Gifts received after July 31 do not appear here but will be published in the Winter 2020 issue of The Bent.

The generous support of each member is deeply appreciated by the Executive Council and other Association Officials. The financial resources have permitted strengthening our programs in several areas that emphasize the importance of Tau Beta Pi's basic objectives and that help all collegiate chapters and student members.

Recognition Club Donors are listed alphabetically within their chapters and appear in the first section below. Member-contributors appear in the subsequent section. Names marked with a † symbol are of deceased members in whose memory donations were made either by relatives and friends or through bequests. In addition to gifts acknowledged here, several were made anonymously through the Combined Federal Campaign and are also deeply appreciated.

Donor Recognition Clubs

The names of 1,546 Tau Bates and others appear in this first section. They made donations to the Alumni Giving Program between May 1 and July 31, 2019, AND they have also made CUMULATIVE contributions (in some cases including matching gifts) and bequests to Tau Beta Pi through the years totaling from \$250 to more than \$1,000,000.

The Donor Recognition Clubs are part of our effort to recognize a donor's total lifetime cumulative giving to Tau Beta Pi. Such continuous support significantly contributes to the overall strength of the Association and allows our Society, with confidence in our financial resources, to plan for modest growth in our services to the engineering profession. These clubs were chartered by the Executive Council in 1986 and have been set at the following levels:

Matthews Club	500,000	Alpha Club	25,000	Chi Club	1,000
Nagel Club	250,000	Beta Club	10,000	Second Century Club	500
Williams Club	100,000	Delta Club	5,000	Founders Club	250
Heikes Club	50,000	Zeta Club	2,500		

HEIKES CLUB

AZ B Myers, Jerry Elwyn '70
TX H Taylor, Lee Deatherage '68
ALPHA CLUB
CA † Levin, Robert Edmond '53
CA E Anonymous '83
CA E Anonymous '83
IN A Newcomb, Robert W. '55
NJ † Lim, Yung Bong '87
NY B Anonymous '80
OH † Robe, Richard '55
SD A Gomulinski, Tricia E. '88
TX G Loewenstern Jr., W. '59

BETA CLUB

CA † Davies III, Paul Lewis '83
CA † Duckworth, Jack E. '66
IN † Rice Jr., Donald B. '61
IA A Peterson, Michael L. '89
LA E Champagne Jr., Pierre '76
MA † Lee, Richard G. '51
MAH Sin, Chi-Kai '88
MI A Colbry, Katy Luchini '99
MI A Colbry, Dirk J. '06
MI E Gomulinski, Curt D. '01
NY † Angle, Fritz F. '82
PA B Klingensmith, Rick Lee '82
TN A Cook, James Michael '72
TX A Adamo, Paul Magness '85
TX † Fox, Craig Alan '77
TX † Sisney, Steven Lynn '83
WAB Moors, Donald Edward '55
WVB Teti Jr., John J. '71

DELTA CLUB

CA A McCune Jr., Earl W. '79
CA H Crotchett, Denton R. '71
CA A Crews, Brian '70
CA N Erickson, Ralph E. '71
CA N Joy Jr., Robert Lee '66
CA Y Idenmill, Ethan M. '04
FL A Anonymous '78
IL A Luzbetak, Paul Daniel '96
IL B Bernhardt, John E. '89
IN A Millstein, Leo '70
IA B Carson, David N. '54
LA B Junius Jr., Ralph W. '70

ME A Brigham, Ernest B. '53
MDB Sabio, Vincent Joseph '86
MAB Godrej, Adi B. '63
MA E †Mahoney, John Joseph '56
MAH Wotiz, Robert Paul '78
MI † Halverson, Mark W. '72
MI † Hopping, William D. '71
MI E Hock, Roy Edward '51
MI Z Quaid, Richard C. '65
MI † Pivitt, Barry Robert '88
MI † Amici, Alan J. '85
MS A Benton, William Daniel '71
NJ A Post, Edwin Lewis '62
NJ J Kenney, Thomas E. '70
NY † Luckett, Larry Wayne '83
NY E Grosso, John Joseph '69
OH A Rasbold, James C. '83
OH B Zureick, Elizabeth Ann '73
PA B Reese, J. Mark '80
PA B Williams, John Roger '60
PA Z Walter, Donald K. '53
PA A Schuler, Joseph J. '80
TX A Dorr, Lawrence Daniel '68
TX A Mickelson, Kent B. '77
TX B Tye III, John M. '67
TX † Jordan, Paul Joseph '90
TX E Sitton, Randal Warren '85
VA B Anderson, Mark Evan '76
WAA Gunter, Robert Arnold '62

ZETA CLUB

SPEC Anonymous '00
AL A Wilhelm, William Jean '58
AZ B Barnett, J. Matthew '90
CA A Dozier, J. Ronald '54
CA A Fong, Kirby William '67
CA B Drowley, Clifford Ian '75
CA † Fuller, Robert Osborne '51
CA † Holmen, Bob R. '85
CA † Zehrbach, Bill Ernest '69
CA A Yung-Rubke, Belinda '80
CA N Chew, James S B '84
CA P Kraft, Lyle David '87
CO A Maurer, Mike Allen '87
CO B Clair, David Richard '58
CO † Pearson, Larry '64
CT B Leib, David Bernard '61

DC A Engram, Robert Louis '69
DC † Keene, Warren Elmer '57
IL A McGinnis, Gerald E. '58
IL A Robertson, John Allen '65
IL B Forish Jr., George E. '75
IN A Houze Jr., Gerald L. '58
IN A Novy, Robert Alan '85
IN A Palas, Richard Francis '65
IN A Renner, Arnold E. '54
IN A Weigand Jr., Karl R. '66
IN A Weiss, Arthur Frank '55
IN † McDonald, Patrick J. '60
IN † Poore, Michael Francis '71
IN † Epperly, Michael Philip '65
IN † Luecke, Edgar Jacob '55
IA A Davenport, Delbert J. '67
IA A Snyder, Merrill H. '68
IA B Schwarting, Eugene R. '63
KS A Meyer, Leslie D. '65
KS A Moore, Richard Arthur '51
KS B Wilson, Bryan Keith '85
KS † Fowler, Eddie R. '57
KY B Arbaugh, Andrew C. '95
LA A Richardson, John D. '72
LA † Poole, Ronald Gene '69
ME A Bragdon, Reginald G. '93
MDB Bryner, Nelson P. '83
MDB De Oms, James H. '68
MDB Joseph, John Hamilton '85
MAA Bujaucius, Jerry Alan '79
MA Z Kelly, Thomas William '80
MAH Maneval, Daniel C. '82
MI B Vojtech, Larry Joseph '69
MI † Bell, Lawrence David '68
MI † Holderness, James H. '67
MI † Holmes, John William '65
MI † Johnson, Kalin Shaw '46
MI † Liepa, Mark Albert '81
MI † Sarns, Richard Norman '76
MI † Stewart, Russell Steve '66
MI † Eberl, Edward George '74
MI A Rose, Jonathan D. '81
MI A Wittman, Bernard A. '64
MI E Husak, Philip William '72
MI E Kolodziej, David G. '59
MI E Philippart, Nancy L. '80

MI Z Pettiford, Steven D. '72
MI H Hock, Darryl Allen '81
MI H Obudzinski, Gary T. '76
MS A Black, Howard Wayne '95
MS A Boozer, Drayton Daniel '66
MS A Owens, John Kent '65
MO B Fennewald, Gary J. '73
MO † Hurwitz, Dan Norman '50
MO † Saufnauer III, John '61
NJ B Rodgers, Douglas Noss '67
NJ A Kline, Donald R. '55
NMA Bacastow, Jack L. '73
NMA Smith, Jeffrey A. '84
NY B Newman, Michael '84
NY B Wedlake, Raymond A. '73
NY † Brand, Terrance Alan '90
NY † Chamberlin, Donald M. '67
NY † Gray, Robin Bryant '46
NY † Thal Jr., Herbert L. '53
NY † Abel, John Fredrick '63
NY † Hart, Marjorie Leigh '51
NY † Jones, Paul Skee '51
NY E Martin, Kent Richard '66
NYH Pollack, Herb William '50
NYH Varon, Michael '73
NY A Moon, Monte Lee '75
NY N Sisson, Albert Eugene '66
NY T Olenik, Anthony M. '08
NC A Hall, Michael L. '83
NC A Hunter, Stuart '47
NC † Vadnais, Paul A. '73
OH A Goralski, Christian T. '64
OH A Gropp, William D. '77
OH A Hamilton, Joshua J. '09
OH A Linsalata, Frank N. '63
OH A Soeder, James Frank '72
OH A Whittington, John T. '93
OH B Totten, James Ernest '56
OH † Clum, James Avery '60
OH † Cowan II, Robert Lee '66
OH † Ouellette, Andrew L. '86
OH † Sing, Edward Yuke '43
OH Z Tenney, Thomas H. '67
OHM Kovacs II, William '74
OR A Cantwell, Gary K. '80
OR A Milton, Stuart W. '84

PA A Berglund, Thomas A. '82
PA B Anderson, Charles A. '57
PA B Marstiller, Charles E. '74
PA B McGivern, Patrick John '90
PA B Sterner, George R. '62
PA Z Pechulis, Michael John '97
PA H Reiner, Robert Elmer '64
RI A Vascellaro, Jerome C. '74
RI B Luz, James J. '80
RI B Wylie Jr., Thomas F. '51
SC A Rushton, Floyd Robert '63
SC † Hanes, Richard M. '67
SD A James, Karleen Kay '86
TN A Prados, John W. '54
TN B Casson Jr., Walter A. '56
TN B Hampton, David R. '85
TN E Smith, Craig '80
TX A Bethell, William D. '45
TX A Carroll, Billy Dan '64
TX A Smith, Matthew T. '93
TX A Tran, Tan Dai '87
TX B Carey, Martha Derden '80
TX B Glenn, Stephen W. '66
TX † Capshaw, David M. '80
TX † Clinton Jr., Daniel D. '52
TX † Johnson, Dennis Ray '74
TX † Strait, William Lewis '49
TX E Bailey, Robert Richard '70
TX † Stokes, F. Xavier '78
VA A Wadsworth, Robert M. '82
WAA MacDougall, Donald G. '61
WAA O'Byrne Jr., Michael E. '61
WAA Shanafelt, Robert E. '67
WAB Oakley, Fanning T. '53
WVA LeMasters, Jerry Ray '63
WVA Lengyel, Nicholas M. '70
WVA Rockenstein, Richard '63
WVB Ashman, Michael D. '84
WI A Larson, Nils Irving '58
WI B Whittington, Laura L. '88

CHI CLUB

AL A Glover, Martin Cochran '70
AL A Goodwin, James J. '58
AL A Slotkin, Arthur Lewis '68
AL A Wear, A. Wesley '92
AL B Andrzejewski, Joseph '90

Special Gifts

Special gifts were received in memory of Philip C. Dunn, IN A '64, by the family; Herman E. Kiefer III, PA A '55, from his son Rupert Kiefer; Richard H. Menke, IN A '56, by the family; Donavon D. Nickel, ND A '52, from Nora Nickel, Nace Nickel, and supporting family; and Mrs. Eddie Young, from her son, Timothy Young, FL Z '07.

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CO B Hidahl, Jerry Paul E. '77	IN B Yee, Stuart '89	MI Z Tarricone, Louis Guy '82	NY E Lee, John H-J '70	PA A Jones, Donald Paul '65
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CT A Cleland, Alan Stuart '60	IN A McAlear, Hugh M. '64	MI Ø Spall, James Charles '79	NY Z Markman, Steven '66	PA A Lynch, Sarah Hayward '89
CT A Kaufman, Earle Bertram '42	IA A Amos, L. Lyeal '69	MI I Flowerday, Andrew J. '02	NY Z Sindel, Fred H. '59	PA A Ortlieb, John Richard '53
CT A Kucera, Daniel Jerome '61	IA A Hammar, Kelly Jean '89	MI K Seymour Jr., Richard '97	NY H Filipek, Stephan John '82	PA B Andrichak, Stephen M. '58
CT A Terry, Elene Sharon '01	IA A King Jr., Maurice A. '67	MNA Lapakko, Kim Alan '76	NY H Kushel, Glenn Elliot '68	PA B Bradt, Andrea '76
CT B Douglass, Michael R. '79	IA A Pedersen, Robert D. '62	MNA Polacek, James Hills '52	NY Ø Cornett, Dean Leo '71	PA B Kolivosky Jr., John E. '92
CT B Hurley, John Frank '66	IA A Sellow, Roger Franklin '59	MNA Thompson, Richard A. '77	NY Ø Tracey, Michael Steven '86	PA B Matthias, Tracey Dawn '89
CT B Kane, Martin Paul '86	IA A Sutherland, Keith Allan '69	MNA Van Essen, John Scott '74	NY I Cassella, Judith Ann '71	PA B Naffin, Richard Keith '06
CT B Staiger, Eugene Harold '57	IA A Wallace, Jean Ellen '81	MS A Dixon, Charles James '56	NY I Schwartz, Richard '57	PA B Overbaugh, Thomas M. '83
CT B Zajac, Gerald Edward '68	IA A Walter, Gordon Escher '41	MS A Gelman, Stephen '73	NYK Allyn, Elwyn George '61	PA B Cavalier III, Forrest J. '89
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DE A Folsom, Steven Allen '77	IA B McSwiggin, Thomas G. '61	MS A Hotard, Daniel Gerard '76	NY A Layton, Dick '63	PA Γ Chan, Allen Henry '82
DE B King, David Alan '68	IA B Roach, John Urban '78	MS A Miller, Elton Ray '70	NYM Grant, Donald '91	PA Γ Kornuta, Nick Joseph '81
DC B Murphy, Joseph A. '60	IA B Toerber, Erwin David '66	MS A Wang, Jyh-Ping J. '79	NYM Montgomery, Michael '75	PA Γ Kühr, Tina Michelle '81
DC B Roberts, Carol Ann '63	IA B Warner, Diana Hix '73	MS A Ware, Marcus Wayne '69	NYM Willis, Michael James '82	PA A Epstein, Herbert '49
DC B Roberts, John Paul '62	KS A Hinton, Robert Allan '61	MS A Williams, Michael L. '80	NYN Barnes, Robert E. '84	PA A Hagist, Warren Mellor '48
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The IRA Charitable Rollover provision is an easy, tax-wise way to make a gift to TBP! Donors aged 70½ or older may move up to \$100,000 annually from their IRAs directly to qualified charities without having to pay income taxes on it. The charitable gift amount will count against the donor's required minimum distribution (RMD).

IRA custodians may send your gift to Tau Beta Pi Association, P.O. Box 2697, Knoxville, TN 37901-2697. Our federal tax ID number is 62-0479545. If you have any questions, please visit our website at <https://www.tbp.org/give/IRArollover.cfm> or send an email to

sherry.jenningsking@tbp.org

ROLLOVER

PA E Stratton, Carl William '81	TX Δ Dokos, Nick George '57	CA A Chan, Sunney Ignatius '57	IN A Levine, Jerrold Louis '61	MI A Lowry, Walter A. '60
PA E Wetzel, Edward D. '74	TX Δ Garner, Scott Jahrand '77	CA A Gourdin, William H. '72	IN A Lierman, Milly Lee '91	MI B Kranz, Paul Richard '63
PA Z Eisenberg, Eric Jay '88	TX Δ Kasch, Vernon Ray '73	CA A Humphreys, George B. '51	IN A Lodol, Peter Nelson '76	MI B Phillips, Gerald R. '70
PA Z Mergel, Joseph John '72	TX Δ Lam, Carroll Frank '58	CA A Austin, Lyman Douglas '61	IN A Morgan, Rachel Diane '90	MI B Sauer, Daniel Michael '05
PA Z Struckman, Russell W. '64	TX Δ Mason Jr., John M. '81	CA A Fisher, Benjamin Paul '74	IN A Murphy, Thomas F. '70	MI G Chick, Kenneth Martin '91
PA H Ellis Jr., Ira Thomas '56	TX Δ Newton, Philip Lynn '67	CA A Ickes, Robert William '65	IN A Muzzillo, William Allen '81	MI G DAVIS, Robert Allan '81
PA H McDonnell, Robert W. '48	TX Δ Pulley, Paul Winfred '87	CA A Putt, Brian Hollis '72	IN A Simnick, James John '74	MI G Foulke, James Alvin '59
PA G Gallen, Robert Michael '64	TX Δ Richards, Tamela R. '81	CA A Weaver, James A. '71	IN A Walker, Neil Renz '69	MI G Gerdes, Walter '58
PA G Latimer, Jose Ramon '77	TX Δ Simpson, Stancy Jean '79	CA A Burley, Cameron Hale '55	IN B Jones Jr., Thomas G. '49	MI G Hannig, William A. '47
PA G McLaughlin Jr., Philip '61	TX Δ Swink II, Marvin Neel '80	CA Δ Roum, James Henry '80	IN B Marum, Steven E. '73	MI G Harris, Frederick Allan '64
PA I Dehoff, Gregg Alan '86	TX E Douglas, William J. '70	CA E Tamanaha, Howard S. '77	IN B Matsuda, Fujio '49	MI G Lang, Brent Dennis '90
PA I Schoenberger, Lewis '84	TX Z Broussard, Lance A. '97	CA Z McGuire, John Patrick '58	IN B Pauls, Jeffrey Dale '79	MI G Pace Jr., George Donald '61
PA K Beseler, Jan W. '88	TX Z McCaleb, Jesse Earl '64	CA H Costa, Michael '88	IN G Bajura, Richard Albert '62	MI G Pulley, Craig Martin '78
PA A Anselm, Gregory Alan '81	TX H Bishop, Neil Erasmus '66	CA H Gerken, Gary Mark '11	IN G Bongiovi, Robert Paul '69	MI G Williams, Dean Stanton '61
PA A Janocko, David Jeffrey '81	TX H Godwin, Albert Eugene '84	CA H Holstead, Raymond H. '71	IN G Henry, Eugene Walter '54	MI G Youser, Rex Jacob '57
PA A Reedy, Herman Earl '75	TX H Hightower, Janice M. '67	CA H Thurston, Jeanie L. '77	IN Δ Moll, Harold Elmer '59	MI Δ Daurer, Walter Peter '60
PR A Hilerio Sanchez, Josuan '07	TX H Southall, Hugh Landon '68	CA G Carpenter, Gordon Lee '49	IN E Ali, Afzal '78	MI E Capraro, Michael A. '70
PR A Irizarry, Arcelio '86	TX G Alvarado, Ruben A. '72	CA G Kolderup, Nils Petter '60	IA A Carosella, Sandy L. '88	MI E Cleary, Gary Kenneth '71
RI A Kenney Jr., Joseph '50	TX G Havo, Karen Patricia '86	CA G Murray, Donald I. '72	IA A Irvine, Alexander John '79	MI E King-Monroe, Stephan '08
RI B Brady III, William J. '80	TX A Hinojosa, Juan Jose '84	CA G Stone, Ronald E. '66	IA A Mohr, Richard Lee '67	MI Z Erickson, Adam A. '88
RI B James, Charles F. '58	TX A Rosenwald Jr., John A. '88	CA K Monesko, George E. '68	IA A Nichols, Donald Orville '61	MI Z Godfrey, James E. '48
RI B Lamoureux, Suzanne '82	VT A Goddard, Eric H. '86	CA K Oliver, Carmen D. '91	IA A Olson, Scott E. '69	MI Z Lenz, Ronald Lee '81
SC A Corpening, Joseph B. '72	VT A Sheldon-Dean, James '79	CA A Young, Jeffrey W. '69	IA A Owens, David Andrew '91	MI Z Lobkovich, Thomas M. '83
SC A Di Lapi, Christine M. '87	VT B Dekalb, Shawn Wayne '85	CAM Empey, Daniel Martin '82	IA A Rerucha, Thomas Lee '81	MI G Messer, Bryan James '98
SC A Drennan Jr., Robert F. '70	VA A Donoho, Thomas E. '59	CA N Eaton, Patrick L. '95	IA A Rush, David Grant '85	MI I Maue, Susanne C. '92
SC A Johnson III, Wilson U. '82	VA A Harris, Wesley Leroy '64	CA N Schmitt, Thomas G. '74	IA A Sabherwal, A. Singh '16	MI K Sikkenga, Chad Douglas '98
SC A Peters, William J. '70	VA B Hanley, Thomas R. '67	CA N Shatila, Mak H. '02	IA B Croissant, Welton '50	MNA Adrian, Ronald John '68
SC B Haggerty, N. Kent '72	VA B Hyde, Robert Alan '74	CA E Doeing, Brian James '81	KS A Gerren, Donna Sue '90	MNA Johnson, Lowell Gale '69
SC B Massey, Kristina L. '71	VA B Parker Jr., Melvor L. '56	CA E Patterson, Richard H. '74	KS A Hood, John Timothy '62	MNA Smits, Talivaldis Ivars '59
SC B Wilson, Samuel Scott '91	VA B Snidow III, Lyle C. '74	CA E Peterson, John A. '93	KS A Scamman, Franklin L. '66	MS A Bui, Tuan Thinh '90
SC G Cochrane, Jerry Wilson '55	VA G Abbott, Terence Scott '75	CA P Alexander, Dean Lee '80	KS G Hightower, Ray E. '64	MS A Carman Jr., Jack Baker '62
SC G Marbois, Matthew C. '81	VA G Mahaney, Jack Morris '82	CA P Costello, Vincent J. '08	KY A Blevins, Parker Ray '64	MS A Clements, Nathan Scott '96
SC G Reed II, Henry M. '60	VA G Chandler, Alan Scott '77	CA P Koehn, Calden R. '81	KY A Click, Randall Robert '00	MS B Gray, James Michael '88
SD A Case, Robert Howard '75	WAA Fosberg, Theodore M. '59	CA P Koehn, Lisa Renee '82	KY A Freeman, Richard E. '73	MO A Gardner, Roger William '63
SD A Jenkins, Creties David '83	WAA Kinell, Donald Karl '64	CO A Bement Jr., Arden Lee '54	KY B Feger, Kathleen Marie '92	MO A Hardin, John Wesley '87
SD B Johnson, Dean Hilbert '81	WAA Reichel, Jerel Dave '66	CO A Stratton, Joan Victoria '74	KY B Johnson, Alan Arthur '52	MO A Hutchinson, Darrell B. '74
TN A Ayers, William Ralph '80	WAA Saxberg, Bror V. H. '80	CO B Dadd, Susan J. '96	KY B Leep, Herman R. '63	MO A Kuehnel, Charles G. '62
TN A Hueser, David Lee '76	WAA Schwam, Susan Elaine '88	CO B Erickson II, Thurston '74	KY B Meyers, James Frank '69	MO B Bondurant, David W. '71
TN A Hunt, Roy Joe '67	WAA Stiegler, Joseph E. '58	CO B Horrell, Robin S. '85	KY B Raderer, Thomas K. '73	MO B Brockhaus, Douglas A. '68
TN A Moore, Robert Monroe '66	WAA Strickland, Elizabeth '77	CO B Muterspaugh, Helen K. '78	LA A Comardelle, Jeremy N. '01	MO B Elfrink, Lindell Herman '62
TN A Tarrant, Charles H. '57	WAA Volkirch, Terence John '84	CO B Primeaux, Paul Rodney '67	LA A Lam, Chi-Kwong '66	MO B Greco, Mary J. '84
TN A Tomlinson, Edward T. '72	WAB Welsh, Bryan Douglas '87	CO G Ton, Scott Marshall '74	LA B Dibenedetto, Leo F. '72	MO B Hendrickson, Richard '53
TN A Trundle, Max Don '72	WAB Barlow, Thomas Martin '57	CO Δ Dadd, Jeffery Scott '97	LA B Garrido, Louis A. '57	MO B Myers, Kenneth R. '72
TN B Burnett Jr., Wilton W. '67	WAB Opfer, Neil David '76	CT A Lehman, Philip Lester '76	LA G Harvey, Irvin Mitchell '69	MO B Saperstein, Lee Waldo '64
TN B Kepper III, James H. '71	WAG Damman, Lawrence M. '71	CT A MacDonald, Mac Hall '64	LA G Owen, Mark Enos '92	MO B Scherrer, Paul Keith '71
TN B Petersen, Eric Scott '84	WAA Burton, Brian Carver '97	CT A McEligot, Donald M. '52	MEA Carsley, Denice Loring '92	MO B Willoughby, Ronald D. '73
TN B Petersen, Stephanie A. '84	WVA Tompkins, Joseph A. '77	CT B Dembieczak, Gerald J. '74	MEA Gagnon, John Robert '62	MO G Galbierz, Robert W. '64
TN B Pulley, Debra Domino '78	WI A Cattoi, Robert Louis '50	CT B Dzieleński, Edward C. '66	MEA Jones, Cheryl A. '78	NE A Shammugam, Alagappan '83
TN Z Rethwilm, Craig R. '92	WI A Lee, Jun Wai '68	CT B White, William Richard '65	MEA Laskey, Jeremy Lindon '51	NVA Davis, Adrienne Marie '98
TX A Anderson, John Eldon '57	WI A Shimko, Darl Vann '79	DE A Gulian, Franklin J. '83	NVA Ogden, Stephen Wade '79	NVA Erickson, Spencer Lee '99
TX A Angel-Jaramillo, Danilo '61	WI A Tennie, John Charles '64	DE A Neimeyer, Terry F. '77	MDA Burroughs, Matthew O. '63	NVA Reynolds, Roger Smith '65
TX A Courtney Jr., Lonzo C. '58	WYA Cavalli, Matthew N. '98	DC B Raley, Charles C. '83	MDA Hartlove Jr., Charles '76	NV B Vodrazka Sr., Walter C. '55
TX A Garrett, Darrel Wayne '70	WYA Dwan, Terrence E. '68	DC G Lintner, William Anton '82	MDA O'Berry, William A. '55	NHA Davis, Paul Fraser '76
TX A Henry, Wesley Bert '51	WYA Scharton, Craig Allen '85	DC G Potterton, Richard Lee '60	MDA Sutura, Salvatore P. '54	NHA Zecchini, Charles R. '50
TX A Hurst, Terry Lee '76	SECOND CENTURY CLUB	DC F Whitham, Charles L. '61	MDA Wallace III, William E. '86	NJ A Ciccollella, Sergio A. '72
TX A Kuenemann, Wesley B. '59	AL A Carey, George Walter '69	FL A Charlton, John D. '72	MDA Denny, Samuel A. '90	NJ A Denzer Jr., George C. '61
TX A Peet, Ed '69	AL A Grantham, Ronald Joe '77	FL A Glass, John Dorrance '73	MDB Errera, David R. '75	NJ A Dudis, Joseph '64
TX A Reese, Francis Edward '75	AL A Malseed, Robert Allen '77	FL A Ireland, Ronald Joe '61	MDB Horner, Matthew L. '01	NJ B Ayres, Marc Coiner '84
TX A Smith, Daniel Robert '75	AL A Miller III, Edwin H. '84	FL A Lovell, Gilbert H. '82	MDB McCracken, Richard P. '70	NJ B Badgley Jr., Robert H. '60
TX A Whitesides Jr., John L. '65	AL A Singly, John Charles '73	FL A Militeolo, Sam '61	MDB Poulter, Harry David '88	NJ B Emmons Jr., Harry L. '40
TX B Boyd, Suzanna Ruth '81	AL A Walkley, Kenneth B. '71	FL A Van Horn, William A. '82	MDB Sacks, Herbert K. '64	NJ B Nixon, Allen Mackenzie '62
TX B Darby, Mark Leslie '79	AL B Ashcraft Jr., James H. '78	FL B Stambolion, Damon B. '98	MDB Tracy, Anita Lynne '89	NJ B Richards, John Reed '76
TX B Gilmer, Tracy F. '80	AL B Mason, William Warren '89	FL G Anderson II, Shannon '75	NJ F Wamsley, Brian W. '77	NJ F DiDomenico, Michael J. '65
TX B Johnson, Mark Sheldon '74	AL B Vickers, William T. '63	FL Δ Sieck, Robert B. '60	MDB Yourshaw, Sheryl L. '99	NJ F Kasuba, Peter Francis '65
TX B Nall, Albert Arnold '81	AL Δ McCartney, Crystal L. '08	FL G Leon, Felipe Antonio '99	MAA Haringa, Glenn E. '74	NJ F Labos, William Joseph '73
TX B Osborne, David C. '61	AK A Pilch, Stephanie Ruth '10	FL G Lund, Karen Elizabeth '98	MAA Mangiarelli, Chris '96	NJ F Morgan, Dennis Ross '68
TX B Stinson, John Michael '66	AZ A de Shazo Jr., Thomas '62	GA A Allen, Myron B. '58	MAA Wielk, Michael C. '86	NJ F Okoye, Chuka Kameme '96
TX G Altman, Thomas Clark '70	AZ A Muterspaugh, Milo E. '66	GA A Flegal, William M. '66	MAB Delagrange, Arthur D. '62	NJ F Paone, Charles Joseph '66
TX G Hagler, Marion Otho '63	AZ A Shaver, Frederick W. '55	GA A Ham, John Michael '80	MAB Honigsberg, Charles A. '52	NJ F Reznak, Frederick John '69
TX Δ Armstrong, Bryan M. '95	AR A Perciful, Jerry Cecil '60	GA A Olive, Charles Michael '70	MAB Johnson, Timothy Lee '68	NJ F Telva, Thomas '64
TX Δ Brittan, Charles Laury '65	AR A Reed, John Lee '68	GA B Jones, David Neal '92	MAB Miller, Paul George '49	NJ F Thompson, Susan M. '92
TX Δ Coman, Paul Daniel '03	AR A Williams, Curtis Ray '63	ID A Spangrude, Gene R. '73	MAB Morin, Gene Douglas '58	NJ A Chen, Ephraim J. '09
		IL A Hillman III, Arthur B. '67	MAB Shepperd, Stan Wayne '70	NJ A Gross, Gary Robert '80
		IL A Jonas, Steven Geza '66	MAB Smith, Thomas L. '67	NJ A Nash Jr., Raymond A. '60
		IL A Kenny, Kevin Bernard '90	MAB van Raalte, John A. '59	NJ A Wise, Frank W. '80
		IL A Madsen, Wayne Arthur '60	MAB Wasem, Ondria Gay '85	NMA Woodward Jr., Clinton '84
		IL A Person, Burton Conrad '48	MAB Babaian, Peter Martin '99	NY B Holt, Ralph Ephraim '50
		IL A Resman, Tom A. '84	MAA Bloch, Frederick Hersh '68	NY B Leader, Jeffrey James '85
		IL A Richards, Elizabeth A. '75	MAA Ingalls, David Peabody '51	NY B Leader, Margaret Ellen '85
		IL B Gewartowski, James '52	MAA Quock, Pamela Jeanne '78	NY B Thomas, Henry Howard '62
		IL G Asbury, Michael G. '83	MAA Serencha, Mark John '93	NY B Tobin, Michael R. '87
		IL G Crane, Morton Jack '45	MAA Wilson, Robert J. '70	NY F Capek, Thomas George '86
		IL G Dorn, James David '54	MA E Sciarrelli, Anthony P. '86	NY F Diefenbacher, Robert '59
		IL G Herman, Richard Neal '55	MA Z Fiejdasz, Paul Andrew '85	NY F Greaves, Charles J. '60
		IL G Rivera, Angel Luis '80	MA Z Gross, Stephen R. '80	NY F Jennings, Robert Edgar '63
		IN E Fioocchio, Samuel D. '73	MAH Daniels, Susan Carol '81	NY F Levy, Michael David '89
		IN A Dillard, James Orland '77	MAH Garde, Sharon Ilene '86	NY F McKersie, Alan David '52
		IN A Eykamp, G. Richard '56	MAH Walsh, Edmund John '83	NY F Segal, Joshua L. '68
		IN A Goette, William E. '56	MAΘ Burns, Nancy E. '84	NY F Smith, Charles Alan '81
		IN A Hammond, Joel C. '83	MA I Schreiner, Steven '86	NY F Veldman, John Peter '70
		IN A Hockema, Richard W. '68	MI A Beck, Maureen E. '03	NY A Hurta Jr., Gary Paul '06
		IN A Jobsen, Eric Richard '80	MI A Bonner, Robert Hudson '84	NY A Logan, Joseph Skinner '56
		IN A Kelly, Paul Donald '59	MI A Brewer, Frederick E. '57	NY A Price, Richard Henry '65

NY E Ferrar, Rob '74
 NY E Markatos, Louis G. '65
 NY Z Schurr, Albert Alfons '62
 NY H Kern, Frank John '70
 NY H Prager, Jay Martin '68
 NY @ Bunker, Wayne Albert '82
 NY @ Godlove, Katie Ann '02
 NY @ Hamn, Jeffrey H. '74
 NY @ Harris, Everette C. '76
 NY @ Hunt II, William E. '59
 NY @ Newman, Mitchell J. '81
 NY @ Wells, Eugene Francis '50
 NY I Andrews, Richard F. '79
 NY I Brand, Alfred H. '67
 NY I Kayton, Myron '55
 NY I Liberatoro, Federico '85
 NY I Selinger, Carl S. '67
 NY K Cohn, Brian David '80
 NY A Madia, Michael '81
 NY A Novakoff, Alan K. '74
 NYM Bunk, Donald Samuel '55
 NYM Hurewitz, David Lewis '64
 NYN MacNeil, Randall Lewis '69
 NYN Theoditus, David T. '86
 NY @ Bruzzone, Anthony F. '12
 NY @ Costello, Joseph John '70
 NY @ Defelice, Nicholas J. '77
 NY @ Machuca, Luis Arthur '69
 NY @ Mohan, Marguerite A. '04
 NY @ Rodriguez, Ernesto '85
 NY @ Eggleston, Peter A. '81
 NY @ Spitz, Glenn Steven '87
 NY @ Howles, Douglas '76
 NY P Cortina, Thomas J. '87
 NY P Lubrano, Michael '80
 NY S Smith, Jason Stephen '95
 NC A Clark, Jennifer Anne '79
 NC A Cutchin IV, James M. '62
 NC A Doggett, William Ray '86
 NC A Helms, Chester Ethane '74
 NC I Behnken, Kenneth C. '67
 NC I Maxson, Robert Jay '62
 NC I Peters, William Thomas '59
 NC A Clark, Michael J. '75
 NC E Blunk, Thomas R. '92
 ND A Dieser, Mark '84
 ND A Schoot, Peter A. '85
 OH A Diederich, Norman F. '64
 OH A Erdelsky, Philip John '67
 OH A Kownacki, Edward J. '66
 OH A Moorhead, Kenneth W. '50
 OH A Zurilla, Ronald William '61
 OH B Avellano, Michael A. '85
 OH B Bulcher, Thomas J. '76
 OH @ Powell, David Allen '71
 OH Z Rober, Kenneth Jerome '68
 OH H Carlson, Lonnie '07
 OH H Crowder Jr., George E. '77
 OH H Gilbert, John Ellis '70
 OH H Hartman, Dean H. '99
 OH H Mandt, Gregory Alan '81
 OH H Menna, Richard Joseph '62
 OH H Merkle, Laurence D. '92
 OH H Piske Jr., Andreas A. '61
 OH H Wolfe, Stephen A. '85
 OH @ Burkard, Leo Arthur '67
 OH @ Walsh, Michael Anthony '75
 OH @ Westerheide, Donald E. '58
 OH I Marone, Victor D. '59
 OH K Stimler, Jeff Joseph '84
 OH A Folk, Joseph William '98
 OHM Huff, Richard Keith '94
 OK A Bastron, Victor C. '66
 OK A Wright, Roger McClain '55
 OK B Harper, Lois Marie '86
 OR A Loughmiller, Bert E. '64
 OR A Miller, Mark Wade '89
 PA A Haist, Randall Matthew '80
 PA A Marshall, Steven John '82
 PA A Muller, Eduardo E. '87
 PA A Swartwout, John B. '73
 PA B Bova, Francesco A. '05
 PA B Cashdollar, Barron H. '57
 PA B Cook, William Joseph '54
 PA B Fetchen, John Howard '69
 PA B Pasko, Thomas Joseph '59
 PA B Pickenheim, Timothy R. '90
 PA B Reifsnnyder, Jeffrey W. '80
 PA @ Boler, William Charles '69
 PA @ Flaminio, Herman '62
 PA @ Rouleau, Wilfred T. '51
 PA @ Sack, John Stuart '75
 PA @ Baxley, John Hirst '88
 PA @ Nackoney, Ogden G. '63
 PA @ Boyles, Bruce William '76
 PA @ Hartman Jr., Harold F. '56
 PA @ Santo, William John '53
 PA @ Schenck, Arthur Jacob '73

PA E Steel, Henry William '58
 PA Z Angilletta, Gerald V. '79
 PA Z Browne, Joseph Dominic '60
 PA Z Chmielewski Jr., Thomas '77
 PA Z Kirsch, Paul Andrew '75
 PA Z Schubele III, Charles W. '60
 PA Z Thomas, Jeffrey R. '65
 PA H Russell, J. Frank '74
 PA @ Addotta, Robert Frank '77
 PA @ Braun, James Francis '84
 PA @ Salvo, John P. '56
 PA K Ellis, Raymond Henry '64
 PA A Christian, Rob Francis '07
 PA A Hays, James Charles '73
 PA A Kvitkovich, James F. '81
 PR A Archilla, Joaquin '68
 PR A Cancio, Hugo M. '74
 PR A Perez, Juan A. '78
 RI A Townsend, James C. '60
 RI B Knickle, Harold Norman '62
 RI B Mastrotostefano, Vincent '75
 SC A Exley Sr., Slade Forrest '72
 SC A Harley, John Price '78
 SC A Hill, James C. '61
 SC B Fripp, Archibold Linley '66
 SC I Kelly, Robert Thomas '86
 SD A Eidsness, Karen Rose '83
 SD A Strobel, Julius Walter '67
 TN A Bowden, Bryant Baird '68
 TN A Conway, Tammy Kay '82
 TN A Dobrodziej, Kristen L. '08
 TN A Drake, Mark Anthony '82
 TN A Graves, Richard Telford '70
 TN A Harper, James Robert '63
 TN A Hudson, Dale '64
 TN A Sewell, John Ike '54
 TN A Taylor, David Richard '69
 TN A Witt, Teddy Carr '90
 TN A Zimmerman, James L. '58
 TN B Casson, Leonard Walter '81
 TN B Hawkins, Kenneth E. '88
 TN B Zabriskie, Kenneth A. '80
 TN @ McCormick, Jack R. '64
 TN @ McDonald, Gary H. '77
 TN @ Pedigo, Donald Bruce '83
 TN @ Tipps, Richard Douglas '69
 TN Z Keck, Christopher Clark '95
 TN Z McGlumphy, Jonathan '02
 TX A Crippen, Robert L. '60
 TX A Felton, Charles Ronald '73
 TX A Seaman, George Cook '66
 TX A Wilkes, Chester Peyton '50
 TX B Atwood, Martin Price '76
 TX B MacCallum, Gregory J. '81
 TX @ Hobbs, William Edward '65
 TX @ Williamson, Kent Alan '77
 TX @ Barksdale, Donald Lee '55
 TX @ Chevalier, Mark T. '91
 TX @ Foster, Scott Alden '84
 TX @ Gray, Foster Lee '53
 TX @ Johnson, Vance Clay '78
 TX @ Massett, Donald Allen '70
 TX @ McGinnis, Charles Irving '49
 TX @ Murthy, Prahlad N. '92
 TX @ Sullivan Jr., Samuel L. '57
 TX @ Tipton, Dewey Ross '64
 TX @ Whitney, Herbert Ward '57
 TX E Brown Jr., Thomas B. '72
 TX H Benson, Marvin Dale '79
 TX H Reid, Thomas Anthony '65
 TX H Tepper, John C. '82
 TX @ Davis, Richard Callier '79
 TX K Alexander, Craig Steven '88
 UT B Craig, Donald Dean '82
 UT B Dickson, Lloyd Brent '63
 UT B Hinman, Paul Victor '71
 UT @ Esplin, Robert Barton '04
 VT A Bouchard, Donald Raoul '81
 VT A Garno, Douglas Thomas '58
 VT A Clark, David Thomas '81
 VT A Guerreri, Carl N. '62
 VA A McNair, Grayson E. '62
 VA A Shirley, David Eugene '65
 VA B Blanton, John C. '76
 VA B Boward, Jill Kathleen '87
 VA B Cassell II, Ray Vaughn '88
 VA B Haight, Roger Quentin '82
 VA B Parsons, Jerome S. '66
 VA B Ray II, Robert E. L. '74
 VA B Thiel, Stephen Ward '81
 VA @ Hartelius, John Taft '80
 VA @ Lashomb, Susan Marie '83
 WAA Grant, Patrick William '75
 WAA Haase, Richard H. '50
 WAA McNeese, Jackson Lowry '68
 WAA Miller, Steven Claude '72
 WAF Lock, Raymond Tan '83
 WVA Britton, Barry Kevin '85

WVA Easterling, William S. '81
 WVA Farnsworth, David L. '68
 WVA Mongold Jr., Guy Earl '50
 WVB Bennett, Chris John '06
 WVB Farmer, Harry Clayton '70
 WI A Devoe, Michael James '78
 WI A Goba, John J. '66
 WI B Fedler, Richard E. '65
 WI @ Merkel, Brian John '81
 WI @ Eichman, Donald G. '06
 WYA Simon, Ronald Wayne '81

FOUNDERS CLUB
 AL A Cobb IV, Henry Clay '71
 AL A Cochran Jr., John Evell '66
 AL A Holloway Jr., Coley M. '94
 AL A Marshall, Jerry Wayne '69
 AL B Franks, Larry Daniel '71
 AL B McLaughlin, Douglas '77
 AL B Pilleteri, Joseph '74
 AL @ Fortune, Julie Lynn '01
 AZ A Gundrey, Lana Bellus '88
 AZ B Nucci Jr., Joseph E. '86
 AR A McKinnie, Jane Lillian '84
 AR A Morris, Stacey O. '73
 CA A Anwar, George '82
 CA A Whisler, William D. '59
 CA B Almsley, William T. '71
 CA @ Conti, Walter '81
 CA @ Miller, William C. '50
 CA A Fujihara, Glenn Y. '74
 CA A Schneider, Kenneth J. '58
 CA A Scottline, Charles A. '61
 CA H Kolber, Gregory J. '02
 CA @ Florez, Paul Mark '06
 CA K Bodnar, James David '93
 CAM Hermanson, Glenn E. '87
 CAM Lightcap, William L. '86
 CA O Alvarez, Desi '75
 CA T Tran, Doc Van '89
 CA @ Ward, John Lee '00
 CO B Stone, Michael A. '88
 CT B Rey, Donald Paul '78
 DE A Gardiner Jr., Francis '62
 DE A Shade, Patrick Joseph '76
 FL A Kiersz, Donna Cecilia '80
 FL A Rathkopf, James Arden '79
 FL A Ruekle, Timothy James '89
 FL A Zegel, William Case '61
 FL @ Jones, Lawrence E. '90
 FL A Smith, Shaina Maryann '99
 FL E Sinibaldi, John Claude '85

GA A Church, Billy Ray '63
 GA A Cleveland, Paul H. '82
 GA A Gumm, Milton S. '67
 GA A Gunter, Richard R. '50
 GA A LeCroy, Robert T. '83
 GA A Royer, Steven Lee '88
 IL A Hoyt, Roger Franklin '71
 IL A Koepke, Barry George '60
 IL A Miller, David Archer '61
 IL A Rudolph, James G. '55
 IL A Uhalt Jr., Alfred Hunt '58
 IL A Wilton, Donald Robert '64
 IL B Burnley, Robert Todd '89
 IL @ Gamble, Robert Blount '53
 IL @ Hill, Deborah Kay '80
 IL @ Lieske, John Charles '82
 IL @ Davis, Michael R. '78
 IL @ McLachlan, Christopher '96
 IL A Yerby, Joel Talbert '56
 IL E Silich, Bert Allen '79
 IN A Anders, James Larry '72
 IN A Beuchel, Patrick T. '81
 IN A Brennan Jr., Paul John '46
 IN A Ewart, Howard Lee '58
 IN A Hamilton, Robert John '58
 IN A Matsumoto, Randall I. '75
 IN A Schoendorf, Joseph P. '66
 IN A Vanderheyden, Greg P. '80
 IN B Badger, David Harry '53
 IN B Bechtel, Morris Alan '64
 IN A Bolur, Adam Reza '02
 IA A Ackley, Mark W. '72
 IA A Bridges, Harold Ray '65
 IA A Dueker, Leonard L. '55
 IA A Hegg, Bob Allen '66
 IA A Philipp, Bruce Edward '63
 IA A Ryken, Mike Jon '96
 KS B Schneidewind, Deanna '99
 KS B Shields, Suzanne L. '83
 KS @ Glaze, James B. '75
 KS @ Hakimian, Hekmat '58
 KY A Calasanz, Leandro E. '77
 KY A Ogden, William R. '65
 KY B Cooper, Brian Edward '88
 KY B Sheehan, Charles J. '52
 LA A Fowler, James Bradley '82
 LA A Miller Jr., Frank C. '62
 LA A Petitbon, John B. '86
 LA A Shoemaker, Harry L. '69
 LA A Slade Jr., Bill Ernest '61
 LA @ Nugent, Larry Edward '61

LA @ Risle, Martin Cary '66
 LA @ Sutton, Jerry Kent '67
 LA A Horton, Kenneth J. '79
 ME A Theriault, Lucien J. '51
 MD A Chang, William '01
 MD A Dorsey, Herb Warfield '62
 MD A Slack, Albert Jeffrey '76
 MD B Brundrett, C. Phillip '66
 MD B McCoy, Charles M. '68
 MD B Spittler, Philip '64
 MA A Hopf, William Herbert '58
 MA A Irwin, Michael Joseph '75
 MA A Levesque, Allen Henry '59
 MA A Smestad, Haley H. '15
 MA B Losh, Samuel Johnston '54
 MA B Torrielli, Luisa K. '98
 MA B Wampler, Charles W. '79
 MA @ De Capite, Marco Luigi '91
 MA A Walsh, James Ralph '90
 MA E Dow, Benjamin L. '88
 MA E Murphy, Kelly Ann '83
 MA E O'Donnell, John J. '56
 MA Z Hawryliw Jr., Michael '65
 MA I Masi, James V. '60
 MI A Berg, Dale Evan '67
 MI A Herrick, Robert James '68
 MI A Pfeil, Richard John '54
 MI A Wang, Peggy P C '77
 MI B Chekan, Vicki A. '90
 MI B Gosling, Christopher D. '79
 MI @ Badalament, Michael '91
 MI @ Hiltunen, Dennis R. '83
 MI @ Hubble, Thomas W. '71
 MI @ Stoughton, Herbert W. '73
 MI @ Weins, Michael James '61
 MI @ Zelenka, Jerry S. '58
 MI E Donaldson, Keith W. '85
 MI E Klotz, James C. '01
 MI E Miesiak, Stephen J. '84
 MI E Yarne, Victor Carl '68
 MN A Sanders, Ivar '68
 MS A Cleveland Jr., Grover '69
 MO A Vetter, Louis Hugo '62
 MO B Liescheidt, Brenda Ella '78
 MO B Ward, Terrence Ray '70
 MO B Weese, John R. '74
 MT A Hart, William Frank '67
 MT A Monaghan, Kathleen L. '90
 MT A Morse, Mark Harry '83
 NE A Cox, John Dean '85
 NE A Fortik, Jason LaVern '98

The heritage society

The Heritage Society was created to recognize those who include Tau Beta Pi in their estate plans. Becoming a member can help the Association achieve its mission. For more information, email Sherry Jennings-King at sherryjenningsking@tbp.org or visit www.tbp.org/giving.cfm

“Tau Beta Pi has been very important to me from the time of my induction in 1960 to the present. It embodies the 4 E's that have been the focus of my professional career: Engineering, Education, Excellence, and Ethics. As such, it has provided inspiration and incentive to thousands of engineering students and alumni and funded hundreds of graduate fellowships. Recognizing that the good things done by Tau Beta Pi require money, Dorothy and I have supported the Society financially as we have been able. We also saw the opportunity to continue our support after we are gone by including Tau Beta Pi as a beneficiary in our wills. It is gratifying to know that the Society will continue its work well into the future and that our legacy will help it to do so.”



Lyle's Law creator and frequent contributor to The Bent, Lyle D. Feisel, Ph.D., P.E. (Ret.), Iowa Alpha '61, is dean emeritus of the school of engineering and applied science at SUNY at Binghamton. His new series Why Do We Call it a...? appears each Summer and Winter.

FOUNDERS CLUB CONTINUED

- NV A Day, Jorgi M. '92
- NJ A Amato, Corrado '76
- NJ A Maroulis, Alexandros '04
- NJ B Russell, Kenneth A. '65
- NJ F Della Rovere, Richard '10
- NJ F Graber, Eugene A. '66
- NJ F Kuchner, Robert A. '69
- NJ F McDermott, Kevin J. '65
- NY A Carlucci Jr., Joseph J. '68
- NY F Berman, Charles H. '64
- NY F Gross, Philip Murray '62
- NY F Polmann, Donald J. '79
- NY A Willis III, William T. '66
- NY E Torigian, Andrew '60
- NY Z Weschke, Rainer '67
- NY H Palazzo, Cosimo J. '60
- NY H Pandey, Kabi Raj '99
- NY O Periard, James Richard '81
- NY A Leonardi, Thomas S. '72
- NYM Griggs, Francis E. '56
- NY N Dressing, Thomas G. '90
- NY N Dristy, Mark Edward '85
- NY N Hamner, Mark R. '81
- NY N Markunas, Justin K. '01
- NY N Rosenthal, Jordan C. '95
- NY O Leu, Derek Huc-Keng '06
- NY T Runkel, Andrew N. '09
- NC A Ellington, Barry Todd '86
- NC A Starkey, Robert L. '80
- NC A Willis, John Keith '78
- NC A Wirth, Thomas R. '87
- OH A Churchman, Joseph S. '67
- OH A Contenza, Michael D. '78
- OH A Radke, Charles Edwin '55
- OH B Bodoesi, Andrew '65
- OH B Lynch III, Thomas J. '72
- OH B Shoger, Kristen Todd '97
- OH F Jordan, Sarah E. '99
- OH E Harrold, James Leon '91
- OH E King, Mark Joseph '74
- OH H Hannan, Shawn M. '95
- OH H Silkowski, Eric '90
- OH O De Jaco, Norbert F. '62
- OH O Marks, Steven James '85
- OH O Trovato, Joseph A. '71

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- | | | | |
|----------------------------------|---------------------------------|---------------------------------|----------------------------------|
| OH I Drouhard, Todd A. '98 | PA A Lucas, Jay Philip '69 | TX B Neill, John Michael '74 | WI B Morris, Leslie R. '78 |
| OH I Lehnert, Andrew B. '63 | PA Z Borig, Walter A. '49 | TX B Reinking, Greg F. '84 | WI B Novak, David A. '77 |
| OH I Rowland, Benjamin C. '06 | PA Z Brecht, Howard Earle '63 | TX F Cronin, Robert H. '65 | WI B Russell, Jeffrey Thomas '88 |
| OH I Rowland, Sarah L. '06 | PA Z Pessiki, Stephen P. '84 | TX A Boatright, Paul A. '70 | WI F Beisner, Richard C. '74 |
| OH I Ward, Robert Lee '88 | PA Z Shaffer III, Thomas H. '68 | TX A Hall, Charles L. '72 | WI E Holte, Jennifer E. '90 |
| OH A Repko, Raymond '77 | PA H Toole, T. '83 | TX A Pardue, Lon Hubert '63 | WI E Holte, Kenneth Alan '89 |
| OH A Slovasky, Mark S. '85 | PA A Loehlein, Werner C. '74 | TX A Szymczak, Edward J. '61 | WYA Bowen, Douglas Glenn '75 |
| OH A Stevens, Charles A. '58 | SC A Cox, Anthony James '83 | TX I Smith, Jason Andrew '10 | WYA Caudill, Lisa Ann '86 |
| OK A Greenberg, Charles M. '66 | SC A Dowdle III, H. '85 | TX K Harness Jr., Jerry W. '03 | WYA Killian, Jessica M. '03 |
| OK B Strawser, Donald E. '71 | SC A King, Charles Henry '66 | TX K Williams, Donald Craig '89 | WYA Reese, David Leland '81 |
| OR A McCann, Curtis E. '62 | SC A McMullan, Richard J. '91 | UT A Forbes, Charles Robins '49 | |
| OR A Voit, David Edward '66 | SC B Wolf, Kathleen Ann '88 | UT A Liu, Kevin K. '80 | |
| OR B Joanis III, Marvin A. '96 | SC F Guagua, Mike Vicente '13 | UT A Talbot, Kevin R. '88 | |
| PA A Corbett III, Stanley W. '55 | SC F Hoel, Jeffrey Scott '83 | UT B Alley, Lynn David '81 | |
| PA A Fertig, James Henry '71 | SC F Tomasik, Donald M. '77 | UT B Larsen, Bradford W. '88 | |
| PA A Heffernan, Robert B. '70 | SD A Weinacht, Daniel J. '84 | VT B Shyloski Jr., Ed C. '66 | |
| PA A Lucadamo, Gene A. '71 | TN A Cofer Jr., Joseph A. '63 | VA A Ginn, F. Lester '72 | |
| PA A Moser, George M. '67 | TN A Jackson, Robert Harris '59 | VA A Kennedy, Michael F. '72 | |
| PA A Stein, Fred Paul '56 | TN A Kaley, John Straud '01 | VA A Kolodney, Matthew '71 | |
| PA A Weiss, David Steven '65 | TN A Key, Jesse Alexander '52 | VA B Arntson, Stephen G. '64 | |
| PA B Chadwick, Kevin S. '78 | TN A Sinko, Robert John '85 | VA B Rhodes, Marvin D. '63 | |
| PA B Deluca, Bob Michael '70 | TN A Smith, Robert Kenneth '63 | WAA Reavis, Gretchen Marie '84 | |
| PA B Kalasheh, Amir Samuel '09 | TN A Wunderlich, Walter O. '56 | WAA Schueman, Gerald M. '64 | |
| PA B Okrent, Scott '00 | TN B Lippert, Michael John '86 | WAA Semke, Leon Kirkland '58 | |
| PA F Kaplan, David Seth '03 | TN E Thompson, David A. '00 | WVB Harper, Wendy Ann '00 | |
| PA F Miley II, George H. '55 | TX A Chen, Annie Y. '89 | WI A Anderson, Eric Scott '71 | |
| PA F Polefka, Allen Jack '71 | TX A Johnson, Mark Edward '78 | WI A Fell, Malcolm McKeen '41 | |

Assistant Executive Director Emeritus



In recognition of a long and dedicated career, the Association announced in late 2018 the departure of Roger E. Hawks, NY A '75, after 32 years of service. Roger was hired in 1986 as the Assistant Secretary-Treasurer, only the sixth person to hold that position and the first to do so for a period longer than ten years.

After the Association's elimination of that title in 2016, he assumed the role of Director of Chapter Programs. Roger's duties over the years were diverse and included many important aspects of the organization. He oversaw most chapter operations including membership, reporting, projects, surveys, studies, and awards, creating the Membership Award. He acted as liaison to the District Directors and Chapter Advisors and assisted with the management of the Engineering Futures Program. Roger was a primary coordinator of our annual Convention since the 1986 event in College Park, MD, and worked with petitioning societies interested in establishing a TBPi chapter. As our first webmaster, he was instrumental in developing the organization's website.

Roger's years of service place him among the giants of Tau Beta Pi history with Red Matthews, Bob Nagel, and Jim Froula, all of whom dedicated a substantial period of their lives to the Association.

A 1975 graduate of the Pratt Institute, Roger majored in chemical engineering and was initiated into the New York Lambda Chapter in 1974. Prior to being hired at TBPi, he was an engineer in process design and development with the Maxwell House Division of General Foods in Jacksonville, FL. He and his wife Stefanie moved to the Knoxville area in 1986 and reside in Maryville, TN.

In gratitude for his commitment and contributions to Tau Beta Pi, and in recognition of his years of service, Roger Hawks has been granted the title of Assistant Executive Director Emeritus.

In Grateful Appreciation of Member-Contributors

AL A Lewis, William Douglas '78	GA A Pei, Dekun '11	MAB Wofsey, Robert Allen '48	NY B Chamberlain, Steven C. '68	PA 0 Kamedulski, Gregory E. '76
AL A Tamblyn, Lynn M. '15	GA B Palmer, Jennifer W. '07	MA A Chan, Alex Yat Ning '13	NY F Furman, Bill Nelson '82	PA A Beese, Robert Emery '90
AL G Carpenter, Nolan A.W. '09	ID A Deehr, James Richard '75	MA E Cohen, Jacob '81	NY F Harris, Robert Philip '74	PA A Tomko, Leonard M. '80
AL G Chambliss, Alton R. '92	ID F Khanal, Mandar '76	MA E Gadon, Charles B. '80	NY F Rizzuto, Raymond John '79	PA A Whiteside, Raymond A. '81
AZ A Lee, Steve Eugene '77	IL A Bajt, Ronald Michael '66	MA H Zulkefli, Zamir A. '05	NY A Zimmons, Paul Michael '98	PR A Burgos-Rubio, Concepcion '89
AZ A Pratt, Roger Davison '67	IL A Gronewold, David A. '70	MI B Hudson, R. Dennis '62	NY H Koss, Leonard Louis '66	SC A Elrod, William Corbin '49
AZ B Olson, Marilyn T. '78	IL A Skala, Stephen L. '87	MI B Lamping, Gerald A. '67	NY 0 Cipollina, Joseph D. '09	SC A Lindsay, Spencer Clark '18
AZ B Vismantas, Andreas '87	IL B Parks, Robert Franz '88	MI B Schmitz, Eugene J. '52	NY 0 Watson, Richard Paul '78	SC A Waddington, David M. '84
ARA Johnson, Cody '15	IL B Rosen, Edward M. '52	MI F Berry, Danny Boyd '78	NY I Leviitsky, Myron '51	SC B Brizes, Cindy '93
ARA Pile, Stephen Chine '66	IL B Staschke, Ralph A. '50	MI F Betz, David Karl '95	NY I Mullan, Philip Joseph '57	SC B Caldwell, Thomas B. '82
CA A Paoli, Richard John '62	IL F Parks, Melvin Jay '52	MI F Gotham, Joe '07	NYM Dartt, Randall Foster '94	SC B Johnson, Johnny Martin '71
CA B Dixon, David Adams '71	IL A Plouzek, John Michael '86	MI F Marsh IV, Joseph '64	NYN Chen, Lisa Ann '84	SC B Pittman, Donny Ray '75
CA F Martin, Vince Lionel '60	IL A Walczynski, Stanley A. '77	MI F Sproull, William Cargill '55	NYN McCullough, Earl S. '63	SC B Witt, Alton Wayne '66
CA A Klein, Jerry Alan '61	IL Z Navarro, Robert W. '87	MI E Casagrande, Roger D. '60	NYN Michalek, Kenneth P. '83	SD A Espeland, Ron Wayne '82
CA A Mehnert, Warren Leon '65	IL Z Steinkoenig, Glen Lee '95	MI E Paterson Jr., John M. '68	NYN Scura Jr., Lawrence T. '71	SD A Kirk, Steven James '74
CA E Delettrez, Jacques '65	IN A Albrecht, Robert W. '57	MI Z Slagh, Douglas James '78	NY 3 Defeo, Paul '93	TN A Becker, Mia Isabella '18
CA H Knox, Thomas M. '82	IN A Butcher, David N. '68	MI Z Weimer, Kenneth E. '09	NY P Nguyen, Tuyen '18	TN A Campbell, William B. '58
CA I DeVan, Glenn Charles '71	IN A Cole, Larry Gene '64	MI 0 Jarbo, Sania '09	NY P Lanzarone, John R. '78	TN A Kalshoven Jr., Jan E. '69
CA A Brooks, Michael Steven '76	IN A Dash, Sourabh Kumar '01	MI I Rossi, Robert E. '85	MI I Weimer, Kirstie T. '11	TN A Kress, Reid Leonard '80
CA A Grathwell, Travis J. '06	IN A Elijah, Darrel L. '64	MI K O'Hare, Daniel Scott '13	NC A Ferguson, Roger G. '73	TN A Lambert, Lisa Renee '90
CAM Riddiough, Todd N. '96	IN A Hall, Robert Gordon '58	MI A Fenwick, Max Randle '18	NC A Parker, William E. '51	TN A Lambert, William M. '91
CAN Huff, William J. '80	IN A Kenny, Michael D. '63	MS B Echols, John Alford '67	NC A Rudisill, Jacob M. '75	TN A Waller, J. Wayne '60
CA 3 Matthew-John, Stephen '87	IN A Tarjan, Peter Paul '59	MS B Sims, Thomas Randall '79	NC A Troxler, Robert Ernest '83	TN B Lantz, John Everett '13
CA O Wong, Peter '78	IN B Grammel, Cassandra '10	MO A Bade, Darrell Dean '73	NC F Berry, Jeff Matthew '98	TN F Orr, David G. '69
CA P McComb, Chris Carson '12	IN A Singo, Kenneth Michael '72	MO A Hippe, Thomas Gillman '75	NC F Dudley, John Gary '73	TX A Yen, Gary Po-Chuan '16
CA T Bui, Jim '12	IN E Mereau, Oliver Pierre '02	MO A Stoenner, David W. '70	NC F Kayagil, Turan Altay '07	TX B Hansen, Gracie Arlene '04
CA T Sam, Karen Nhoc '03	IA A Cullian Jr., John James '87	MO B Hartenberger, Jeffrey '73	ND A Dunnell, Nathaniel C. '01	TX F South, Hugh Miles '71
CA Y McNinch, James E. '82	IA A Kurr, Amy Catherine '18	MO B LaBundy, Jeffrey J. '07	ND A Wahlgren, Jon Michael '96	TX A Brown, Robert Calvin '51
CA Y Miller, Samuel Price '06	IA A Mukherjee, Subhransu '90	MO B Sides, Andrew '15	ND B Bartholmy, David W. '79	TX A Johnson, Max Edward '97
CA Y Radimsky, Anne-Louise '63	IA A Wassef, Wagdy G. '91	MO F Fleschner, William L. '67	OH A Andersen, Kayla B. '17	TX A McIver, Jes David '51
CA X Rayes, Ramseen Bill '18	KS A Cronemeyer, Donald C. '45	MO F Moerner, William Esco '75	OH B Knapp, Gregory W. '81	TX A Pensock Jr., Edward P. '83
CAAA Mow, Maurice '63	KS A Walter, David Wayne '74	MO F Schroeder, Nathan E. '82	OH F Bower, William Albert '50	TX A Simon, Haskell L. '53
CAAA Mantey, Patrick E. '60	KS B Longacre, Charles J. '74	MO F Stiens, Robert Russell '56	OH F Cook, James Howard '65	TX A Wagner, David '88
CO A Lockhart, Frazer R. '78	KY B Schmitt Jr., George F. '62	MO F Stone, George Oliver '66	OH F Crawshaw, James R. '54	TX A Woodall, Harold Wayne '71
CO B Kannolt, James Rodger '58	LA A Hutchinson, Jeffrey T. '68	MT A Johnson, Donald Owen '59	OH F Luth, Harold J. '64	TX Z Acosta, Ritchie A. '10
CO B Kraft, Virgil Don '55	LA A Landry, Lambert P. '67	MT A Wright, Stephen Dell '76	OH A Buda, Steven M. '88	TX I Sincuse, Judy F. '86
CT A Loshier, Morton Irving '50	LA A Rakigijia, Mirko '69	NE A Harsh, Brett Douglas '05	OH 0 Jewett, Stephen Frank '71	TX K Sowell, Dale Anthony '76
CT A Peters, Mertz Kenton '55	LA A Reed Jr., Thomas P. '81	NE A Roelle, Wayne Bertson '53	OH I Chelmins, David T. '08	TX A Gonzalez, Israel T. '73
CT F Worrlich, Colin G. '17	LA F Smith, Jerry Mickel '66	NE A Silver, Harry Irvin '71	OH A Speece, William M. '77	UT B Pittard, Matt Thurlow '01
DE A Dominy, Kenneth S. '90	LA E Gardner, Chris Sidney '91	NV A Hull-Stancliff, Erika K. '05	OH 3 Campbell, Kristin Sarah '18	VT A Lara, Nelson Rafael '73
DE A Knapp, Paul Edward '77	ME A Claudon, Lynnette W. '99	NJ A Goller, Karl Richard '52	OR A Bailey, Robert William '65	VT A Nowlan, Nicholas P. '72
DC B Winters, Patrick J. '74	ME A Furrows, Stanley D. '56	NJ A Habert, William C. '63	OR A Marx, Kenneth Donald '61	VA A Colen, Rodney Beyer '83
FL A Chin, Stanley '79	ME A Saltzman, Robert S. '50	NJ A Jansson, Peter Allan '64	OR A McLaren, James M. '72	VA A Pong, Ryan Chi-Yu '99
FL A Ferrall-Fairbanks, Meghan '12	MDA Dexter, Frederick J. '71	NJ A Kottke, William Curtis '73	PA A Granata, Dianne Marie '82	VA A Owen, William Rodney '69
FL A Knapp, Paul Edward '77	MDA Johnson, William A. '74	NJ B Catovic, Abir A. '89	PA A Kearney, Edward R. '53	VA B Harvie, Erica Jayne '13
FL G Anzalone, Alex '03	MDA Ulanowicz, Robert E. '64	NJ B Kerman, Kian '08	PA A Kiefer III, Herman E. '55	WAA Johnson, Brian E. '83
FL G Anzalone, Patricia B. '03	MD F Scioli, Blaise E. '84	NJ B Vorndran, Ronald Noel '61	PA A O'Connor, Jill Marie '88	WAA Nichols, Rebel Robert '81
FL G Levins, Jess W. '74	MAA Grimm, John Richard '89	NJ F Frattini, Bert J. '72	PA A O'Such, Frederick M. '58	WAA Rone Jr., Kenneth John '71
FL G Roberts, Maureen B. '83	MAA Kmiotek, Stephen J. '80	NJ F Gallagher, Thomas P. '90	PA B Polifko, John Terrance '70	WAB Barnes, Robert Keith '80
FL E Ungvichian, Vichate '71	MAA Skliutas, John Paul '79	NJ F Igneri, Ronald John '77	PA F Kunze, Jay Frederick '54	WAB Hirzel, David Morrow '63
FL Z Young, Timothy '07	MA B Calvano, Charles N. '70	NJ F Shilling, Norman Z. '66	PA E Purdy III, Herbert W. '59	WAB Pfeifer, Vickie Ann '83
GA A Fairbanks, James P. '16	MA B Eldred, William A. '72	NMA Subia Jr., Samuel R. '81	PA E Sobotka, Louis J. '75	WVA Alford, Steven Wayne '87
GA A Hecht, Robert Gustav '48	MA B Gelles, Stanley Harold '52	NM F Erickson, Allen Darel '14	PA Z Freed, Robert Lloyd '73	WI A Thompson, Dianne M. '79
GA A Menocal, Serafin G. '74	MA B Luthiger, Walter E. '82	NY A Altmann, Howard W. '73	PA Z Griffin, Phyllis Kay '64	WI A Thompson, William A. '78
GA A Parker, Elton L. '47	MA B Parente, Robert Bruce '58	NY A Gerson, Kelece Megan '18	PA Z Misiewicz Jr., Raymond '79	WI B Cheney, Edwin J. '60
GA A Pass, Edgar Marvin '66	MA B Walter, Robert F. '72	NY A Mucci, Thomas '84	PA 0 Dorley, Albert Joseph '87	WI F Hartwig, Aaron Michael '16

\$\$ Benefit for Members

Members may be eligible for an additional discount off their automobile insurance.

Did you know that GEICO provides a discount to Tau Beta Pi members on their auto insurance, which benefits Tau Beta Pi whenever a member gets a quote? Members could save up to an additional 8 percent on car insurance. Also, GEICO can help you find great insurance rates on motorcycle, homeowners, renters, boat, and much more. Get a free quote today to see how much you could save with GEICO. It will be a very wise decision! Visit <https://www.geico.com/landingpage/member-discount/?logo=17829> or call 1-800-368-2734 for your free quote.



Executive Director's Report

By: **Curtis D. Gomulinski**, Michigan Epsilon '01



The Wisconsin Alpha Chapter hosted its 20th annual Pi Mile Run in 2019.

OVERALL, the year 2018-19 was good in many respects, but trust investments dropped due to the volatile market. Support by alumni through volunteer efforts and annual contributions was strong, but the number of donors continued to drop. Corporate and university financial support of the Convention remained high. The 6th annual Tau Beta Pi Day was held on March 14. Over 135 collegiate and alumni chapters again held events in conjunction with the celebration. Over 18,200 members now receive *The Bent* electronically which is an increase of 3,200 members over last year. A new recruiting website targeted to candidates was launched, and interest in maintaining a relationship or reconnecting with the Association continued to be strong with hundreds of members attending conferences and alumni events.

CHAPTERS

No new collegiate chapters were installed during the year. Colorado Gamma requested that their charter be returned with the resumption of engineering education at the University of Denver. The Convention granted the request, and new members were initiated and the chapter was reactivated during Convention.

Inspection committees visited

the University of Texas at Dallas in November and the University of Arkansas at Little Rock, and petitions from these schools will be considered by the 2019 Convention. One petition for a new chapter was received, and an inspection team will visit the local engineering honor society at Georgia Southern University this fall.

One alumni chapter was reactivated (Columbus, OH); 45 of 78 alumni chapters are active.

A total of 233 collegiate chapters (212 in 2018) completed annual surveys that listed approximately 2,363 projects. A report on the contents of the survey will be published in the November 2019 issue of *The Bulletin*.

MEMBERSHIP

The chapters initiated 8,613 members in 2018-19, down 723 (7.7%) from last year. This included 8,207 undergraduates, 331 graduate students, 39 alumni, and 36 eminent engineers. Tau Beta Pi's initiated membership on July 31, 2019, was 602,043, and an estimated 67,000 are deceased.

During the year, about 57,800 engineering students in the 248 TBPi chapter schools were scholastically eligible for membership in the top fifth of their senior or the top eighth of their junior classes. About 30% of

these were members of TBPi at the close of the year—up from 32% last year. About 2% were not initiated, chiefly because of their chapters' failure to hold spring ceremonies. The remaining 66% indicated a lack of interest in membership, unchanged from last year.

Tau Beta Pi chapter schools graduate about 89.7% of all B.S. engineers at 450 schools with ABET EAC-accredited programs and 16 schools without accreditation.

Twenty-nine chapters held only one election and initiation of new members, no school did not conduct an initiation, and all others held two or more. One chapter held an initiation without approval. Three members resigned during the year, and none were expelled.

CONVENTION

The 113th Convention was held October 11-13, 2018, in Denver with the Front Range Alumni Chapter and Colorado Alpha, Beta, and Epsilon as hosts. The meeting was fully reported in the Winter 2019 issue of *The Bent* and the November 2018 issue of *The Bulletin*. The 2019 Convention will be hosted by the Ohio Gamma, Delta, and Iota Chapters in Columbus.

The Convention approved amendments to clarify graduate

student eligibility, adjust when the Advisory Board approves graduate student eligibility and when documents are submitted; clarify a District Director's role in mediating candidate activity disputes; allow the Executive Council and Convention to modify programs; change the deadline for Executive Council nominations, adjust when Executive Council nominations are allowed from the floor, and refine the Executive Council election process, which were ratified by the chapters and reported in the Winter 2019 issue of *The Bent*.

The Convention approved the request to reactivate Colorado Gamma; approved changes to the petitioning process; left reimbursement rates for the 2019 Convention at levels set for the 2018 event; made recommendations to the Executive Council regarding the Association's finances; approved changes to the instructions for the ritual; accepted the invitation from Tennessee Alpha and the Great Smoky Mountains Alumni Chapter to host the 2021 Convention; approved a new logo and recommended changes to the website and branding; granted two program appeals; amended the Constitution to require programs that are not ABET-EAC accredited or have the same name of an ABET-EAC accredited program be appealed and approved by Convention; elected two new members and re-elected one member of the Executive Council; and made several recommendations to the Executive Council for further study.

OFFICIALS

The TBP Executive Council, with term expirations, includes President W.B. Paugh and Councillors G. Youssef and M.M. Youssef (2019); Secretary S.E. Fable, Treasurer S.L. King-Monroe, and Vice President C.C. Smith (2020); and Councillors R.K. Alexander, G.J. Morales, and R.W. Pierce (2021). Council meetings were held on Aug. 25, Oct. 10, 12 & 13, Nov. 11, and Dec. 1, 2018, and Jan. 19, Feb. 9-10, Apr. 4, May 8, June 29-30, and July 10, 2019. Tau Beta Pi has five appointed directors with responsibilities in major areas of its interest: K.L.

District Directors			
District 1	Kaleia Kramer Haley H. Smestad Lauren J. Swett	District 8	Bruce A. DeVantier Thomas F. Schaub Jr.
District 2	Anthony M. Olenik Thomas A. Pinkham IV Jason Rogan Lara L. Spinelli	District 9	K. Cody Johnson Raymond P. LeBeau Will D. Lindquist
District 3	Christopher C. McComb Jon M. Sonstebly Mary Ann Susavidge	District 10	Madison R. Herman Gary L. O'Day Jr. Jose E. Suarez
District 4	Joseph P. Blackford Russell L. Werneth	District 11	Christina M. Harrison James C. Hill
District 5	David J. Cowan Jr. Josuan Hilerio-Sanchez Meghan C. Ferrall-Fairbanks	District 12	George K. Miyata Gregory M. Newcomb Matthew T. Pittard
District 6	Andrew I. Doyka S. Thomas Stewart Ellen S. Styles	District 13	Allen D. Erickson C. Christopher Stemple
District 7	Michael J. Hand III Lauren H. Logan Warren C. Roos Tonya J. Whitehead	District 14	Ian J. Frank Janette A. Keiser
		District 15	Aaron R. Alpert Daniel T. Kruusmagi Christopher W. Potts
		District 16	Neal T. Bussett Sam Rokni
Engineering Futures Facilitators			
District 1	Michael D. Czebatul Stephen K. Kramer	District 10	Stewart R. Baskin Nancy F. Gray
District 2	Annette M. Brenner	District 11	Kirstie T. Weimer
District 3	Christie R. Hasbrouck Christopher C. McComb Andrea J. Pinkus	District 12	Amy C. Kurr
District 4	Joseph P. Blackford Richard Della Rovere	District 13	Wayne B. Paugh
District 5	Vanessa A. Bechtold	District 14	William P. Cleveland Dennis J. Tyner
District 6	R. Tracy Choat Wendy A. Harper Ellen S. Styles	District 15	Cheryl Cheng Diana Hasegan Janette A. Keiser Felipe A. Leon Dennis A. Negron Rivera Julia M. Nolan Russell W. Pierce Angadbir S. Sabherwal
District 7	Y. Andy Boucher Dirk J. Colbry Kathleen L. Colbry	District 16	Yue C. Chang Stephan L. King-Monroe Scott V. Eckersall
District 8	Matthew W. Ohland		
District 9	Timothy J.F. Luchini		

Colbry as Director of Engineering Futures, E.J. D'Avignon as Director of Rituals, T.E. Gomulinski as Director of Alumni Affairs, S.L. Forkner as Director of the District Program, and S.J. Steadman as Director of Fellowships. Members of the Fellowship Board include R.E. Efimba, L.W. Faidley, S.C. Fantozzi, and A.M. Richards. The Trust Advisory Committee, which directs investment activities of the corporate trustee, includes R.F. Smith (chair), H.W. Lange, and J.W. Johnson Jr.

District Directors and Engineering Futures Facilitators as of July 31 are listed above.

The International Headquarters staff, which is located on the Knoxville campus of the University of Tennessee, includes members Executive Director C.D. Gomulinski, Major Gifts Officer S.D. Jennings-King, Member & Chapter Services Representative A.P. Karnauch, and thirteen additional employees (see tbp.org/HQ).

AWARDS

Tau Beta Pi's top chapter prize, the R.C. Matthews Outstanding Chapter Award, was bestowed on Ohio Iota for the excellence of its total pro-

gram in 2018-19. Honorable mentions went to Alabama Epsilon and Michigan Gamma. The R.H. Nagel Most Improved Chapter Award was given to New Mexico Beta; an honorable mention went to Arkansas Alpha. J.D. Froula Most Improved Membership honors were extended to New Jersey Delta; honorable mentions were presented to Massachusetts Theta and Oklahoma Gamma.

The Headquarters staff gave 28 Chapter Excellence Awards (successor to the Secretary's Commendation and the Membership Award) to chapters for high quality reporting, excellent chapter operations, and a commitment to improving initiation rates. Chapter Project Awards were presented to 32 chapters for ingenuity and creativity in activities.

MEMBER AWARDS

The 2019 Outstanding Advisor was selected by a committee of past winners: E.A. Stephan, Ph.D. (chair); B.L. Walcott, Ph.D, and R.L. Ward, Ph.D., P.E. The recipient of a \$1,000 cash award and an equal sum to be presented to his dean's discretionary fund is Kurt P. Rouser, USAF (ret.), Ph.D. *OH H '11*, Oklahoma Gamma's Chief Advisor. [See page 11.]

The alumnus recognition selection committee consists of three District Directors: M.C. Ferrall-Fairbanks (chair), D.T. Kruusmagi, and R.P. LeBeau. They were charged with selecting the recipients of the TBII-McDonald Mentor Award and the Distinguished Alumnus Award. The 2019 TBII-McDonald Men-

tor will be presented to Martha C. Mitchell, Ph.D., *WI A '89*. The 2019 Distinguished Alumnus Awards will be presented to Wayne T. Davis, Ph.D., *TN A '73*; David L. Ford Jr., Ph.D., *IA A '67*; William E. Jennings, *GA A '85*; and Abdallah H. Yabroudi, *NY B '78*. [See pages 10, 14-15.]

The 2019 Laureates were selected by a committee of three District Directors: J. Hilerio-Sanchez (chair), C.C. McComb, and M.L. Morris. They chose four Laureates from eight nominees made by ten chapters. The 2019 Laureates are Casey Main, *IN Δ '20*; Kendra K. Noneman, *ID Γ '20*; Rose C. Ridder, *PA K '20*; and Kelli L. Swenson, *WI Γ '19*. [See pages 12-13.]

During the year, the Executive Council gave 21 Resolutions of Appreciation, 5 Distinguished Service Awards, and 3 Superior Service Awards to collegiate chapter advisors and Association Officials for service to TBII.

PROGRAMS

Sixteen districts held at least one conference last year and conducted meetings during the 2017 Convention, and directors visited many chapters during the year. The Council continued the suspension of the June 2019 meeting to reduce expenses.

ENGINEERING FUTURES

The Engineering Futures Program presented a total of 149 training sessions to 3,406 individuals by 37 volunteer facilitators to develop the leadership skills of student members during 2018-19. This award-winning program helps prepare engineering students for their careers by enhancing their overall personal effectiveness through interpersonal skills and teamwork-development seminars.

FELLOWSHIPS

The 86th fellowship group, comprising 37 students, 35 with financial support, will do graduate work in 2019-20 and

was announced in the Summer 2019 *Bent*. Fellows with financial support are paid \$10,000 each.

GRANTS

The Council made no grant under either the Greater Interest in Government (GIG) and the Student Assistance Programs.

MINDSET PROGRAM

MindSET promotes efforts to support math and science programs that contribute to enhanced preparation of students in the K-12 system. Nearly 30 TBP chapters hosted hands-on activity sessions with local schools. At the close of the fiscal year, nearly 9,500 elementary, middle, and high school students had participated in MindSET sessions. In 2018-19, 11 grants totaling \$1,930 were issued to 8 chapters for MindSET projects. In addition, 25% of collegiate chapters report participating in K-12 and tutoring activities last year.

SCHOLARSHIPS

The 21st group of 289 TBII Scholars, who will complete their undergraduate engineering studies in 2019-20, are announced in this issue. [See page 24.] All Scholars receive a cash grant of \$1,000 or \$2,000 for their senior academic year. Since the program began in 1998, Tau Beta Pi has given and committed more than \$6,000,000 to 3,087 students.

In the TBII Chapter Performance Scholarship Program, \$9,000 in scholarships were available to students selected by 18 chapters.

Six \$1,000 scholarships were funded by the Society (for a 21-year total of 130) in 2019-20 for incoming freshman engineering students through the national program conducted by the Society of Automotive Engineers (SAE).

FINANCES

The financial condition of TBII at the close of the fiscal year was weakened by substantial capital losses in the trust, which were partially offset by high dividends and distributed capital gains. Excess expense over revenue was \$766,000. Assets decreased in 2018-19 by \$696,000 to a total of \$31,672,000.

Top 10 Fellowship and Scholarship Funds by Value on July 31, 2019		
Fund	2018	2019
Record Scholar/Fellow Fund	\$6,212,000	\$5,909,000
Stabile Scholarship Fund	\$5,121,000	\$4,868,000
TBP Fellowship Fund	\$2,500,000	\$2,411,000
Forge Scholarship Fund	\$621,000	\$524,000
Anderson Fellowship Fund	\$436,000	\$414,000
Dodson Scholar/Fellow Fund	\$422,000	\$400,000
Stark Fellowship Fund	\$400,000	\$398,000
Best Fellowship Fund	\$371,000	\$370,000
Zimmerman Fellowship Fund	\$340,000	\$329,000
Forge Fellowship Fund	\$335,000	\$283,000

FINANCIAL POSITION STATEMENT

The several named trust funds are commingled and invested under the jurisdiction of the TBP Trust Advisory Committee. The trustee is the trust department of the PNC Bank in Cleveland, OH, and performed satisfactorily during the year.

Investment earnings of the funds, less trustee fees and including capital gains, are used for the purposes indicated by the fund titles: paying fellowship and scholarship stipends, paying for *Bent* magazines delivered to life subscribers, paying project grants to chapters in the MindSET and Greater Interest in Government Programs, supporting the Convention, and financing many useful activities of the collegiate chapters. A breakdown of the portion of the trust for each major program area is shown to the right. Overall, net earnings of the investments, including security sales and market gains, were -0.4%; the previous year's figure was 10.6%. Paid investment earnings were \$2,790,000; net investment market losses were \$2,897,000.

Securities held by the trustee on July 31, 2019, are carried at market value of \$28,531,000, a decrease of 3.0% from the previous year, and comprise holdings in 15 non-overlapping, no-load mutual funds. Equity securities constituted 90% of the total trust funds.

The current liability in fellowships and scholarships is for those stipends committed in 2018-19 for payment in 2019-20 to student recipients. The 2019 Convention liability includes the assessments paid by new initiates during the year and \$39,000 in gifts from corporate and university sponsors. The deferred *Bent* subscription liability is for both annual subscriptions and the four-year subscriptions for new members included in the Association's initiation fee. The liability for delivering future magazines under four-year subscriptions is entered on the books at the time of initiation.

The decrease in *Bent* life subscription liability was countered by 90 new life subscribers. Life subscription fees are recorded as a liability because of the commitment against the annual earnings of those fees to pay for copies of *The Bent* to

be delivered. This liability represents the total value of all life subscriptions in force on July 31, 2019, at their enrollment-fee prices, less an actuarial proportion of \$1,334,000 recognized as revenue since 2004. Upon the death of a life subscriber, their paid fees are transferred on the books to the Fellowship Fund and are reported as revenue.

The net assets of the Association decreased by \$760,000 mainly due to the loss of value in the trust of \$888,000 which was partially offset by an increase in pledges receivable of \$94,000. A subsidiary report details the changes during the year in individual funds, which posted mixed results due to market volatility.

STATEMENT OF ACTIVITIES

Chapter and initiation fees (shown less *The Bent* subscription and Convention support) decreased by \$25,000 primarily due to a lower number of initiates.

Convention revenue consists of assessments for the 2018 Convention, \$79,000 in gifts, and \$95,000 from alternate delegates and visitors.

Bent publication revenue decreased by \$6,000 due to reduced recruitment advertising which was partially offset by the increased four-year subscription price; expenses rose by \$2,000 due to increased

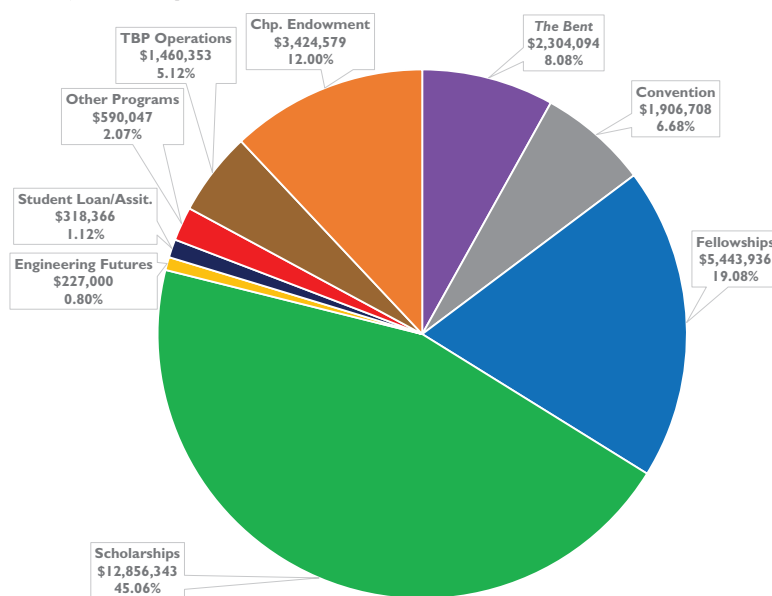
printing costs. Total investment earnings and market gain on the Life Subscription Fund decreased by \$279,000. In 2018-19, the invested fund lost \$0.04 per life copy delivered, compared with the previous year's earnings of \$1.78. Expenses per life copy exceeded revenue by \$0.96, versus last year's gain of \$0.84 per copy.

The total of interest and dividends in 2018-19 increased by \$1,406,000. The net loss on investments was \$2,897,000 reflecting reported changes in market value.

The 11 major chapter programs (denoted with a (C) in front of their name under Expense) usually reflect an operating loss. Convention expenses dropped by \$52,000 and include the cost of attendance by one student delegate from each collegiate chapter, alternate delegates, alumnus delegates, chapter advisors, and visitors—but not by Association Officials. Part of the increase reflects a more expensive Convention location, offset in part, by changes to reduce on-site expenses.

Expenses for fellowships and scholarships rose by \$54,000 because more scholarships and fellowships were given. Revenue for these awards includes matching gifts from corporations, alumni contributions specifically earmarked by donors, and trust earnings. Fellowships and scholarships comprise the major

Major Components of the Trust Investments on July 31, 2019



THE TAU BETA PI ASSOCIATION

STATEMENT OF FINANCIAL POSITION

On July 31, 2018 and 2019

ASSETS			LIABILITIES AND NET ASSETS		
<i>Current Assets</i>	<i>2019</i>	<i>2018</i>	<i>Current Liabilities</i>	<i>2019</i>	<i>2018</i>
Cash and cash equivalents	\$ 594,751	\$ 551,834	Accounts payable		
Accounts receivable			Chapters	\$ 19,973	\$ 5,300
Chapters	78,809	66,494	Laureate awards	14,000	7,000
Student loans	18,071	20,092	Fellowships/Scholarships	937,160	873,800
<i>Bent</i> life subscription installments	3,908	1,707	Other	11,314	13,719
Pledges	393,171	299,249	Accrued expenses	56,852	56,108
Trust contributions	2,000	0	Deferred Convention revenue	146,430	158,910
Other	21,453	28,170	Deferred <i>Bent</i> revenue, current	110,534	99,120
<i>Total Receivables</i>	517,412	415,712	Annuities payable, current portion	26,137	19,037
Inventory	60,821	47,537	<i>Total Current Liabilities</i>	1,322,400	1,232,994
Split-interest agreements, cur. portion	84,354	82,424	Deferred <i>Bent</i> subscription revenue	78,535	123,241
Prepaid expenses	42,109	27,664	<i>The Bent</i> life subscriptions	1,070,507	1,085,037
<i>Total Current Assets</i>	1,299,447	1,125,171	Annuities payable, net of cur. portion	118,995	79,353
<i>Depreciable:</i> Furniture and equipment	144,692	144,084	<i>Total Long-term Liabilities</i>	1,268,037	1,287,631
Less accumulated depreciation	(115,027)	(113,634)	TOTAL LIABILITIES	\$ 2,590,437	\$ 2,520,625
<i>Total Depreciable</i>	29,665	30,450	<i>Net Assets</i>		
<i>Other Assets</i>			Unrestricted:		
Investments	28,543,095	29,430,630	Undesignated	367,843	347,724
Split-interest agreement, net of cur. portion	799,451	781,151	Designated	8,160,870	8,888,999
<i>Total Other Assets</i>	\$29,342,546	\$30,211,781	Donor restricted	19,552,508	19,610,054
TOTAL ASSETS	\$30,671,658	\$31,367,402	TOTAL NET ASSETS	\$28,081,221	\$28,846,777
			TOTAL LIABILITIES & NET ASSETS	\$30,671,658	\$31,367,402

Financial statements have been audited.

philanthropic program of the Society—made possible by gifts from alumni, friends, and participating corporate firms.

CONTRIBUTIONS FROM ALUMNI

Total contributions and bequests increased by \$60,000 during the fiscal year. An increased number of designated gifts for scholarships, fellowships, and professional development represent most of this increase. Support by alumni amounted to gifts totaling \$1,863,000 (down 9.4%) from 8,900 donors (down 7.9%), including 367 donations from new donors (up 8.9%). Unrestricted giving totaled \$1,020,000 from 8,816 donors versus \$1,023,000 last year from 9,570 donations. Their names were published in each issue of *The Bent*. Included in the total is \$34,000 allocated to the Fellowship and Scholarship Programs from 297 companies that match gifts from employees.

The Society discontinued its affiliation with the CFC in 2017 due to

increased expenses which will have negatively impacted the funds. Tau Beta Pi still received over \$1,200 in CFC support this year.

INITIATION FEES

Tau Beta Pi's low Association initiation fee covers the cost of the official badge, membership certificate, copies of the *Constitution and Bylaws* and *Information Book*, and a four-year subscription to *The Bent*. The initiation fee has been \$55 since August 1, 2016, and includes \$10 that is used for partial support of the annual Convention.

STUDENT LOANS

One new loan was made to a member in 2018-19. Two loans were repaid, none were written off during the year, leaving 10 outstanding on July 31, 2019, with a principal balance of \$18,071. Since inauguration in 1932 of the program, 1,805 loans have been made to student members for a total of \$905,500.

PUBLICATIONS

During 2018-19, the four issues of *The Bent* contained a total of 208 pages, and 385,000 copies were delivered to paid subscribers. This represents no change in paid copies above the previous year's circulation total. Engineering and graduate-school recruitment advertising for the year totaled 2 pages, a 71% decrease from the previous year. Total production cost of the magazine per paid copy was \$0.92, down from \$0.94 the preceding year.

New *Bent* life subscribers numbered 90 (up from 80), bringing total life subscriptions to 80,564. Of all the life subscribers enrolled since 1929 when the plan was instituted, 14,894 are deceased, and their fees totaling \$441,700 have been transferred to the Fellowship Fund in accord with the Constitutional requirement.

An average of 27 copies per issue in 2018-19 was delivered to annual renewal subscribers, 36,153 copies to original four-year subscribers, and

THE TAU BETA PI ASSOCIATION

STATEMENT OF ACTIVITIES

	For the year ended July 31, 2019			For the year ended July 31, 2018		
	<i>Donor</i>			<i>Donor</i>		
REVENUE	<i>Unrestricted</i>	<i>Restricted</i>	<i>Total</i>	<i>Unrestricted</i>	<i>Restricted</i>	<i>Total</i>
Initiation and chapter fees and fines	\$ 287,644		287,644	312,203		312,203
Chapter and individual sales	185,876		185,876	184,877		184,877
Contributions and bequests	1,205,170	713,114	1,918,284	1,153,056	705,349	1,858,405
Convention	267,158		267,158	261,660		261,660
<i>Bent</i> publication	148,930		148,930	143,221		143,221
Net life subscription fee transfer	21,940		21,940	47,241		47,241
Student loan interest	1,490		1,490	2,229		2,229
Miscellaneous/ Net gain on equipment sales	35,167	1,000	36,167	11,923		11,923
Interest and dividends	1,041,551	1,819,317	2,860,868	539,612	914,874	1,454,486
Net gain (loss) on investments	(1,080,657)	(1,816,118)	(2,896,775)	564,596	896,386	1,460,982
Change in value of split-interest agreements			20,230		6,633	6,633
Net assets released from restrictions	795,089	(795,089)	0	707,642	(707,642)	0
TOTAL REVENUE	<u>2,909,358</u>	<u>(57,546)</u>	<u>2,851,812</u>	<u>3,928,260</u>	<u>1,815,600</u>	<u>5,743,860</u>
EXPENSE						
Program services						
(C) Advisor Program	27,805		27,805	24,967		24,967
Alumni Program	58,075		58,075	63,907		63,907
<i>Bent</i> publication	353,471		353,471	351,872		369,821
(C) <i>Bulletin</i> production	21,433		21,433	22,056		22,056
(C) Chapter and initiate supplies	374,390		374,390	346,253		385,780
(C) Convention	627,329		627,329	575,484		575,484
(C) Cost of chapter and individual sales	168,240		168,240	160,529		160,529
(C) District Program	228,619		228,619	238,843		238,843
(C) Engineering Futures Program	122,290		122,290	133,887		133,887
Fellowship & Scholarship Program	1,008,935		1,008,935	955,165		955,164
(C) Greater Interest in Government Program	5,403		5,403	5,723		5,723
(C) K-12 MindSET Program	34,586		34,586	37,533		37,534
(C) Laureate Program	14,657		14,657	11,609		11,609
McDonald Mentor Program	6,043		6,043	4,633		4,633
(C) Student Assistance Program	2,378		2,378	2,449		2,449
Student Loan Program	6,538		6,538	6,783		6,783
<i>Total program services</i>	<u>3,060,192</u>		<u>3,060,192</u>	<u>2,941,693</u>		<u>2,999,169</u>
General and administrative	301,564		301,564	387,180		319,756
Alumni Giving Program	255,612		255,612	277,159		287,109
TOTAL EXPENSE	<u>3,617,368</u>		<u>3,617,368</u>	<u>3,606,032</u>		<u>3,606,034</u>
CHANGE IN NET ASSETS	(708,010)	(57,546)	(765,556)	322,228	1,815,600	2,137,825
Net assets, beginning of year	9,236,723	19,610,054	28,846,777	8,914,495	17,794,454	26,708,952
Net assets, end of year	\$8,528,713	19,552,508	28,081,221	9,236,723	19,610,054	28,846,777

Financial statements have been audited.

59,996 copies to life subscribers, for a total of 96,175 paid copies per issue. The total number of paid copies for the Summer 2019 magazine was 96,656.

The Association is indebted to the alumni who serve as judges and writers of the Brain Ticklers column: H.G. McIlvried III, Ph.D. (chair), J.C. Rasbold, J.R. Stribling, Ph.D., and F.J. Tydeman.

THE BULLETIN

During 2018-19, the four issues contained a total of 43 pages, and no copies were printed. All issues are

available on the website. Published chiefly for sharing information with student members, officers, and advisors of the collegiate chapters, the newsletter is a valuable means of exchanging project ideas and distributing advice and guidelines related to chapter operations.

OTHER COMMUNICATIONS

New editions of the *Constitution and Bylaws and Eligibility Code* and the *Information Book* were printed in August 2018 and November 2019, respectively. Other brochures and materials were updated

and reprinted throughout the year.

Tau Beta Pi's presence on social media continued to increase. Over 28,563 members are part of our LinkedIn group, 1,136 people follow @taubetapi on Twitter, 4,709 people "like" TBPI and 534 people are in the "Tau Beta Pi for Members" group on Facebook, and over 4,500 people read our blog with daily news over 6,000 times last year. The website has received over 84 million visits since its creation and contains a wealth of information about the Society. Visit tbp.org to find the latest TBPI news!

The condensed style of these notices of death is made necessary by the Association's large membership and space limitations in The Bent. You may email or write 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, with appropriate details, including date of death and full name. You may report the death of a member by sending an email to chapter.eternal@tbp.org.

- AL A '47 **Pfrimmer, John Gray**; June 17, 2019.
'65 **Bedsole, James Arthur**; June 9, 2019.
- AL B '56 **Krout, Claude Richard**; July 4, 2002.
- AZ A '54 **Dickson Jr., Paul Wesley**; May 14, 2019.
'54 **Dudley, Donald G.**; January 2, 2007.
'55 **Christiansen, Richard Anton**; November 5, 2016.
- AZ B '79 **Van Rennes, Jerry Wayne**; July 23, 2019.
- AR A '53 **Winters, Paul Nixon**; no details.
'54 **Harvey, Edward M.**; June 5, 2017.
- CA A '56 **Keller, Robert Edward**; May 21, 2007.
'81 **Yoshioka, Alan James**; July 28, 2019.
'88 **Girouard, Forrest Richard**; no details.
- CA Γ '50 **Kirtland, John Avery**; April 22, 2019.
'55 **Nilsson, Nils John**; April 23, 2019.
'58 **Jones, Gordon Blanding**; June 17, 2019.
'61 **Kennedy, Robert Phillip**; December 30, 2018.
- CA H '69 **Noonan Jr., John T.**; April 17, 2019.
- CA K '67 **Holley, William Edwin**; October 5, 2017.
- CA M '56 **Fabricius, Eugene David**; October 22, 2016.
- CO A '48 **Allen, Bernard Wayne**; no details.
- CO B '56 **Gish, Robert Carlton**; August 7, 2005.
'57 **Gilbert, William Charles**; September 6, 2018.
'57 **Moss, Arthur Robert**; October 11, 2014.
- CT A '49 **Stanley, Thomas Osborne**; January 14, 2019.
- CT B '68 **Joakim, Michael Anthony**; July 9, 2019.
'79 **Dzubay, John Robert**; June 20, 2019.
- DE A '55 **Olson, Jon Hanning**; October 26, 2014.
- DC Γ '54 **March Jr., Joseph W.**; March 22, 2001.
'63 **Rawdon-Smith Neel, Faith**; December 28, 2015.
- FL A '59 **Green, Robert Hamilton**; August 2, 2019.
- FL Γ '55 **Llewellyn, John Anthony**; July 2, 2013.
- FL E '12 **Sookhoo, Allan Rajesh**; December 6, 2016.
- GA A '47 **Patterson, Malcolm**; June 29, 2005.
'48 **Winterbottom, Daniel Atherton**; no details.
'54 **Haywood, Robert Stone**; December 10, 2009.
'55 **McCord III, James Richard**; May 3, 2008.
'56 **Nevitt, John Gartrell**; January 14, 2015.
'60 **Allen Jr., Augustus T.**; July 29, 2019.
- ID A '78 **Henderson, Garr Evans**; August 2, 2016.
- IL A '44 **Roller, George Granville**; April 2, 2017.
'51 **Troupis, Donald Theodore**; December 8, 2005.
'54 **Reside, Kenneth Dale**; April 20, 2019.
'65 **Unikel, Errol**; March 1, 2018.
- IL B '52 **Wendes, Rudolph William**; November 19, 2017.
'54 **Kacek Jr., George Joseph**; November 23, 2018.
- IL Γ '51 **Stone, Richard Joseph**; November 30, 2015.
'53 **Whitmore, Donald Herbert**; no details.
- IN A '40 **Holmes Jr., Lowell Lytton**; August 10, 2016.
'48 **Bertram, Paul Frederick**; November 8, 2018.
'52 **Altschaeffl, Adolph George**; April 12, 2019.
'55 **Cottingham, William B.**; September 29, 2009.
'55 **Haubold, Frederick George**; December 23, 2016.
'56 **Asher, William Johnston**; June 22, 2019.
'56 **Martin, Tom Hugh**; June 19, 2013.
'56 **Meditch, James Stephen**; September 23, 2003.
'56 **Menke, Richard Henry**; November 21, 2018.
'56 **Ross Jr., Blair Arthur**; September 29, 2002.
'56 **Schatz, William Jackman**; June 5, 2019.
'56 **Westall, Carey Lee**; no details.
'57 **Foulds, Donald Duane**; no details.
- IN A '57 **Groves, Charles R.**; no details.
'57 **Wright, Ray Edward**; no details.
'62 **Wilmer, David Louis**; July 2, 2019.
'64 **Dunn, Philip Campbell**; April 28, 2019.
'75 **Cass, Jane Carol**; December 27, 2018.
'80 **Piepho, Richard Stewart**; June 24, 2019.
'84 **Kutz, Lawrence J.**; no details.
- IN B '43 **Winters, Frank Harrison**; March 28, 2003.
'49 **Hogg, Aaron Gilbert**; May 12, 2018.
'49 **Laughlin Jr., James Park**; January 14, 2019.
- IA A '42 **Kratz, Edward Milford**; March 16, 2004.
'47 **Pride, Richard Allen**; June 29, 2018.
'49 **Patterson, James Galser**; December 31, 2004.
'56 **Oakes, Samuel James**; August 25, 2007.
'57 **Ream, Harold Eugene**; July 18, 2007.
- IA B '48 **Beckwith, Ivan Earl**; September 19, 2007.
'50 **Herud, Frank Roger**; May 17, 2019.
'50 **Stooker, Robert Simeon**; July 4, 2002.
'55 **Rim, Kwan**; March 4, 2018.
- KS A '49 **Harry, Edward Brooke**; June 27, 2005.
'50 **Patterson Jr., Arthur Eugene**; no details.
'56 **Dunwoody, Gerald Axtell**; no details.
'69 **Goebel, Karl Bruce**; June 25, 2019.
- KS B '54 **Cook, Everett Lamar**; June 21, 2002.
- KY A '56 **Meyer, Fredrick Anthony**; May 25, 2019.
- LA A '55 **Weaver, Paul Eugene**; no details.
'56 **Vergez Jr., Jules Paul**; June 2, 2018.
- LA B '48 **Lee Jr., Griff Caliccutt**; April 3, 2018.
'50 **Nunn Jr., Walter Melrose**; no details.
'56 **Markel Jr., Henry Elmer**; June 27, 2019.
- LA Γ '50 **Scarborough, N. D.**; August 24, 2005.
'57 **Smith, Conley Paul**; April 21, 2018.
'60 **Gardner, Jimmie Wactor**; April 2, 2016.
- ME A '55 **Clark, Llewellyn Evans**; June 5, 2019.
'56 **Dunphy Jr., Wilbur John**; no details.
'56 **Griswold, Richard Bruce**; April 18, 2019.
'59 **Leach, Arlyn R.**; no details.
'62 **Walker, Stanley Edson**; May 18, 2019.
- MD A '49 **Huffington Jr., Norris Jackson**; November 11, 2016.
- MD B '48 **Hobbs, Charles Hamilton**; August 3, 2019.
'54 **Kuprenas, Algimantas Jonas**; April 21, 2008.
'55 **Krone Jr., Norris Jacob**; June 28, 2019.
- MA A '56 **Dumas Jr., Henry Joseph**; August 29, 2010.
- MA B '44 **Van Rennes, Albert Bernhardt**; May 7, 2010.
'46 **Marshall, Kenneth Aloe**; September 17, 2017.
'47 **Galeski, Edward Whitlock**; no details.
'51 **Maki, Charles Everett**; April 11, 2019.
'54 **Otis, Emmanuel John**; April 5, 2005.
'66 **Chou, Sunlin**; December 5, 2018.
- MA Δ '69 **Wethe, Barbara Gail**; November 2, 2017.
- MA E '42 **Dipietro, William Ovidio**; May 15, 2017.
'52 **Leach, Harold Hunter**; May 23, 2011.
'54 **Heffernan Jr., Joseph Francis**; June 25, 2010.
'55 **Galante, Robert Tito**; October 23, 2015.
'56 **Mahoney, John Joseph**; no details.
- MA Z '52 **Harrington, William Brendon**; December 20, 2007.
'53 **Mathews, Archie**; July 26, 2018.
'59 **Hynes, David Alvin**; June 22, 2019.
- MI A '44 **Schuman, Marvin Milton**; May 22, 2019.
- MI B '54 **Volpel, John Henry**; November 20, 2018.

MI B '56 **Mossner, William Arno**; September 18, 2018.
 MI Γ '50 **Upthegrove, William Reid**; May 25, 2016.
 '56 **Weber Jr., Walter Jacob**; October 18, 2018.
 '59 **Little, Robert Eugene**; May 25, 2019.
 '61 **Hedding, Dale Paul**; June 15, 2019.
 '72 **Samelak, David Raymond**; no details.
 '79 **Stern, Helmut F.**; January 21, 2017.
 MI Δ '50 **Roberts, Earl Alexander**; July 8, 2017.
 '59 **Fedor, Victor Aloysius**; September 28, 2018.
 '62 **Pietrzak, Henry John**; May 24, 2019.
 MI E '49 **Murphy, William J.**; June 2, 2019.
 '51 **Winters, Clifford St. John**; February 1, 2011.
 MI Z '77 **Zmyslowski, Allan John**; March 28, 2019.
 MI H '70 **Noggle, Francis Eugene**; November 16, 2016.
 MN A '45 **Bratt, Russell Irving**; February 15, 2019.
 '62 **Hustrulid, William Andrew**; April 24, 2019.
 MS A '93 **Henderson, Paul Robert**; June 18, 2019.
 MO A '49 **Tillerson, Roy Bernard**; September 20, 2009.
 '54 **McCloud, Robert James**; August 20, 2014.
 '56 **Jorden Jr., Bruce William**; February 25, 2019.
 MO B '49 **Gokenbach, Donald Clarence**; January 21, 2015.
 '49 **Hoehn, Earl Edgar**; July 11, 2002.
 '49 **Kennedy III, Thomas**; January 11, 2017.
 '50 **Dampf, Donald Peter**; June 24, 2019.
 '53 **Weber, Albert LeRoy**; no details.
 '54 **Dowell, Jack Boyce**; March 11, 2016.
 '58 **Zesch, Eugene Nicholas**; December 27, 2016.
 '59 **Bayless, Jerry Roger**; July 2, 2019.
 MO Γ '48 **Kourik, John W.**; October 23, 2017.
 '48 **Schuetz, John Pershing**; June 12, 2009.
 '48 **Wolf, William Theodore**; May 11, 2012.
 '50 **Appelman, Melvin**; November 26, 2013.
 '50 **Lapin, Jay Marvin**; June 8, 2018.
 '52 **Blanke Jr., Joseph E.**; December 7, 2017.
 '52 **Katz, Israel Norman**; January 15, 2019.
 '52 **Krone Jr., Lester Herman**; March 10, 2015.
 '56 **Michaels, Frank Houser**; August 7, 2013.
 MT A '55 **Shunk, Edward Raymond**; July 10, 2014.
 NV A '85 **Cromwell, Stephen Daniel**; June 11, 2019.
 NJ A '53 **Kepler, Laurence William**; January 20, 2007.
 '56 **Desaix, Pierre**; May 31, 2007.
 NJ B '79 **DeMaio Jr., Samuel J.**; July 25, 2019.
 NJ Γ '47 **Cohen, David S.**; June 23, 2017.
 '48 **Freundlich, Werner**; March 3, 2007.
 '56 **Benkert, Richard Charles**; no details.
 '56 **Turrin, Richard Herbert**; no details.
 '65 **Kersten, Richard Holliday**; April 26, 2019.
 NY A '50 **Bauer, Arthur Adolph**; February 20, 2019.
 NY B '51 **Sayer, Bertram**; July 12, 2019.
 '57 **Graves, Harry Weston**; August 11, 2004.
 '61 **Jensen, Herbert Karl**; June 19, 2019.
 NY Γ '50 **Maisch, John Walter**; May 7, 2019.
 '51 **Wilkinson, Richard Walter**; July 4, 2018.
 '51 **Zinman, Walter George**; June 16, 2018.
 '52 **Rothschild, Jerome Philip**; October 17, 2002.
 '53 **Stull, Frank Donald**; August 9, 2019.
 '56 **Levatich, Peter**; May 30, 2008.
 '59 **Obernesser, Michael Edwin**; April 23, 2019.
 '61 **Schneider, Allan S.**; May 26, 2019.
 NY Δ '48 **Pabo, Shirley Ann**; June 16, 2019.
 '48 **Rothschild, David Emil**; March 1, 2019.
 '52 **Goldman, Peter**; March 19, 2017.
 '52 **Livingston, James Duane**; May 7, 2019.
 '57 **Ahearne, John Francis**; March 12, 2019.
 '59 **Nestor Jr., John Wesley**; June 2, 2019.
 NY E '52 **Wrieden, Eugene George**; no details.
 '53 **Marcus, Alfred**; no details.
 NY Z '58 **Tartanian, Charles Noubar**; July 26, 2019.

NY H '42 **Stolz, John Francis**; May 13, 2015.
 '48 **Himmel, Seymour Charles**; March 19, 2016.
 NY I '55 **Strickholm, George E.**; November 15, 2006.
 NY Δ '49 **Moroney, Daniel J.P.**; May 31, 2019.
 '49 **Stein, Ralph Philip**; no details.
 NY Ξ '52 **Clark, Donald Joseph**; February 9, 2019.
 NC A '52 **Hood Jr., Edward Exum**; February 3, 2019.
 '64 **Sharp Jr., William Robert**; August 11, 2019.
 ND A '52 **Nickel, Donavon Dale**; June 22, 2019.
 '61 **Trambley, John Brian**; July 23, 2019.
 OH A '49 **Leach, Ernest Bronson**; December 29, 2015.
 OH B '43 **Winterman, Roger Earl**; October 23, 2005.
 '48 **Ryckman Jr., William David**; January 28, 2003.
 '59 **Thoene, Ralph Bernhard**; no details.
 '61 **Davis, John Adamson**; March 6, 2019.
 '61 **Thomas, James Hamlin**; October 7, 2018.
 OH Γ '42 **Bowman, David Francis**; May 24, 2019.
 '42 **Wintermute, Glenn Edward**; August 9, 2006.
 '47 **Bushnell, Robert Hempstead**; January 28, 2018.
 '49 **Bates, Paul Edward**; March 5, 2015.
 '49 **Hultz, Jack Mason**; May 12, 2019.
 '51 **Scott, Robert Manly**; August 15, 2019.
 '54 **Lackey, Robert Bush**; November 4, 2013.
 '57 **Stinogel, Robert**; June 4, 2019.
 OH Δ '53 **Bishop, John Daniel**; no details.
 '57 **Essman, Joseph Edward**; August 13, 2018.
 OH E '55 **Francisco, Allen Charles**; no details.
 '77 **Lisy, Stephen**; September 26, 2018.
 OH Z '54 **Lahti, Leslie Erwin**; August 17, 2019.
 OH H '54 **Battle, Ed Len**; March 22, 2018.
 OH Θ '54 **Thomson, Robert Alexander**; August 1, 2005.
 '58 **Battenberg, Virgil Branden**; August 12, 2011.
 OH A '56 **Kay, Donald Peard**; December 31, 2005.
 OK A '44 **Herzmark, Ralph Albert**; May 8, 2019.
 '44 **Turkington, Donald Barton**; March 10, 2016.
 '50 **Patterson, Leon Leslie**; July 23, 2007.
 '92 **Ciulla Jr., Peter**; July 12, 2019.
 OR A '50 **Kerrebrock, Jack Leo**; July 19, 2019.
 PA A '45 **Iacocca, Lido Anthony**; July 2, 2019.

LEHIGH PENNSYLVANIA



Lido (Lee) A. Iacocca, PA A '45, passed away on July 2, 2019, at the age of 94. He was a "visionary automaker" who ran Ford Motor Company and then the Chrysler Corporation. Iacocca spoke at the 1985 centennial TBII Convention at Lehigh Univ.

- PA A '47 **Matheis, Richard Anthony**; April 8, 2015.
 '50 **Hacik Jr., John**; June 15, 2019.
 '50 **Newhard Jr., Fred Jerome**; February 18, 2014.
 '55 **Kiefer III, Herman Eugene**; March 13, 2019.
 '56 **Jennings, Uel Duane**; September 29, 2018.
 PA B '83 **Fehr III, Ralph Edward**; July 19, 2019.
 PA Δ '56 **Shaw, Leonard Glazer**; October 22, 2014.
 PA Z '39 **Goldman, Albert**; no details.
 PA H '56 **Jacoby, John Zeigler**; no details.
 PA © '75 **Koller, Robert F.**; April 6, 2019.
 RI A '55 **Juergens, Walter M.**; no details.
 RI B '59 **Garreau, Roger R.**; March 27, 2019.
 SC Γ '50 **Bultman, John Parker**; November 8, 2007.
 '64 **Laier, James Emil**; May 29, 2019.
 TN A '54 **Britton Jr., John Washington**; July 24, 2019.
 '56 **Eddlemon, Joseph Donald**; June 7, 2019.
 '61 **Peishel, Frank Louis**; May 17, 2019.
 '62 **Boles Jr., Raymond L.**; May 22, 2019.
 '62 **Yahr, George Terry**; June 16, 2019.
 '72 **Simpson, David Bruce**; May 30, 2019.
 TN E '79 **Wheat Jr., William L.**; no details.
 TX A '44 **Ribe, Fred Linden**; June 19, 2019.
 '46 **Montgomery, James Irl**; May 15, 2019.
 '47 **Murphy, John Malcolm**; March 9, 2019.
 '50 **Rosenbaum, Mervin**; July 16, 2019.
 '54 **Shamblin, James Earle**; January 7, 2010.
 '56 **Davis, James Alan**; June 20, 2019.
 '63 **Caudle, Ben Hall**; February 6, 2019.
 TX B '62 **Birgel III, Stephen Harrington**; no details.
 TX Γ '56 **Dobbins, Porter King**; February 26, 2017.
 TX Δ '42 **Du Bose, Lawrence Addison**; no details.
 '43 **Nedderman, Wendell Herman**; May 8, 2019.
 '49 **Alexander, James William**; April 27, 2014.
 '49 **Haywood, Joseph Lee**; no details.
 '49 **Michels, Edward Conrad**; December 31, 2008.
 '51 **Keelan, Dare Kendall**; no details.
 '55 **MacKin, John Gilman**; September 16, 2015.
 '55 **Newsom, Melvin Max**; August 6, 2005.
 '55 **Purcell, John Thomas**; January 18, 2018.
 '56 **Sweet, Harry Jerome**; June 27, 2001.
 '58 **Jordan, Gerald Lane**; March 10, 2019.
 '58 **Lam, Carroll Frank**; August 2, 2019.
 '58 **Mundkowsky, William Fredrick**; August 5, 2013.
 '59 **Langston, James Robert**; July 25, 2019.
 '60 **Poobrasert, Suparb**; no details.
 TX H '75 **Conley, Walter Thomas**; no details.
 TX I '56 **Wright, Edwin Shelby**; March 23, 2002.

IN MEMORY

Leslie E. Lahti, Ph.D., *Ohio Zeta '54*, passed away on August 17, 2019, at the age of 87. "Les" served as Dean of engineering (1980-88) and a professor of chemical engineering (until 1995) at the University of Toledo. He was awarded the Ohio Engineering Educator of the Year in 1978.

William R. Sharp Jr., *North Carolina Alpha '64*, passed away on August 11, 2019, at the age of 76. His 50-year career with Newport News Shipbuilding and Dry Dock Company included a number of engineering and managerial roles. In 2015, he was recognized by Newport News Shipbuilding as a master shipbuilder. In addition, Sharp enthusiastically supported Rotary International's polio elimination efforts and was recognized as a Paul Harris Fellow for his efforts.

- UT A '56 **Bona, Blair Earl**; November 21, 2017.
 '68 **McLatchy, Michael John**; July 10, 2017.
 VA A '41 **Mason, Julien Jaquelin**; July 23, 2014.
 VA B '43 **Whitmore Jr., Lester McClellan**; July 18, 2008.
 '47 **Powers, Herman Goldsborough**; April 28, 2019.
 '47 **Whitmore III, Clarence W.**; February 28, 2009.
 '49 **Brooks, Roger Raymond**; December 14, 2011.
 '49 **Camden Jr., Hubert Norvel**; no details.
 WAA '39 **Adderson, Francis Marvin**; August 31, 2011.
 '41 **Pardee, Otway O'Meara**; December 4, 2018.
 '49 **Leach, Paul Clark**; June 2, 2006.
 '50 **Maguire, James Hirtz**; no details.
 '50 **Pugel, James Donald**; March 2, 2019.
 '53 **Bucknell, Richard Lee**; May 24, 2019.
 '56 **Lawrence, Donald Conrad**; no details.
 WVA '44 **Ulrich Jr., Benjamin H.**; January 11, 2013.
 '65 **Jamison II, Charles Edward**; no details.
 WI A '56 **Birner, Richard Edward**; July 31, 2006.
 '61 **Guelker, Marshall F.**; July 13, 2019.
 '69 **Lorenze, Robert D.**; January 28, 2019.
 WI B '49 **Winter, Walter Ralph**; no details.
 '56 **Pasion, Alfonso Justo**; March 6, 2018.
 '62 **White, Peter E.**; November 20, 2018.
 '67 **Talarczyk, Richard Daniel**; no details.

CHANGE OF ADDRESS ✎ THE BENT

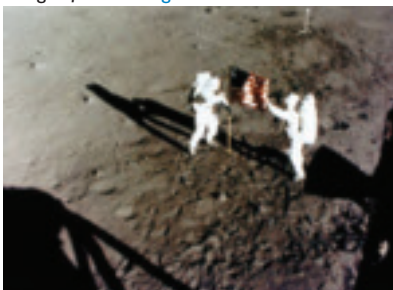
Name _____ Chapter _____ Class _____
 New Address _____ Effective date of new address _____
 New City _____ State _____ Zip _____ Email _____
 Email information to: member.update@tbp.org
 Or complete this form and mail to: *Tau Beta Pi / P.O. Box 2697 / Knoxville, TN 37901-2697*

50 Year Anniversary of Apollo 11

July 20, 2019, marked the 50th anniversary of the first man on the Moon as part of NASA's Apollo 11 Lunar Landing mission. The Apollo 11 astronauts were Neil A. Armstrong, Buzz Aldrin, MA B '62, and Michael Collins. Armstrong and Aldrin walked on the Moon on July 20, 1969. The December 1969 issue of *The Bent* magazine (www.tbp.org?Apollo11) featured an article on "Tau Bates and the Lunar Landing," which highlighted the Tau Bates who were involved with and working on the Lunar mission.



Images from nasa.gov



Top Image: Panoramic mosaic of several images taken by Armstrong at Little West Crater on the Moon (1969).

Image Above Left: Still from 16-mm film of Armstrong (left) and Aldrin setting up the American flag on the Moon (1969).



Above Image: Earthrise image of Earth from the Moon's surface taken from lunar orbit by astronaut Major Gen. William A. Anders, OH H '62, during the Apollo 8 mission (1968).



Image Left: The acrylic enclosed bent monument was taken to the Moon by pilot Anders during the Apollo 8 six-day flight mission in 1968. Anders presented the bent to the Association at the 1969 Convention in Houston, Texas. The image also appeared on the cover of the December 1969 issue of *The Bent* magazine.



Graduway[®]

Empowering Alumni
Networks

<https://tbpalumni.org/>

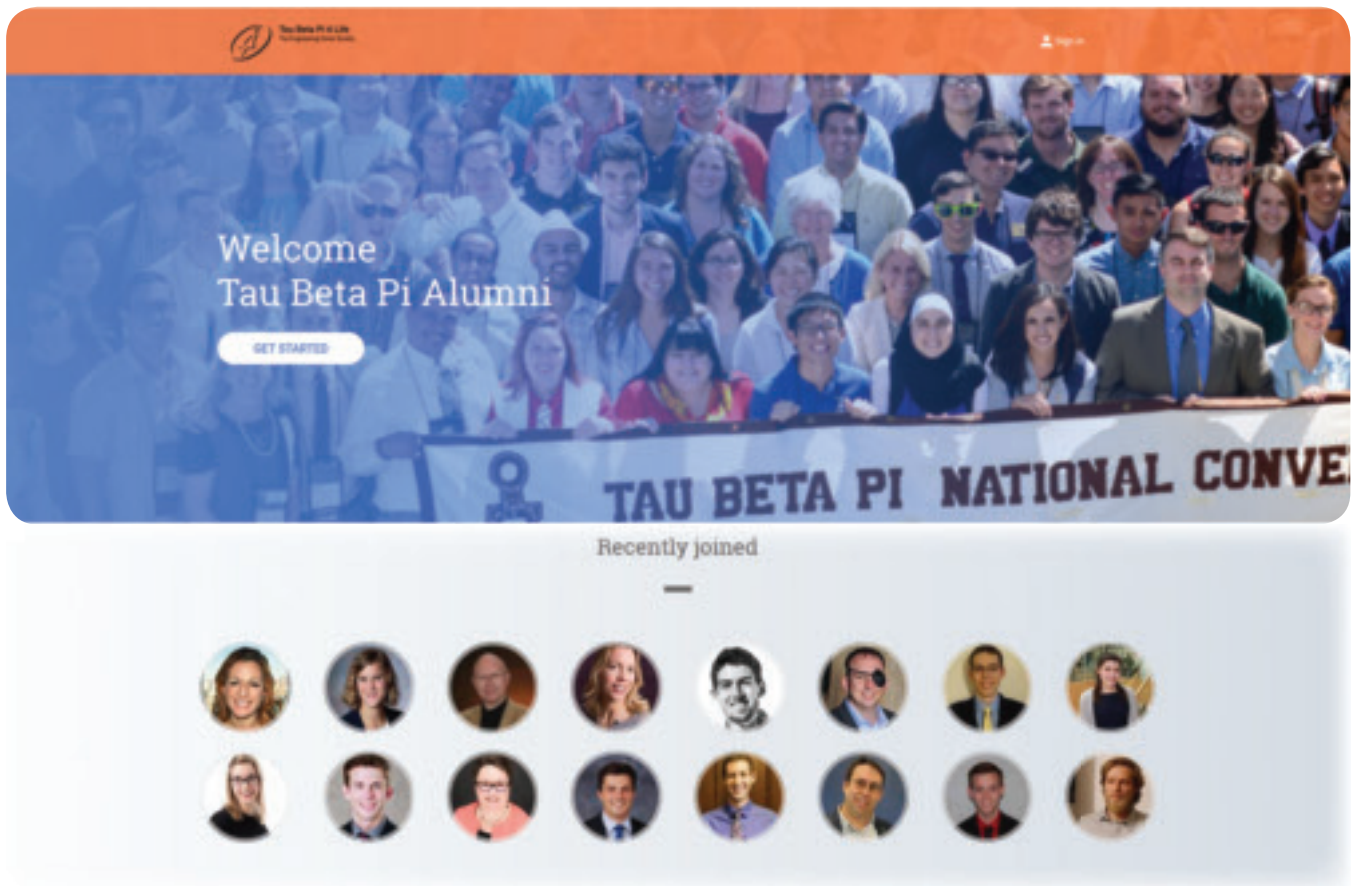
New Upgraded Alumni Platform

The **Tau Beta Pi 4 Life** community aims to bring together alumni and student members by interests, skills, and location. The platform goes beyond networking with a focus on creating mentor-mentee relationships.

Other features include registration integration with Facebook & LinkedIn, access to TBP social media platforms in one location, and job searches with free job posting.

Emails were sent about the migration from VineUp. If you did not receive an email, you can join the community at <https://tbpalumni.org/>. The VineUp URL has been removed and will not forward.

We encourage members to post events, opportunities, and reach out to student members and those in need of mentoring.



Help grow the network, Join Today!

CAPTION CONTEST

SEND US a clever caption for this photo from the *Bent* magazine photo archives. If the judges vote yours as one of the best, and you *have not* been a previous winner, you will win a TBII t-shirt of your choice.

The photo, right, first appeared in the Winter 1989 issue of *The Bent*. During the 1988 Convention at Iowa State University, District 14 Director Marcia R. Chadly, IA A '85, left, and President Martha A. Martin (now Polston), TN A '79, realized they each were given half of the same geode.

Submit your entries to pat@tbp.org or mail them to HQ by Monday, November 4, 2019.

The summer caption contest picture below, which appeared in the summer 1991 issue, shows then Secretary-Treasurer James D. Froula, left, presenting a polished, engraved Bent paperweight to Patrick A. Toole, NY T '60, senior vice president of IBM and eminent engineer initiate, during the NY Tau Chapter installation at SUNY Binghamton on March 16, 1991.

Our judges considered 46 entries from 29 members with the following results. Previous t-shirt winner James C. Hedtke, MN A '69 was the overwhelming front runner with this caption: **“By golly, you’re right! It does say ‘Made in China’.”**



Second place and a t-shirt goes to contest newbie David M. Dummeyer, AZ A '84, for his entry: **“James D. Froula and Patrick A. Toole geek out over the world’s smallest slide rule. ‘It even does logarithms,’ James points out. ‘Fascinating!’ exclaimed Patrick.”**

There was a three-way tie for third place among previous winner Yi-Hsien Doo, P.E., MI Z '81 – **“This is how you roll, er...I mean, solder a joint.”**; David Dummeyer – **“A minor incident occurred at last year’s Convention when James D. Froula used his trick pen to squirt black ink all over Patrick A. Toole’s clean white shirt.”**; and our newest t-shirt winner, William N. Pulyer, P.E., DE A '90, for his caption: **“If you look real close Pat, you can see we engraved your name in binary code!”**

All 46 terrific captions can be viewed online at www.tbp.org/pubs/captionContest.cfm.

Thanks again to all of you who have taken the time to reach out and make us laugh.



**TELL US THE
TALE...
WIN A T-SHIRT!**

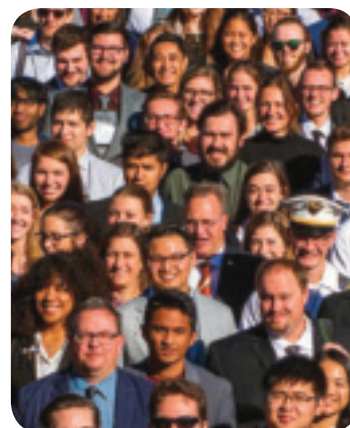
ASSOCIATION VOLUNTEERS

Tau Beta Pi would like to thank the following retiring volunteers:

Steven P. DeCabooter	<i>MI A '94</i>	Engineering Futures Facilitator for 17 years
Cathy G. Gorzkowski	<i>PA A '00</i>	Engineering Futures Facilitator for 15 years
Ed P. Gorzkowski III	<i>PA A '99</i>	Director of Districts 3 and 4 for 17 years
Justin M. Glasgow	<i>IA B '05</i>	Director of District 3 for 2 years
K. Cody Johnson	<i>AR A '15</i>	Director of District 9 for 3 years
Andrew K. Lloyd	<i>FL G '12</i>	Engineering Futures Facilitator for 3 years
Melissa L. Morris	<i>WV A '06</i>	Director of District 4 for 4 years
William W. Provett	<i>NJ G '69</i>	Director of District 4 for 1 year

Thanks to the following volunteers for serving another term:

Aaron R. Alpert	<i>CA A '10</i>	Director of District 15 for 4 years
Neal T. Bussett	<i>CA X '09</i>	Director of District 16 for 7 years
Andrew I. Doyka	<i>TN G '17</i>	Director of District 6 for 1 year
Meghan C. Ferrall-Fairbanks	<i>FL A '12</i>	Director of District 5 for 4 years
Michael J. Hand III	<i>MI G '11</i>	Director of District 7 for 3 years
Christina M. Harrison	<i>TN A '93</i>	Director of District 11 for 6 years
Josuan Hilerio Sanchez	<i>PR A '07</i>	Director of District 5 for 6 years
James C. Hill	<i>CA G '62</i>	Director of District 11 for 24 years
Janette A. Keiser	<i>AK A '76</i>	Director of District 14 for 4 years
Daniel T. Kruusmagi	<i>CA H '13</i>	Director of District 15 for 4 years
Raymond P. LeBeau	<i>VA A '90</i>	Director of District 9 for 3 years
George K. Miyata	<i>WA D '10</i>	Director of District 12 for 7 years
Dusty L. O'Day Jr.	<i>TX E '16</i>	Director of District 10 for 3 years
Anthony M. Olenik	<i>NY T '08</i>	Director of District 2 for 10 years
Thomas A. Pinkham IV	<i>MA E '88</i>	Director of District 2 for 29 years
Matthew T. Pittard	<i>UT B '01</i>	Director of District 12 for 9 years
Sam Rokni	<i>CA C '05</i>	Director of District 16 for 6 years
Warren C. Roos	<i>OH A '99</i>	Director of District 7 for 4 years
Thomas F. Schaub Jr.	<i>NY N '93</i>	Director of District 8 for 4 years
Jon M. Sonstebj	<i>PA B '95</i>	Director of District 3 for 3 years
Lara L. Spinelli	<i>NJ G '14</i>	Director of District 2 for 3 years
C. Christopher Stemple	<i>AZ A '10</i>	Director of District 13 for 4 years
S. Thomas Stewart	<i>AL A '14</i>	Director of District 6 for 1 year
Jose E. Suarez	<i>LA E '10</i>	Director of District 10 for 3 years
Lauren J. Swett	<i>ME A '04</i>	Director of District 1 for 11 years
Russ L. Werneth	<i>MD B '64</i>	Director of District 4 for 28 years



Stacey L. Forkner
WIA '96



New Director
of District Programs

Stacey is employed as a research, development & engineering manager at S.C. Johnson, earned a chemical engineering B.S. degree from the Univ. of Wisconsin-Madison, and has served as an Association volunteer, District 8 Director, since 1997. She served on the inaugural District Program Planning Committee. She has two sons, the oldest of whom is pursuing an engineering degree this fall at UW-Madison.

The four other Director roles have been reapointed: Alumni Affairs, Engineering Futures, Fellowships, and Rituals. Visit our website for information on the directors of these other departments.

www.tbp.org?Officials

ALUMNI GATHERINGS



The Milwaukee Area Alumni Chapter hosted a technical tour of Miller Park on Saturday, July 20, for alumni, family, and friends. The stadium is home to the Milwaukee Brewers of Major League Baseball. It was completed in 2001 and features include a fan-shaped convertible roof. One member noted the tour “hit it out of the park!”

Thanks to Milwaukee AC secretary Teresa J. Hutton, *WI B '91*, for submitting this image and summary.

To join an alumni chapter, contact the Director of Alumni Affairs, Tricia Gomulinski, tricia@tbp.org. Visit www.tbp.org/Memb/Alumni.cfm to check on alumni events.



The following members have been reappointed as Engineering Futures Facilitators for a new three-year term through 2020.

Stewart R. Baskin, *FL E '13*
 Andy Boucher, *MI G '08*
 Tracy Choat, *TN G '83*
 William P. Cleveland, *MS A '10*
 Mike D. Czebatul, *OK A '92*
 Richard Della Rovere, *NJ G '10*
 Amy C. Kurr, *IA A '18 (Welcome!)*
 Felipe A. Leon, *FL Q '99*
 Timothy J.F. Luchini, *SD A '11*
 Chris C. McComb, *CA R '12 (Welcome!)*
 Matthew W. Ohland, *FL A '96*
 Wayne B. Paugh, *FL G '93*
 Kirstie T. Weimer, *NY T '11*

On Saturday, July 27, the Albuquerque Alumni Chapter held a BBQ at Roosevelt Park. Members met to socialize, escape the heat, and talk about upcoming events and opportunities for the chapter. The chapter was formed in Spring of 2018 and has grown in membership and activities. The chapter regularly holds social events for alumni as well as professional development and networking events to support the local student chapters.

SERVICE ANNIVERSARIES

Director of Programs

Tricia E. Gomulinski—Alumni Affairs (6 years)

District Directors

- District 1 Kaleia Kramer (Welcome!)
District 3 Christopher C. McComb (6 years)
Mary Ann Susavidge (Welcome!)
District 4 Joseph P. Blackford (Welcome!)
District 5 Josuan Hilerio Sanchez
(6 years)
District 6 Andrew I. Doyka (Welcome!)
Ellen S. Styles (12 years)
District 7 Lauren H. Logan (Welcome!)
District 11 Christina M. Harrison (6 years)
James C. Hill (24 years)

Engineering Futures Facilitators

- District 5 Vanessa A. Bechtold (6 years)
District 7 Dirk J. Colbry (12 years)
Katy L. Colbry (18 years)
District 10 Stewart R. Baskin (6 years)
District 14 Cheryl Cheng (18 years)
Felipe A. Leon (18 years)

Special (Multi-Role)

Katy L. Colbry—Engineering Futures Facilitator
and Director of Engineering Futures
(18 years)

Tricia E. Gomulinski—District 12 Director and
Director of Alumni Affairs
(18 years)

Susan L.R. Holl—Member of Fellowship Board
and Executive Council (VP and President)
(21 years)

James D. Froula—District 12 Director, Execu-
tive Director, Secretary-Treasurer, Editor, and
Member of the Editorial Board
(42 years)

Trust Advisory Committee

- Harry W. Lange (12 years)
James J. Johnson (18 years)
Rodger F. Smith (36 years)



Executive Director Curt Gomulinski attended Don McMillan's comedy show at the Ventura Harbor Comedy Club on Saturday, August 10, while on vacation in southern California. Don is a Tau Beta Pi (Pennsylvania Alpha 1981) who won Star Search in 1993 and has entertained Convention attendees in 2014, 2016, and 2018. Don mentioned Curt and TBPi during his show which focused on geeks, nerds, and engineers. Find out more about Don at technicallyfunny.com.

HEADQUARTERS VISITORS

Molly Thomson, Guest, Oregon, WI;
August 19, 2017.

Joseph P. Blackford, DC G '95, Washington, DC;
September 15, 2017.

Robert B. Townes IV, Guest, Decatur, GA;
September 15, 2017.

James D. Froula, TN A '67, Knoxville, TN;
October 26, 2017.

Terry D. Olberding, TN A '78, Knoxville, TN;
October 26, 2017.

Debbie Nelson, Guest, Lakewood, CO;
December 4, 2017.

Michael E. Kennedy, TN A '86, Lexington, KY;
December 7, 2017.

Henry R. Hollander, Guest, Alexandria, VA;
January 10, 2018.

Phiwat Klomkaew, AL E '18, Mobile, AL;
February 26, 2018.

Larry A. Simonson, SD A '69, Rapid City, SD;
March 20, 2018.

D. Lee Cousins, SC B '93, Carmichael, CA;
April 5, 2018.

Wayne B. Bolden, TN A '82, Marietta, GA;
May 10, 2018.

Scott T. Miller, PA B '02, Albuquerque, NM;
August 17, 2018.

Richard R. Andre, NY K '96, Austin, TX;
October 4, 2018.

Raymond P. LeBeau, VA A '90, St. Louis, MO;
October 23, 2018.

C. Craig Smith, TN E '80, Knoxville, TN;
November 15, 2018.

Andrew I. Doyka, TN G '17, Cookeville, TN;
November 15, 2018.

Wayne B. Paugh, FL G '93, Greenwood Village, CO;
November 30, 2018.

RESULTS FROM
SPRING

Perfect

*Bohdan, Timothy E.	IN	Γ	'85
*Couillard, J. Gregory	IL	A	'89
*Gee, Albert	CA	A	'79
*Gerken, Gary M.	CA	H	'11
*Griggs Jr., James L.	OH	A	'56
*Gulian, Franklin J.	DE	A	'83
Gulian, Joseph D.	Son of member		
*Handley, Vernon K.	GA	A	'86
*Harvey, Arthur J.	OH	A	'83
*Johnson, Mark C.	IL	A	'00
*Marx, Kenneth D.	OR	A	'61
*Norris, Thomas G.	OK	A	'56
*Parks, Christopher J.	NY	Γ	'82
*Richards, John R.	NJ	B	'76
*Slegel, Timothy J.	PA	A	'80
*Tang, Angela L.	NY	Δ	'18

Other

Alexander, Jay A.	IL	Γ	'86
*Anderson, Kurt E.	KS	Γ	'90
Barthel, Gerald R.	OH	B	'67
Budd, Christopher M.	AZ	B	'94
*Chapman, Thomas W.	Son of member		
*Dechman, Don A.	TX	A	'57
*Foster, David E.	VA	B	'94
Grewal, Rashi	NJ	Γ	'09
*Johnson, Roger W.	MN	A	'79
*Kimsey, David B.	AL	A	'71
Lalinsky, Mark A.	MI	Γ	'77
Niemi, Michael G.	MD	Γ	'07
Pendleton III, Winston	MI	Γ	'62
Pineault, Wayne	IL	Γ	'79
*Quan, Richard	CA	X	'01
Rentz, Mark	Son of member		
*Riedesel, Jeremy M.	OH	B	'96
*Schmidt, V. Hugo	WA	B	'51
*Shepperd, Stan W.	MA	B	'70
*Sigillito, Vincent G.	MD	B	'58
Silver, Robert E.	NY	P	'80
*Spong, Robert N.	UT	A	'58
*Strong, Michael D.	PA	A	'84
Summerfield, Steven L.	MO	Γ	'85
*Voellinger, Edward J.	Non-member		
*Zison, Stanley W.	CA	Θ	'87

*Denotes correct bonus solution

SPRING REVIEW

The spring batch of Ticklers was apparently somewhat easier than other recent sets. The hardest regular problem was No. 4, about upgrading a poker hand, with only $\frac{2}{3}$ of the entries that answered this Tickler having gotten it correct. The rest of the regular problems had close to 100% correct answers. The Bonus (about three triangular numbers whose product is a perfect

square) was correctly solved by about $\frac{3}{4}$ of the entries.

SUMMER ANSWERS

1 The priest is **52** years old. As listeners, we don't know the actual whispered hint and we might not know all the visitor's ages, but we can figure out the priest's age.

The priest's first hint indicates that the product of the three visitors' ages is 2652, and the cantor calculates the prime factorization of 2652 as $2^2 \times 3 \times 13 \times 17$. Ignoring any potential upper bound on age, the factors can be combined to produce the following set of 28 age triples: $S = \{(12\ 13\ 17)\ (6\ 17\ 26)\ (6\ 13\ 34)\ (3\ 26\ 34)\ (4\ 17\ 39)\ (2\ 34\ 39)\ (2\ 3\ 442)\ (4\ 13\ 51)\ (2\ 26\ 51)\ (3\ 17\ 52)\ (1\ 51\ 52)\ (3\ 13\ 68)\ (1\ 39\ 68)\ (2\ 17\ 78)\ (1\ 34\ 78)\ (2\ 13\ 102)\ (1\ 26\ 102)\ (1\ 17\ 156)\ (1\ 13\ 204)\ (3\ 4\ 221)\ (2\ 6\ 221)\ (1\ 12\ 221)\ (1\ 6\ 442)\ (2\ 2\ 663)\ (1\ 4\ 663)\ (1\ 3\ 884)\ (1\ 2\ 1326)\ (1\ 1\ 2652)\}$.

The content of the priest's second whispered hint is unknown, but it narrows the potential solution to a member of $S' = \{(y_i\ m_i\ o_i)\}$. S' is a subset of S and the values y_i , m_i , and o_i in each age triple are the ages of the youngest, middle, and oldest visitor. The cantor is still unsure which triple matches the visitors' ages, so we know the cardinality of S' is greater than 1.

Let the priest's age be denoted by p . Let o_0 be the smallest o_i in S' . Let o_1 be the second smallest o_i in S' . With the priest's third statement about his birthday, we learn that the priest is older than any of the visitors, and that the cantor knows the priest's age. Combined with the previous hints, the cantor is able to use the new information to determine the visitors' ages. Knowing the priest's age, and that the priest is older than all the visitors indicates that there is only one triple in S' where all of the ages are less than p . That is, we can conclude the age relationship $o_0 < p \leq o_1$ exists.

Finally the cantor makes a

statement that allows anyone listening to unambiguously determine the priest's age. From this, we conclude $o_0 + 1 = o_1$, so therefore $p = o_1$. Only $o_0 = 51$ and $p = o_1 = 52$ fits from S , so the priest is 52 (and the oldest visitor is 51).

2 The maximum probability of winning is $4 / (4 + \pi)$, which occurs when the diameter is $4 / (4 + \pi)$. Each tile is 1 square unit. Let d be the diameter of the disk. You lose if the disk does not touch the boundary of the tile; this happens if the center of the disk is at least $d/2$ from the edge. The area of that portion of the tile is $(1-d)^2$. You also lose if the disk covers the corner of a tile, that is, if the center of the disk is within $d/2$ of a corner. That area is $\pi(d/2)^2$.

The probability of winning $P(d) = 1 - (1-d)^2 - \pi(d/2)^2 = 2d - d^2(1 - \pi/4)$. Differentiating with respect to d , $P'(d) = 2 - 2(1 - \pi/4)d$. Setting $P'(d) = 0$ and solving, we find $P(d)$ is maximized at $d = 4 / (4 + \pi)$. Plugging $4 / (4 + \pi)$ into $P(d)$, we find $P(4 / (4 + \pi)) = 4 / (4 + \pi)$.

3 There are **88** ways to walk up a flight of 13 stairs. Let S_n be the number of ways to climb n steps. Clearly, there is one way to climb 1 step and one way to climb two steps (one at a time). Three steps can be climbed in two ways, that is, one step three times or three steps once. So $S_1 = 1$, $S_2 = 1$, and $S_3 = 2$. From there, observe that S_n is defined by the recurrence relation $S_n = S_{n-1} + S_{n-3}$. Therefore, $S_n = 1, 1, 2, 3, 4, 6, 9, 13, 19, 28, 41, 60, 88$. Hence $S_{13} = 88$.

4 There are **six** cubes with 2 sides of each of three colors. Since there are 8 corners on the 3-inch cube, each color (red, white, blue) must have 8 cubes with three faces of their color, 12 cubes with two faces of their color, and 6 cubes with one face of their color.

No cube may have more than three faces of a single color. So there

are three possible color distributions across the faces: 3-2-1, 3-3-0, and 2-2-2.

A cube with a single face of an individual color must have a 3-2-1 distribution. There are 3 colors and each needs 6 cubes with a single face, so 18 of the 27 cubes must have the 3-2-1 distribution.

Each color needs a total of 8 cubes with 3 faces of their color, so 3 of the 27 cubes must have a 3-3-0 distribution (each color appears on two of these cubes). The one cube that has no faces of given color will be at the center of the 3-inch cube.

Six cubes remain, each with the 2-2-2 distribution.

5 Drawing the **King of Clubs** or better gives a player a greater than 50-50 chance of winning. Find the least ranked card such that if one picks four other cards out of the remaining 51, the chance of being highest ranked is greater than 50%. Numerically, this is equivalent to finding the N th ranked card, where N is the least integer such that $p = C(N-1,4)/C(51,4) \geq 0.5$. For $N = 45$, $p \approx 0.543$. For $N = 44$, $p \approx 0.494$. So, we pick the 45th ranked card, which is the King of Clubs.

Bonus A and B's numbers are **34** and **55**, respectively.

Observe that because the integers on each of the logician's hats must be positive, for if any two logicians have the same number, then the third will immediately know her number, since hers must be sum of the other two and not the difference.

Let $[a\ b\ c]$ be the integral ratio of the three numbers. The only triples possible are ones where one of the three is the sum of the other two. On her first turn, A will only be able to deduce her number if the ratio of the three is $[2\ 1\ 1]$. When A passes, all three logicians know that $[2\ 1\ 1]$ is not possible.

On B's first turn, as a result of A passing, B will be able to guess correctly if she observes that A is twice C, or $[2\ 3\ 1]$. In addition, similar to A, B can also know her number if A and C's numbers are equal. So when B passes, all know that both $[2\ 3\ 1]$ and $[1\ 2\ 1]$ have

been eliminated.

On C's first turn, C can properly deduce her number if it is the sum of a and b in any the previously eliminated triples. And like A and B's respective first turns, also if A and B's numbers are equal. When C passes, the ratios $[2\ 1\ 3]$, $[2\ 3\ 5]$, $[1\ 2\ 3]$ and $[1\ 1\ 2]$ are eliminated.

With each additional passing logician's turn, the list of not-possible ratios grows. On her turn, a logician examines all the newly eliminated ratios from each of the two previous turns. For each eliminated ratio, she adds the values of the other two logicians and replaces the value of the guessing logician with the sum. For A's second passing turn, she eliminates $[4\ 3\ 1]$, $[3\ 2\ 1]$, $[4\ 1\ 3]$, $[8\ 3\ 5]$, $[5\ 2\ 3]$ and $[3\ 1\ 2]$.

On each turn, the eliminated triples grow at a Fibonacci rate. B eliminates 10 triples on her second pass, C 16 on her second, A 26 on her third, and B 42 on her third. However, on her third turn, C deduces her number to be 89. Of the 68 triples under consideration, the c in only one equals 89, that is $[34\ 55\ 89]$. (Had C's number been non-prime, any triple with a c that divides her number would do.)

Computer Bonus $P_{170} = 42208400$.

Completing the eight integer sequence, $P_{171} = 47627751$, $P_{172} = 53047102$, $P_{173} = 58466453$, $P_{174} = 63885804$, $P_{175} = 69305155$, $P_{176} = 74724506$, $P_{177} = 80143857$. The corresponding denominators are $Q_{170} = 13435351$, $Q_{171} = 15160384$, $Q_{172} = 16885417$, $Q_{173} = 18610450$, $Q_{174} = 20335483$, $Q_{175} = 22060516$, $Q_{176} = 23785549$ and $Q_{177} = 25510582$. The sequences P_i and Q_i are an interesting study. Large jumps in the sequences occur at irregular intervals. At other places, P_i and Q_i increment monotonically for intervals of consecutive elements.

Observe that between P_{170} / Q_{170} and P_{177} / Q_{177} above, $P_{i+1} = P_i + 5419351$ and $Q_{i+1} = Q_i + 1725033$. Not coincidentally, the increments correspond to $P_{169} = 5419351$ and $Q_{169} = 1725033$. In addition to including a P_i with units digit 0, and being of minimum length eight, only runs

where the increment ends with the digit 1 can generate a desired count-up units digit sequence. The alternate example $P_{14} / Q_{14} = 355 / 133$ provides a long-ish run of fixed increments from $i = 15$ through $i = 162$, but in that interval, the units digit in P_i strictly alternates between 3 and 8. After P_{170} , the five next sequences of at least length 8 start at P_{189} (length 42), P_{781} (9), P_{986} (10), P_{1169} (8) and finally P_{1866} starting an incredibly long length of 10388 consecutive P_i with unit-digit unit increments.

NEW FALL PROBLEMS

1 The following cryptic additions are to be solved simultaneously, that is, letters have the same value in both cryptics; different letters are different values; * can represent any value. There are no zeros anywhere. The two sums are mirror images (i.e., reverses) of each other.

```

*****      MIRROR
+MIRROR     +IMAGE*
-----     -----
IMAGE*      *****

```

—an Enigma by Albert Haddad in
New Scientist

2 An antimagic square is an $N \times N$ grid containing the integers from 1 through N^2 , such that the sum of each row, column, and main diagonal is a different number, and those sums form a consecutive sequence of integers. There are no 3×3 antimagic squares, but there are some that are close in that the sequence of sums is consecutive except for one missing value. Find a 3×3 near antimagic square in which the three digit number represented by the top left (hundreds position) to bottom right (units position) main diagonal is a minimum. Present your answer as a 3×3 grid containing the digits 1 through 9.

—H.G. McIlvried III, *PA F '53*

3 On average, how often (once every N years) does a blue moon (2nd full moon in the same month) fall on New Year's Eve in Los Angeles?

—F.J. Tydeman, *CA Δ '73*

4 As a promotion, a pizza shop advertises a medium plus a large pizza, with up to five toppings each, for just the price of a large pizza. The advertisement further states that a patron has a choice of 1,048,576 different combinations of two pizzas. Assuming this statement is correct, if a topping can be used only once on a given pizza and the two pizzas can each have a different combination of toppings, how many different toppings does the pizza shop have?

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

5 Another order of merit (no ties) for A, B, C, D, E—this time for Deception. In their usual chatty way, they are making remarks about their places. The remarks of those who were first and second are false, the rest are true.

A: D was third.
B: E was not first.
C: I was not last.
D: C was lower than B.
E: B was second.

What were their places (first to last)?

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

Bonus Consider a unit radius circle whose center is at the origin of a set of Cartesian coordinates. Construct a 2Θ sector of this circle lying along the x-axis, with half the sector lying above the x-axis and half lying below the x-axis. Inscribe in this sector a series of circles of radii R_1, R_2, R_3, \dots , whose centers are on the x-axis. The first circle is tangent to the arc of the sector and its two sides. The second circle is tangent to the first circle and the sides of the sector; the third circle is tangent to the second circle and the sides of the sector; ad infinitum. Obviously, the ratio of the sum of the circles' areas to the sector's area is less than 1. For what value of Θ is this ratio the largest, and what is this largest ratio?

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

Computer Bonus The prime 5 exactly divides the sum of all the primes smaller than itself, $(2+3)/5 = 1$. The next prime with this property is 71. What is the next (after 71) such prime?

—*Prime Numbers, the Most Mysterious Figures in Math*
by David Wells

Postal mail your answers to any or all of the Brain Ticklers to **Dylan Lane, Tau Beta Pi, P.O. Box 2697, Knoxville, TN 37901-2697** or email to BrainTicklers@tbp.org as plain text only. 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). The method of solution is not necessary. We welcome any interesting problems that might be suitable for the column. The Computer Bonus is not graded. Dylan will forward your entries to the judges who are **H.G. McIlvried III, PA Γ '53; J.C. Rasbold, OH A '83, J.R. Stribling, CA A '92**; and the columnist for this issue,

—**F.J. Tydeman, CA Δ '73**

The Editor of *The Bent* is frequently searching for well-written, general interest, feature articles for the magazine. Many of you have the appropriate experience, are qualified, and capable of preparing such a feature. If you have a topic that you believe would be suitable, email proposals to tbp@tbp.org. Members working on interesting research or design projects are encouraged to submit an article. Manuscripts should be 1,000-3,000 words, double-spaced, and submitted as a text or MS Word document. Publishing decisions cannot be guaranteed.

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The Executive Council met in Knoxville, TN, February 9-10, 2019

(continued from page 9)

A summary of the Chapter Support Committee was presented and charges developed for 2019 to include review of Chapter Survey data, providing training to advisors, and working with the large, successful chapters to help identify best practices to be provided to other chapters. A summary of the Convention Planning Committee was presented and included discussion of speakers, deadlines, and review of additional time needed for business meetings.

The Development Committee and The Image and Marketing Committee presented reports. The Program Support Committee discussed procedures to advertise for potential director positions and the process to solicit and fill positions to assist in recruiting; assistant director positions were discussed. The Website Task Force discussed the consolidation with the Image and Marketing Committee.

The Council reviewed and approved the UT Dallas Inspection Report and a final petition will be presented at the 2019 Convention. The Council approved to commit the Director term alignment to the Governance Committee. Councillor Morales recommended that Director Gomulinski work with the Finance Committee to have an accurate budgetary trend analysis to ensure targets will be met. The 2019 District Conference Presentation was reviewed and Mr. Gomulinski stated the presentation needs to be updated prior to upcoming District Conferences. The Council approved to direct TBPI HQ to create and utilize a collection envelope for donations at events.



Arizona Beta

Heather J. Levene, JD., '04, is now the managing partner at Gammage & Burnham PLC. As an attorney, her emphasis is in the healthcare field and she was also named one of Phoenix's 40 under 40. Her bachelor's in biomedical engineering is from Arizona State University.



California Gamma

Carolyn A. Lee, '19, was selected as the Pac-12 Softball Scholar Athlete of the Year. A recent Stanford University graduate in mechanical engineering, she was also a three-time Pac-12 All-Academic first team pick. She will begin working at Microsoft in the fall.



California Lambda

Ryan P. Fong, '00, was promoted to a software architect within the User Interface Tools Architecture Group at Workday Inc. His bachelor's degree is in computer science & engineering from UC Davis and he previously worked for Hewlett-Packard Company.



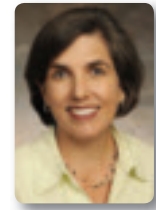
Connecticut Alpha

Neha S. Bhatt, '20, has been accepted into the Whiffenpoofs, the country's oldest collegiate *a cappella* group. She is the first woman of color to join and is a biomedical engineering major at Yale University. She will take the next year off from school to travel and perform.



Illinois Alpha

Tina M. Kilmer, P.E., '81, has been named senior director of engineering at Gaming Laboratories International. She has more than 20 years of global gaming experience with expertise in technical compliance, program management, product development, and strategic planning.



Massachusetts Beta

Christina M. Alvord, '90, assumed the role of president, central division, at Vulcan Materials Company. She previously held various executive management positions at GE Aviation. She double-majored in mechanical engineering and political science at MIT.

Henry Ford Health System photo.



Massachusetts Beta

Stephanie Lee, Ph.D., '07, was named as 2019 winner of the NSF's CAREER Award, an early-career faculty recognition. Lee's research focuses on efforts to make power sources portable, affordable, and easy-to-manufacture. Her three degrees are in chemical engineering.



Michigan Eta

Nicole A. Kennedy, M.D., '95, received the Lawrence Technological University's Alumni Achievement Award at Commencement in May. She is a section chief in the department of vascular surgery and medical informatics officer at Henry Ford West Bloomfield Hospital.



New York Xi

Robert F. Conway, P.E., '79, has joined HNTB Corporation as Northeast Division environmental planning practice leader and vice president. Conway has 37 years of experience and previously served as the environmental officer for Metro Transportation Authority's Capital Construction.



Missouri Beta

Craig A. Brice, Ph.D., '98, is a professor of practice in mechanical engineering at Colorado School of Mines. With the help of his students, Brice assisted in the design and build of a working Iron Man suit for TV star Adam Savage and his new show, "Savage Builds."

"I felt like it was a good teaching moment," Brice said. "We took an engineering approach to an entertainment project where we actually built a useable suit."

Savage is known for hosting "Mythbusters" and his new show premiered on the Discovery Channel in June. Watch a [YouTube video](#) on how the suit was made with 3D printers using titanium.



North Dakota Beta

Joe J. Audet, '19, has joined Ackerman-Estevold as a full-time civil engineer. He recently graduated with a degree in civil engineering from the University of North Dakota. Audet will be working with the municipal group.



Rhode Island Beta

Maureen Lobby Chlebek, P.E., '84, has been elevated to vice president & regional manager of New England at McMahon Associates Inc., joining the Executive Committee. She has 34 years of experience in transportation engineering management. Her bachelor's degree is in civil engineering from the Univ. of Rhode Island.



South Dakota Alpha

Wayne J. Baumberger, '96, has been appointed as the new president of Diamond Mowers LLC in Sioux Falls, SD. He has spent the past 22 years at Caterpillar Inc. in various engineering roles. Baumberger has a passion for education and giving back to the community.



Vermont Beta

Emily H. Oliver, '19, was named Great Northeast Athletic Conference Woman of the Year. Oliver was a three-sport standout and captain in basketball, softball, and volleyball. She graduated with a mechanical engineering degree and will attend medical school in the fall.



Washington Beta

Paige M. Danielson, '19, has been named the Pac-12 Women's Rowing Scholar Athlete of the Year for the 2019 season. She is a recent electrical engineering graduate from Washington State University. Next, Danielson will pursue a Ph.D. at the University of Colorado.



Wisconsin Alpha

Randy L. Jirtle, Ph.D., '70, was awarded the 2019 Hollaender Award recipient by the Environmental Mutagenesis and Genomics Society. Jirtle is a professor at NC State and was recognized for "discovering that the environment can influence inheritance of phenotypic traits through epigenetic reprogramming."

TRUE TALES from the TESTBENCH...

Words / Art
Krishna H. Sankaran
krishna@tbp.org

Fellow engineers: the story you are about to read is true. Only the names have been changed to protect the guilty.



Have a true, humorous tale from your engineering experience that you'd like to see in a future TBT comic? Send your submission for consideration to dylan@tbp.org

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