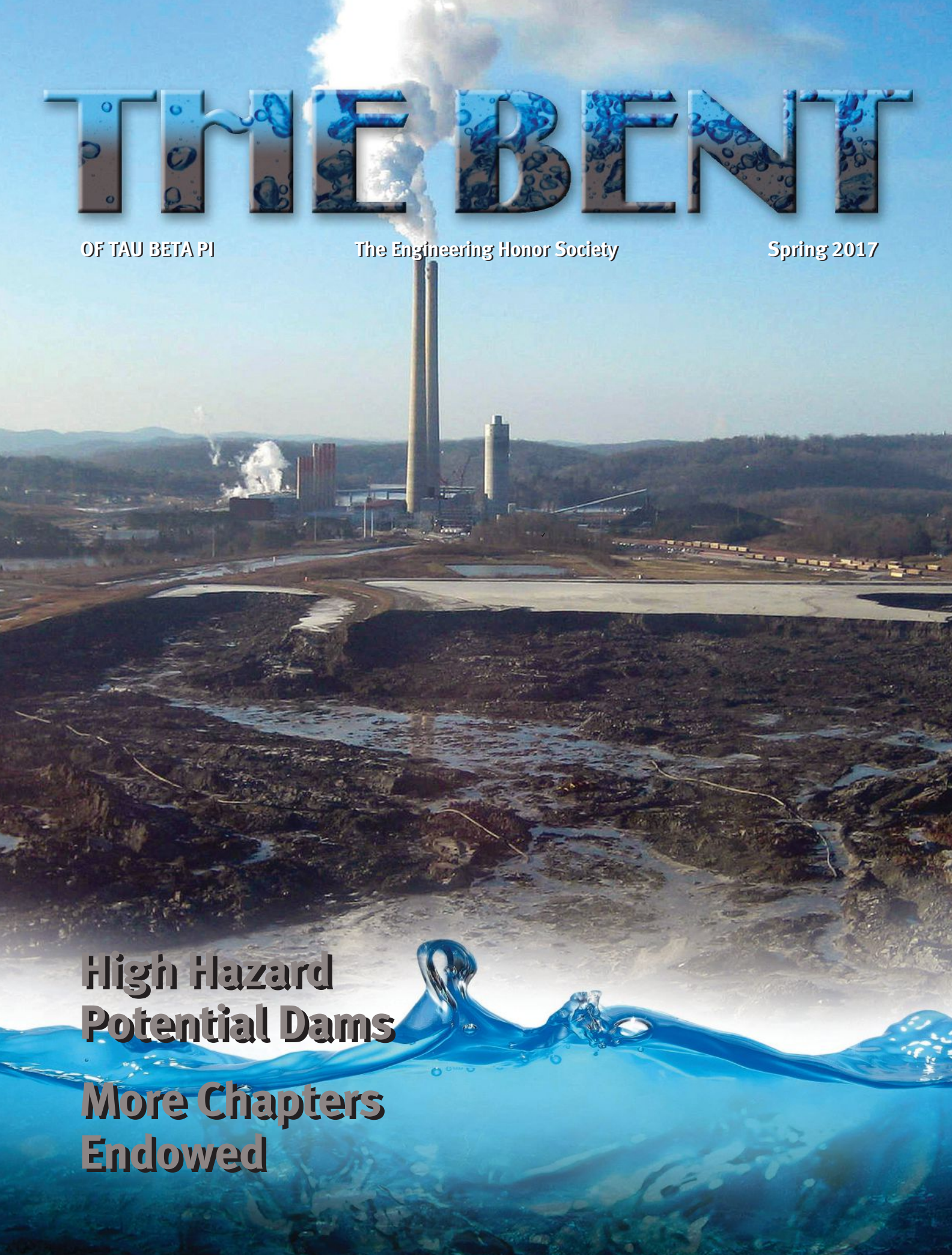


THE BENT

OF TAU BETA PI

The Engineering Honor Society

Spring 2017



**High Hazard
Potential Dams
More Chapters
Endowed**

CHAPTERS

ALUMNI CHAPTERS (74)

District 1 • denotes active chapter

- 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, WI

District 9

- Rolla, MO
- St. Louis, MO

District 10

- Central Texas (Austin/San Antonio)
- DFW (Dallas-Fort Worth, TX)
- 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

- 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, CA
- San Francisco Bay Area, CA
- San Francisco Peninsula, Palo Alto, CA

District 16

- Greater San Diego, CA
- Southern California, Los Angeles

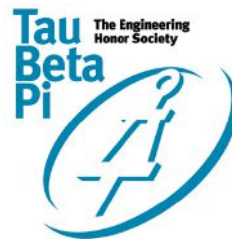
CA K	16	California State Univ., Northridge
CA A	15	Univ. of California, Davis
CA M	15	Calif. Poly. St. Univ., San Luis Obispo
CA N	16	California State Poly. Univ., Pomona
CA E	16	San Diego State Univ.
CA O	16	Loyola Marymount Univ.
CA I	16	Northrop Univ. (inactive)
CA P	15	California State Univ., Fresno
CA S	16	Univ. of California, Santa Barbara
CA T	16	Univ. of California, Irvine
CA Y	15	California State Univ., Sacramento
CA F	15	Univ. of the Pacific
CA X	16	California State Univ., Fullerton
CA U	16	Univ. of California, San Diego
CA Q	16	Harvey Mudd College
CA AA	15	California State Univ., Chico
CA AB	16	Univ. of California, Riverside
CA AF	15	San Francisco State Univ.
CA AD	15	Univ. of California, Santa Cruz
CA AE	16	Univ. of San Diego
CO A	12	Colorado School of Mines
CO B	12	Univ. of Colorado at Boulder
CO G	12	Univ. of Denver (inactive)
CO D	12	Colorado State Univ.
CO E	12	Univ. of Colorado at Denver
CO Z	12	United States Air Force Academy
CT A	1	Yale Univ.
CT B	1	Univ. of Connecticut
CT F	1	Univ. of Hartford
DE A	3	Univ. of Delaware
DC A	4	Howard Univ.
DC B	4	Catholic Univ. of America
DC G	4	George Washington Univ.
FL A	5	Univ. of Florida
FL B	5	Univ. of Miami
FL F	5	Univ. of South Florida
FL D	5	Univ. of Central Florida
FL E	5	Florida Atlantic Univ.
FL Z	5	Florida Inst. of Technology
FL H	5	Florida A&M Univ.-Florida State Univ.
FL O	5	Florida International Univ.
FL I	5	Embry-Riddle Aeronautical Univ.
GA A	5	Georgia Inst. of Technology
GA B	5	Mercer Univ.
ID A	14	Univ. of Idaho
ID B	12	Idaho State Univ.
ID F	12	Boise State Univ.
IL A	8	Univ. of Illinois at Urbana-Champaign
IL B	8	Illinois Inst. of Technology
IL F	8	Northwestern Univ.
IL A	8	Bradley Univ.
IL E	8	Southern Illinois Univ. at Carbondale
IL Z	8	Univ. of Illinois at Chicago
IN A	8	Purdue Univ.
IN B	8	Rose-Hulman Inst. of Technology
IN F	8	Univ. of Notre Dame
IN A	8	Valparaiso Univ.
IN E	8	Trine Univ.
IN Z	8	Indiana Univ.-Purdue Univ. Indianapolis
IA A	11	Iowa State Univ.
IA B	11	Univ. of Iowa
KS A	9	Univ. of Kansas
KS B	9	Wichita State Univ.
KS F	9	Kansas State Univ.
KY A	6	Univ. of Kentucky
KY B	6	Univ. of Louisville
KY F	6	Western Kentucky Univ.
LA A	10	Louisiana State Univ.
LA B	10	Tulane Univ.
LA F	10	Louisiana Tech Univ.
LA D	10	Univ. of Louisiana at Lafayette
LA E	10	Univ. of New Orleans
ME A	1	Univ. of Maine
MD A	4	Johns Hopkins Univ.
MD B	4	Univ. of Maryland
MD F	4	United States Naval Academy
MD A	4	Univ. of Maryland Baltimore County
MD E	4	Morgan State Univ.
MA A	1	Worcester Polytechnic Inst.
MA B	1	Massachusetts Inst. of Technology
MA F	1	Harvard Univ. (inactive)
MA A	1	Tufts Univ.
MA E	1	Northeastern Univ.
MA Z	1	Univ. of Massachusetts at Amherst
MA H	1	Boston Univ.
MA O	1	Univ. of Massachusetts Lowell
MA I	1	Western New England Univ.
MI A	7	Michigan State Univ.
MI B	11	Michigan Tech. Univ.
MI F	7	Univ. of Michigan
MI A	7	Univ. of Detroit Mercy
MI E	7	Wayne State Univ.
MI Z	7	Kettering Univ.
MI H	7	Lawrence Technological Univ.
MI O	7	Oakland Univ.
MI I	7	Univ. of Michigan-Dearborn
MI K	7	Western Michigan Univ.
MI A	7	Grand Valley State Univ.
MN A	11	Univ. of Minnesota-Twin Cities
MN B	11	Univ. of Minnesota, Duluth
MS A	6	Mississippi State Univ.
MS B	6	Univ. of Mississippi
MO A	9	Univ. of Missouri-Columbia
MO B	9	Missouri Univ. of Science & Technology
MO F	9	Washington Univ.
MO A	9	Univ. of Missouri-Kansas City
MO E	9	Saint Louis University
MT A	12	Montana State Univ.
MT B	12	Montana Tech of the Univ. of Montana
NE A	9	Univ. of Nebraska-Lincoln
NV A	15	Univ. of Nevada, Reno
NV B	15	Univ. of Nevada, Las Vegas
NH A	1	Univ. of New Hampshire
NH B	1	Dartmouth College
NJ A	2	Stevens Inst. of Technology
NJ B	2	Rutgers Univ.

NJ F	2	New Jersey Inst. of Technology
NJ A	2	Princeton Univ.
NJ E	2	Rowan Univ.
NJ Z	2	The College of New Jersey
NM A	13	New Mexico State Univ.
NM B	13	Univ. of New Mexico
NM F	13	New Mexico Inst. of Mining & Tech.
NY A	2	Columbia Univ.
NY B	2	Syracuse Univ.
NY F	2	Rensselaer Polytechnic Inst.
NY A	2	Cornell Univ.
NY E	2	New York Univ. (inactive)
NY Z	2	Polytechnic Inst. of Brooklyn (inactive)
NY H	2	City College of CUNY
NY O	2	Clarkson Univ.
NY I	2	Cooper Union School of Engineering
NY K	2	Univ. of Rochester
NY A	2	Pratt Inst. (inactive)
NY M	2	Union College
NY N	2	SUNY at Buffalo
NY E	2	Manhattan College
NY O	2	SUNY at Stony Brook
NY P	2	Rochester Inst. of Technology
NY S	2	Polytechnic Institute of New York Univ.
NY T	2	Alfred Univ.
NY Y	2	Binghamton University
NC A	4	United States Military Academy
NC B	4	North Carolina State Univ.
NC F	4	Univ. of N.C. at Chapel Hill (inactive)
NC A	4	Duke Univ.
NC D	4	Univ. of North Carolina at Charlotte
NC E	4	North Carolina A&T State Univ.
NC Z	4	East Carolina University
ND A	11	North Dakota State Univ.
ND B	11	Univ. of North Dakota
OH A	7	Case Western Reserve Univ.
OH B	7	Univ. of Cincinnati
OH F	7	Ohio State Univ.
OH A	7	Ohio Univ.
OH E	7	Cleveland State Univ.
OH Z	7	Univ. of Toledo
OH H	7	Air Force Inst. of Technology
OH O	7	Univ. of Dayton
OH I	7	Ohio Northern Univ.
OH K	7	Univ. of Akron
OH A	7	Youngstown State Univ.
OH M	7	Wright State Univ.
OH N	7	Cedarville Univ.
OH E	7	Miami Univ.
OK A	9	Univ. of Oklahoma
OK B	9	Univ. of Tulsa
OK F	9	Oklahoma State Univ.
OR A	14	Oregon State Univ.
OR B	14	Portland State Univ.
OR F	14	Univ. of Portland
PA A	3	Lehigh Univ.
PA B	3	Pennsylvania State Univ.
PA F	3	Carnegie Mellon Univ.
PA A	3	Univ. of Pennsylvania
PA E	3	Lafayette College
PA Z	3	Drexel Univ.
PA H	3	Bucknell Univ.
PA O	3	Villanova Univ.
PA I	3	Widener Univ.
PA K	3	Swarthmore College
PA A	3	Univ. of Pittsburgh
PA M	3	Penn State Erie, The Behrend College
PR A	5	Univ. of Puerto Rico
RI A	1	Brown Univ.
RI B	1	Univ. of Rhode Island
SC A	5	Clemson Univ.
SC B	5	Univ. of South Carolina
SC F	5	The Citadel
SD A	12	South Dakota School of Mines & Tech.
SD B	11	South Dakota State Univ.
TN A	6	Univ. of Tennessee
TN B	6	Vanderbilt Univ.
TN F	6	Tennessee Tech. Univ.
TN A	6	Christian Brothers Univ.
TN E	6	Univ. of Memphis
TN Z	6	Univ. of Tennessee at Chattanooga
TX A	10	Univ. of Texas at Austin
TX B	13	Texas Tech Univ.
TX F	10	Rice Univ.
TX A	10	Texas A & M Univ.
TX E	10	Univ. of Houston
TX Z	10	Lamar Univ.
TX H	10	Univ. of Texas at Arlington
TX O	13	Univ. of Texas at El Paso
TX I	10	Southern Methodist Univ.
TX K	10	Prairie View A & M Univ.
TX A	10	Texas A & M Univ.-Kingsville
TX M	10	Univ. of Texas at San Antonio
TX N	10	Univ. of Texas Rio Grande Valley
UT A	12	Univ. of Utah
UT B	12	Brigham Young Univ.
UT F	12	Utah State Univ.
VT A	1	Univ. of Vermont
VT B	1	Norwich Univ.
VA A	4	Univ. of Virginia
VA B	4	Virginia Polytechnic Inst. & State Univ.
VA F	4	Old Dominion Univ.
VA A	4	Virginia Military Inst.
VA E	4	Virginia Commonwealth Univ.
WA A	14	Univ. of Washington
WA B	14	Washington State Univ.
WA F	14	Seattle Univ.
WA A	14	Gonzaga Univ.
WV A	4	West Virginia Univ.
WV B	4	West Virginia Univ. Inst. of Technology
WI A	8	Univ. of Wisconsin-Madison
WI B	8	Marquette Univ.
WI F	8	Univ. of Wisconsin-Milwaukee
WI A	8	Milwaukee School of Engineering
WI E	8	Univ. of Wisconsin-Platteville
WY A	12	Univ. of Wyoming

COLLEGIATE CHAPTERS (252)

Chap. Dist.	Institution
AL A	6 Auburn Univ.
AL B	6 Univ. of Alabama
AL F	6 Univ. of Ala. at Birmingham
AL A	6 Univ. of Ala. in Huntsville
AL E	6 Univ. of South Alabama
AK A	14 Univ. of Alaska Fairbanks
AZ A	13 Univ. of Arizona
AZ B	13 Arizona State Univ.
AZ F	13 Northern Arizona Univ.
AZ A	13 Embry-Riddle Aero. Univ., Prescott
AR A	9 Univ. of Arkansas
CA A	15 Univ. of California, Berkeley
CA B	16 California Inst. of Technology
CA F	15 Stanford Univ.
CA A	16 Univ. of Southern California
CA E	16 Univ. of California, Los Angeles
CA Z	15 Santa Clara Univ.
CA H	15 San Jose State Univ.
CA O	16 California State Univ., Long Beach
CA I	16 California State Univ., Los Angeles

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Spring 2017
Vol. CVIII / No. 2

*f*ounded 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 and (co-founder) Association of College Honor Societies. Affiliate, American Association for the Advancement of Science.

Features

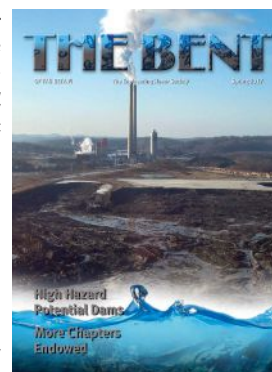
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by Alan S. Brown

ON THE COVER:
Trudy Bell explores the
current status of dams
in the United States and
the potential impact
of a future failure.



Cover artist: Dali Polivka

Tau Beta Pi:
THE BENT



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The Tau Beta Pi Association was founded at Lehigh University in 1885 by Edward Higginson Williams Jr. to mark in a fitting manner those who have conferred honor upon their Alma Mater by distinguished scholarship and exemplary character as students in engineering, or by their attainments as alumni in the field of engineering, and to foster a spirit of liberal culture in engineering colleges.

—Preamble to the Constitution

Moving From Ideas to Action!

When the current Executive Council ran for election at the 2013 Convention in Ames, IA, as the Elevate Slate, our main goal was to build upon the work by the previous EC to keep moving Tau Beta Pi forward. After our installation at the 2014 Convention, we started that work in multiple areas with the support and vision of our Executive Director, Curt Gomulinski.

The Councillors are volunteers who split their time between the Association, family, and work obligations. We soon realized more help was needed to move TBP in the direction we wanted. While we had no problem coming up with a large number of ideas, the real work lay in turning ideas into action.

Through Curt's suggestion, consultant Brad Gray, Ph.D., was brought on board in June 2015 to lead the Council through the process of strategic planning and updating our vision and mission. Brad was also involved in conducting several surveys to help us identify the desires and needs of our members.

With the survey results, ideas from the Vision Development Group, and our updated vision and mission, the EC was able to develop our strategic plan. The six focus areas of the plan are:

- Collaborative member engagement
- Relevant and recognized leadership and professional development
- Improving, facilitating, and enhancing chapter support and operations
- Image, visibility, and branding
- Finances and fundraising
- Organizational process

During this time, Curt also suggested that we consider restructuring the EC. Through work by Curt, Brad, the Council, and the 2015 Convention, followed by chapter ratification, we implemented a restructuring to increase the number of Councillors from five to up to twelve. During the initial years of the change, our plan is to have nine. As you read in the Winter 2017 *Bent*, the 2016 Convention elected three new Councillors, Menna Youssef, Wayne Paugh, and George Youssef, who were installed on January 1, 2017. With the added help and the different skill sets they bring, we are now in the process of moving into action ideas that align with our strategic plan.

Strategic Plan Implementation

One of the key areas in the strategic plan is to address Tau Beta Pi's lack of visibility and branding, not only

with the general public but also on campuses with our chapters. In a brainstorming session with one of our District 11 Directors, Christina Harrison, we came up with the idea of reaching out to the marketing departments in business schools. We now have projects with the Wharton School at the University of Pennsylvania and the University of Iowa Marketing Institute to identify ways to improve our visibility and branding.



Two other key areas in our strategic plan include promoting collaborative member engagement and increasing fundraising. We recognize that many of our members are not currently involved but are prominent in industry, government, academia, and other areas. So we have started a project along with our Major Gifts Officer, Sherry Jennings-King, which we are calling the Tau Beta Pi Ambassadors Program. This will

leverage members who are already active to introduce us to those not currently so. It will help to identify and engage those who might serve in future volunteer roles, can help to improve our visibility and branding through their prominence, and can support our fundraising.

New Format

As part of the Executive Council restructuring, we changed the Councillor's terms to three years, with elections at every Convention. Along with this, the President's term is now one year instead of four. This new EC format aligns with the board structure of most nonprofit organizations. We believe that the shorter terms and more frequent turnover on the Council will increase the sense of urgency and speed up the process of driving ideas into action. We also hope the restructured Council will allow us to engage more members and tap into their skills and experience by giving them a chance to serve.

My term as President started on January 1, 2017, and our Vice President for this year, Sue Holl, will become President on January 1, 2018. We are both very excited about the future of Tau Beta Pi as we now have a strategic plan and a team in place to make it happen.

Norman Pih, *Tennessee Alpha '82, President*

PROGRAM DIRECTOR APPOINTED

Kelly J. Hammar, *Iowa Alpha '89*, has been selected by the Executive Council to be the new Director of the District Program. The position was created in 1978 but was eliminated in 1991 with the restructuring of the District



Program. Due to the program's growth in number of chapters and directors over the past 25 years, the Council re-established the position for a three-year trial period through June 2019.

Hammar currently works as a global demand planning manager in the chemical company division of ExxonMobil. She has worked with Exxon or ExxonMobil since interning with them while a student at Iowa State. She has held a number positions during her career technology planning venture manager and aromatics global financial planning manager. She also serves as a science ambassador and recruiter for Exxon-Mobil.

She served as a District 10 Director from 1992-2001 and rejoined the program in 2015 after taking time off to raise her family. As a student, Kelly served as president of Iowa Alpha, and more recently, as vice president and treasurer of the Texas Gulf Coast Alumni Chapter. Kelly looks forward to working with the District Directors to enhance the District Program over the next three years.

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EDITORIAL

A Labor of Love

*f*our years ago I was chatting with Bill Lasher, *MI Γ '76*, after successfully installing Pennsylvania Mu at Penn State Erie, The Behrend College, where he serves as a professor and chapter advisor. Our conversation turned to Tau Beta Pi's Constitution and Bylaws (C&B) which Bill commented were "a bit long." In his experience, they should be short and include only the essentials and leave more detailed procedure to lower level documents. I ran a word count on our C&B and found it contained 23,000 words. One of our interns reviewed the governing instruments for 60 other honor societies and found that, on average, they clocked in at a short 5,500 words. It was unsettling to realize our C&B contained **4 times** the number of words as the average society, 5,000 words more than the next wordiest society, and 19,000 words longer than the Order of the Coif...the honor society for lawyers!

After this epiphany, I spoke with several members including Russ Pierce, *WA A '70*, past Executive Councillor and Director of Engineering Futures. Russ and I sat down in September 2013 and roughed out what new versions might resemble if the non-governing sections were removed. The 2013 Convention gave the green light to conduct a general revision, and the Executive Council (EC) chartered the Governance Documentation Restructuring Committee (GDRC) in 2014 to begin this process. In addition to Bill, Russ, and me, the committee includes J.P. Blackford, *DC Γ '95*; N.T. Bussett, *CA E '09*; M.J. Hand III, *MI Γ '11*; C.S. Jenkins, *MS B '14*; and R.M. Hickling, *CA E '80*. We met several times by teleconference and in-person during 2014 and 2015. The committee agreed on a set of principles to follow while revising the Constitution and Bylaws:

1. The role of the committee is to restructure and restate the existing Constitution and Bylaws and recommend substitutive changes only when absolutely necessary.
2. A separate Constitution and separate Bylaws should be maintained unless a combined instrument proves advantageous after the revisions are nearing completion.
3. Official policies should be created, adopted, and recorded by the Convention or Executive Council to replace procedural items detailed in the Constitution and Bylaws.
4. The amending requirements, the private nature of the ritual and motto, eligibility standards, and other topics

*that require extensive debate and discussion are **not to be changed**.*

After providing an update to the 2015 Convention and receiving their comments, the EC requested J.P. and I work as a subcommittee to prepare a draft to present to the Convention and the Executive Council. We had received a great deal of input up to this point and really needed to hunker down as a small group to use this material to craft an actual draft revision to the Constitution and Bylaws. J.P. and I met a half dozen times throughout 2016 to prepare the draft which the 2016 Convention reviewed.

After meeting twice this year to date, J.P. and I have taken the suggestions from the 2016 Convention and completed a "final version" for consideration by the Executive Council, the GDRC, and our members. This is "final" in the sense that it is the culmination of our work, but it will go through additional revisions as feedback is received and utilized. A

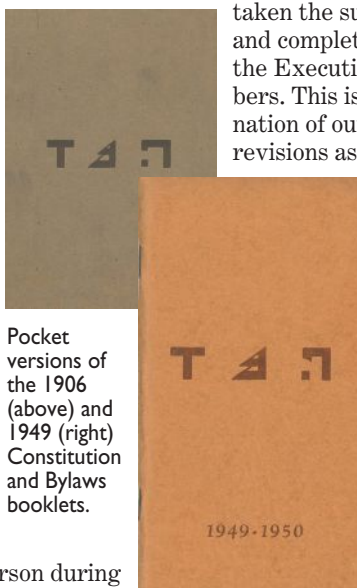
final version for the 2017 Convention to consider will be prepared in July.

In addition to review by our members, we are also enlisting help of outside "experts" to fully vet the proposed changes to the Constitution and Bylaws. Among them are representatives from the English Honor Society to check our grammar and language; representatives from the National Association of Parliamentarians to ensure our processes are sound and conform to Robert's Rules of Order; and by our lawyer to ensure compliance with federal and state law. We welcome input from our

members in this area as well, but rest assured the final version will meet the highest standards!

Please visit www.tbp.org/?CandB to review the proposed changes to the Constitution and Bylaws, provide feedback, or ask questions. Special informational sessions will be scheduled in the late summer and early fall for members interested in learning more in preparation for discussion at the 2017 Convention.

Until later,



Pocket versions of the 1906 (above) and 1949 (right) Constitution and Bylaws booklets.

The Bent welcomes letters from readers regarding recent articles or relevant matters of interest. Please include your full name, TBPI chapter, and class year. Letters should be sent to tbpi.letters@tbpi.org or to: The Bent of Tau Beta Pi / P.O. Box 2697 / Knoxville, TN 37901-2697. We regret that we cannot acknowledge or respond to all letters that are submitted. Letters may be edited for length and clarity.



LETTERS

TBPI: More Than Letters!

- When I graduated, little did I know how powerful these three Greek letters were. At every interview throughout my career, the door opened much wider when I mentioned them.

As an aside, I offer this story: Around 1990, I was working as an electrical engineer on a classified program. Both the program manager and I were early birds and exchanged greetings most mornings around 6 a.m. One morning I had worn the Bent as a tie clasp and it caught his attention. He asked, and I answered! The next morning, he wore a tie tack that literally covered his tie. He explained that it was from a collection of both his and his wife's accumulated honorary awards over their years of schooling.

In conversation, he mentioned that he believed several of his "hand selected" team were Tau Bates. He encouraged me to find out. The next morning, the inside of the only door to the classified area held an enlarged copier image of my initiation Bent with the words "Do You Have One?" That night the Bent image contained 40 plus signatures...over half of the project personnel. Very powerful Greek letters indeed.

Stanley Korzep, OH E '66

Discipline Query

- I noted in the Winter 2017 issue both President Blackford's comments about integrity and the spotlight item on engineering jihad. I was wondering if Tau Beta Pi has ever "disciplined" a member for lack of integrity, or if there have ever been situations where the society even investigated a member for deliberate failure to uphold standards of conduct.

Do we have provisions for ensuring that members who clearly err can no longer be honored by membership? Just curious. Perhaps our vetting process for becoming a member is sufficient to guard against intentional unethical behav-

ior among our ranks.

Col. J. Randall Johnson, IL B '63

[Editor's Note: Tau Beta Pi's member disciplinary procedure is defined in Article IX, Section 5 of the Constitution. A member may be expelled by a majority vote of the active membership and advisory board of a member's chapter. In the last 20 years, only two members have been expelled from membership.]

'Dry' Humor Test

- I enjoyed reading of (unknown) classmate John D. L'Hote's tortured road to membership (*Balsa Bent Beginning! Winter Bent*).

One of his travails was to calculate "... the heat loss through the windows of the bars in East Lansing." A differential equation was not necessary to find the answer: ZERO. East Lansing was dry!

One had to venture east (3 miles) to far off, exotic Okemos where the Polo Bar offered succor. His story is as bizarre as mine.

My drafting table in a machine design class abutted that of the chapter president, Mel Nuechterlein. One day he looked up from his T-square and quoth, "You get better grades than I do! How come you're not in TBPI?"

The rest, as they say, is history!

Jack W. Osgood, P.E., MI A '49

Numbers History

- The excellent article *About Numbers* by Dr. Klinger (*Winter Bent*) is quite interesting, and all the more remarkable since it was based on his paper for English II while a freshman at Cooper Union!

I congratulate him on several scores, including getting a math paper accepted for an English assignment!

Readers may also be interested in the historical concept of numbers described by Oxford Professor Marcus du Sautoy, by watching the first two episodes of *The Story of Maths*, a short British TV series which can

be seen on Netflix (the final two episodes expand the story of mathematics up to 20th century concepts).

Again, kudos to Dr. Allen Klinger!

Louis W. Spradlin, P.E., MA B '97

Thank You

- I would like to say thank you so much for the scholarship from Tau Beta Pi. College certainly is not cheap, so I am very thankful for your support and helping me to afford my education. I hope to make the honor society proud in my future career! Thank you again.

Benjamin M. Durette, WI B '17

Professional Education

- After serving as president of the Ohio State University Chapter in 1951, I maintained an interest in the profession through activities in ASCE and NSPE. In 1960 I was elected president of the local chapter of NSPE and 10 years later became president of the state chapter, which at the time was the largest state NSPE chapter in the U.S.

During this period, I formed a consulting practice in Upper Arlington, Ohio, and managed that for 25 years. I continued my professional activities through involvement with NSPE at the national level as director from Ohio and serving as a member and chairman of various committees, including the NSPE education committee around 1975. It was this committee that developed the NSPE policy on education which the board adopted.

Many, if not all, of the organizations representing engineering groups at the national level have expressed concern about the state of engineering education. Two of those groups, both with significant roles to play in the education and legal status of engineering, are NCEES and ABET. NCEES develops, administers, and grades all the tests for registration throughout the U.S. ABET is the accrediting agency that must approve all university programs in

(Continued on page 38)



WHO'S WHO

BENJAMIN FRANKLIN MEDALS

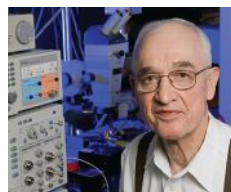
Two Tau Bates were honored in the 2017 Benjamin Franklin Medals:

Mildred S. Dresselhaus, Ph.D., *South Carolina Gamma '51*, of the Massachusetts Institute of Technology, received the Medal for Materials Science and Engineering. She was chosen for contributions to the understand-



ing of carbon nanomaterials, like the spheres known as buckminsterfullerenes, cylindrical pipes called nanotubes, and the single-atom-thick sheets of carbon known as graphene, and for launching the field of low-dimensional thermoelectricity, direct conversion of heat to electricity.

Nick Holonyak Jr., Ph.D., *Illinois Alpha '50*, of the University of



Illinois at Urbana-Champaign, received the Medal for Electrical Engineering. He was

chosen for the development of the first visible (red) laser and LED used in displays and lighting and the use of various alloys in colored light sources. This led to reduced energy consumption and advanced optical communications.

Julio M. Ottino, Ph.D., *Massachusetts Zeta '76*, has received the



2017 Bernard M. Gordon Prize for Innovation in Engineering and Technology Education from the NAE. He is dean of the school of engineering at Northwestern University and was

recognized for the development and implementation of Whole-Brain Engineering, the school's guiding strategy for more than a decade. This merges the analytical and technical components of engineering (left brain) with creativity, design, and divergent thinking (right brain).

Mary T. Barra, Michigan Zeta '85, received the 2016 "Honorary Golden Steering Wheel" at the *Bild am Sonntag* and *Auto Bild's* Steering Wheel awards ceremony in Berlin, Germany. The General Motors CEO was cited for



being "responsible for the renaissance of GM" and "having led the company into the future by establishing a new corporate culture."

Eugene M. DeLoatch, Ph.D., District of Columbia Alpha '59, has received the 2017 Black Engineer of the Year Award "for bringing about progress in higher education during his 50-year career."



He will retire this year after 32 years as founding dean of the school of engineering at Morgan State University. DeLoatch has been president of the American Society of Engineering Education and dean of the Council of Engineering Deans of the Historically Black Colleges and Universities. He was a 2016 TBPI Distinguished Alumnus.

Richard K. Miller, Ph.D., California Lambda '71, has been awarded the 2017 Brock International Prize in Education for "reinvention of undergraduate education." Miller is founding president of the Franklin



W. Olin College of Engineering. The award summary added that the college "has become a model of project-based, design-centric

education for engineering and non-engineering schools alike." The prize is sponsored by the John and Donnie Brock Foundation. **John A. Brock, Oklahoma Alpha '52**, is chairman of the board of Medallion Petroleum.

Mary C. Verstraete, Ph.D., Ohio Kappa '82, has received the 2016



National Outstanding Teaching Award from the American Society for Engineering Education. She is an associate professor and associate

chair of biomedical engineering at the University of Akron. The award recognizes excellence in classroom performance, contributions to the scholarship of teaching, and participation in ASEE. Verstraete is an Advisor of Ohio Kappa.

Steve E. Watkins, Ph.D., Missouri Beta '83, is the 2017 president-elect of IEEE-Eta



Kappa Nu, the honor society of the Institute of Electrical and Electronic Engineers. In 2018, he will lead the organization. He

is professor of electrical and computer engineering and a Missouri Beta Advisor at Missouri University of Science and Technology. He is currently a visiting professor at the USAF Academy.

National Academy of Engineering

The National Academy of Engineering has elected 84 new members and 22 foreign associates, announced NAE President C.D. (Dan) Mote Jr., Ph.D., CA A '59, in early February. Election to the academy is among the highest professional distinctions accorded to an engineer. It honors those who have made outstanding contributions to "engineering research, practice, or education, including, where appropriate, significant contributions to the engineering literature," and to the "pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education." New Tau Beta Pi/NAE members are listed below.

David T. Allen, Ph.D., NY A '79, Melvin H. Gertz Regents Chair in Chemical Engineering, McKetta Department of Chemical Engineering, University of Texas at Austin. For contributions to improving air quality and for developments in sustainable engineering education and practice.

Ellen M. Arruda, Ph.D., PA B '85, professor, macromolecular science and engineering, department of mechanical engineering, University of Michigan. For pioneering research in polymer and tissue mechanics, and their application in innovative commercial products.

David V. Boger, Ph.D., PA H '61, professor, department of chemical engineering, Monash University, Clayton, Victoria, Australia. For discoveries and fundamental research on elastic and particulate fluids and their application to waste minimization in the minerals industry.

Arindam Bose, Ph.D., MI I '76, consultant in business organization, biotechnology, bioengineering, and biosimilars, AbiologicsB LLC, Pawcatuck, CT. For innovations in the manufacture of biologics and service to the professional society organizations that represent the biopharmaceutical industry.

Bimal K. Bose, Ph.D., TN A '56, consultant and emeritus professor, department of electrical engineering and computer science, University of Tennessee, Knoxville. For contributions to advancing power electronics technology and power conversion and education.

Dianne Chong, Ph.D., IL Z '87, retired vice president, assembly, factory, and support technologies, Boeing Engineering, operations, and technology, Boeing Co., Bellevue, WA. For advances in

process and production technologies for composites in large commercial aerospace vehicles.

Mark S. Daskin, Ph.D., MA B '74, Clyde W. Johnson Collegiate Professor and Chair, department of industrial and operations engineering, University of Michigan. For leadership and creative contributions to location optimization and its application to industrial, service, and medical systems.

Andrea J. Goldsmith, Ph.D., CA A '86, Stephen Harris Professor of Engineering, department of electrical engineering, Stanford University, Stanford, CA. For contributions to adaptive and multiantenna wireless communications.

Jennifer A. Lewis, Sc.D., IL A '86, Hansjorg Wyss Professor of Biologically Inspired Engineering, Harvard University, Cambridge, MA. For development of materials and processes for 3-dimensional direct fabrication of multifunctional structures.

Steven B. Lipner, MA B '65, executive director, SAFECode, Wakefield, MA. For developing and deploying practical methods for engineering secure software and computer systems.

Robert W. McCabe, Ph.D., TX E '72, program director, division of chemical, bioengineering, environmental, and transport systems, National Science Foundation, Arlington, VA. For enabling ultra-clean vehicles through conceptual and practical advances in catalytic systems for the abatement of automotive emissions.

Randall W. Poston, Ph.D., TX A '78, senior principal, Pivot Engineers, Austin, TX. For development of diagnostic and repair technologies for concrete

structures and leadership in concrete building code development.

Jon C. Schaeffer, Ph.D., PA A '84, senior engineering manager, materials and processes engineering, GE Power & Water, Greenville, SC. For contributions to the development and implementation of advanced materials in industrial gas turbine engines.

Michael S. Strano, Ph.D., NY P '97, Carbon P. Dubbs Professor of Chemical Engineering, department of chemical engineering, Massachusetts Institute of Technology, Cambridge. For contributions to nanotechnology, including fluorescent sensors for human health and solar and thermal energy devices.

Paul J. Turinsky, Ph.D., RI B '66, professor, department of nuclear engineering, North Carolina State University, Raleigh. For the development of simulation technology for the economic operation, safety, and life extension of nuclear power stations.

David M. Van Wie, Ph.D., MD B '80, mission area executive, precision strike mission area, Applied Physics Laboratory, Johns Hopkins University, Laurel, MD. For contributions to hypersonic technology enabling new classes of flight vehicles.

Katherine A. Yelick, Ph.D., MA B '82, associate laboratory director, computer science, Lawrence Berkeley National Laboratory, and professor, electrical engineering and computer science, University of California, Berkeley. For software innovation and leadership in high-performance computing.

Brink of Failure? High Hazard Potential Dams

By **Trudy E. Bell** (©2017 Trudy E. Bell)

*f*or six weeks straight, rain deluged Kauai, Hawaii. A rural 1,200-acre-foot irrigation reservoir impounded by the 42-foot-high Ka Loko Dam was full, with excess water pouring out the concrete-lined emergency spillway.

Just before dawn on March 14, 2006, a 200-foot-wide breach formed in the dam's 770-foot-long crest; 400 million gallons roared down the steep Waiakalua Stream valley. Within 16 minutes, the wall of water 10 to 30 feet high destroyed, swept away, or damaged over 50 homes and killed seven.

Investigations afterwards revealed that:

High hazard potential dams are ones whose failure would likely kill people. Over 15,000 exist nationwide. Half are older than half a century. More than a third are in poor or unknown condition. And some states exempt dams from safety requirements.

1) the 116-year-old earthfill dam may *never* have been inspected by federal or state regulators because, despite its intermediate size and the farmers living downstream, it was classed as a low hazard dam;

2) two decades earlier, a 1984 joint state-federal report had already cited a need for \$1.9 million in repairs to the dam;

3) in 1997, without a permit, the dam owner bulldozed dirt to partially block the emergency spillway; and

4) the state dam safety office lacked resources to compel the owner to rectify violations or create an emergency action plan.

Ultimately, the owner was charged with manslaughter, convicted of reckless endangerment, and sentenced to seven months in prison.¹

The 2006 Ka Loko Dam tragedy is significant because the dam was all too typical of the thousands of dams that pose risk around the nation: intermediate-sized or even small older structures inadequately inspected and under-maintained, likely without an emergency action plan, whose condition was long ignored despite concern expressed repeatedly by local residents and/or experts.

Many other dams around the country have failed non-fatally in the decade since. October 1–5, 2015 after historic rainfall (15 to 20+ inches¹⁸), 51 dams in and around Columbia, South Carolina—population over 130,000—were overtopped and rapidly eroded away.²¹ A year later, nearly half the public roads washed out by those dam failures still remained closed,²² in part because private dam owners were financially unable to repair or remove their dams. Moreover, last October (2016) almost exactly a year later, another 25 dams failed in the same state during Hurricane Matthew.²³

Official numbers starkly reveal that credit for no fatalities since 2006 is primarily due to dumb luck.

Those dam statistics

After several major fatal dam collapses in the 1970s, the U.S. Army Corps of Engineers (USACE) set up the National Inventory of Dams (NID): a publicly accessible database of dams of any size that potentially threaten at least one human life, plus dams bigger than a certain size (25 feet high storing more than 15 acre-feet, or 6 feet high if storing more than 50 acre-feet; an acre-foot, a volume unit for measuring reservoirs, is 325,851 gallons) regard-





PHOTO: TVA

Five Times Bigger Than Deepwater Horizon Spill!

Not all dams in the National Inventory of Dams (NID) impound water. According to the National Dam Safety Act of 2006, a dam is defined as “any artificial barrier that has the ability to impound water, wastewater, or any liquid-borne material, for the purpose of storage or control...” Some 1,300 dams nationwide (about 1.4%) were constructed by public utilities, mining corporations, or other facilities to impound coal waste, uranium or other mine tailings, or other toxic substances.⁹

Unlike embankment dams built to impound water, tailings dams are commonly made of drilling debris or other loose, unconsolidated material. A 2010 analysis of tailings dam failures over the previous century reveals the failure rate of tailings dams is about 1.2%—“more than two orders of magnitude higher than the failure rate of conventional water retention dams.”¹⁶

One of the nation’s worst tailings dam failures was in Buffalo Creek Valley, WV; it released a suffocating mass of coal waste, wiping out 16 downstream communities and killing 125 people.¹³ On December 22, 2008, the Tennessee Valley Authority’s Kingston Coal Waste Dam near Harriman, TN, collapsed, releasing 1.1 billion gallons (5.4 million cubic yards) of a slurry of ash—a volume five times greater than the massive 2010 BP Deepwater Horizon oil spill in the Gulf of Mexico—into the Emory and Clinch rivers, contaminating water supplies for Chattanooga and other downstream cities in three states [see photo]. While Tennessee does have dam safety laws, regulations specifically exempt coal-ash dams.²⁵ The most recent U.S. tailings dam failure was just last August 27 (2016), when a phosphate tailings dam in Mulberry (Polk County, FL) failed; contaminated liquid reached the Floridian Aquifer,¹⁰ a major water supply for central and northern Florida and southern Georgia.

[Fig. 1] A whopping majority of U.S. dams—nearly two-thirds—are privately owned, whether by corporations, homeowner associations, or individual property owners. Federal agencies own under 4 percent of the nation’s dams (although they regulate additional non-federally owned dams on federal agency lands).¹⁶ Public utilities own more dams than the feds. Over a quarter of all dams are owned by state or local governments. About 70 percent of dams are state-regulated. All charts by Trudy E. Bell based on NID and/or ASCE data.

LEFT: As a result in part of poor maintenance and lack of inspections, Ka Loko Dam in Hawaii breached and the reservoir’s 400 million gallons of water and mud thundered down the river valley, destroying houses and killing seven in the farming community below. The predawn tragedy of March 14, 2006, was the last fatal U.S. dam failure. But two thirds of fatal dam collapses have been of significantly smaller dams. PHOTO: Jack Harter Helicopters

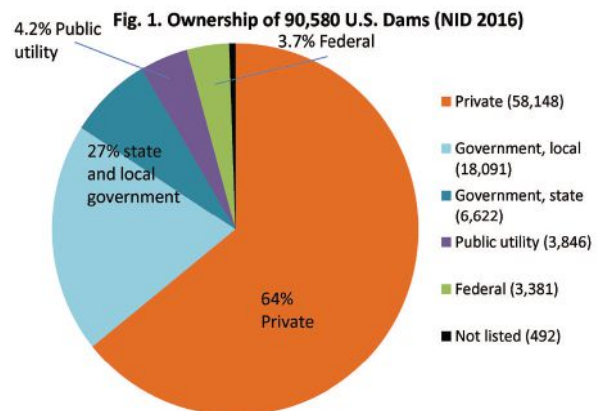
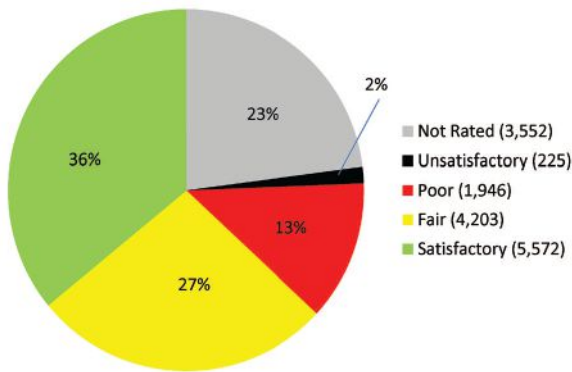
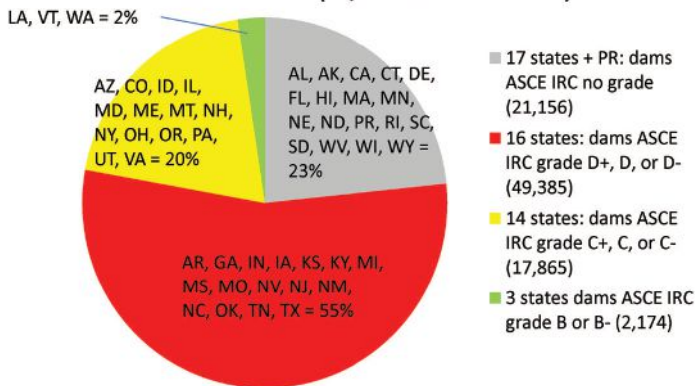


Fig. 2. Ratings of condition of 15,498 U.S. High Hazard Dams, all states (NID 2016)



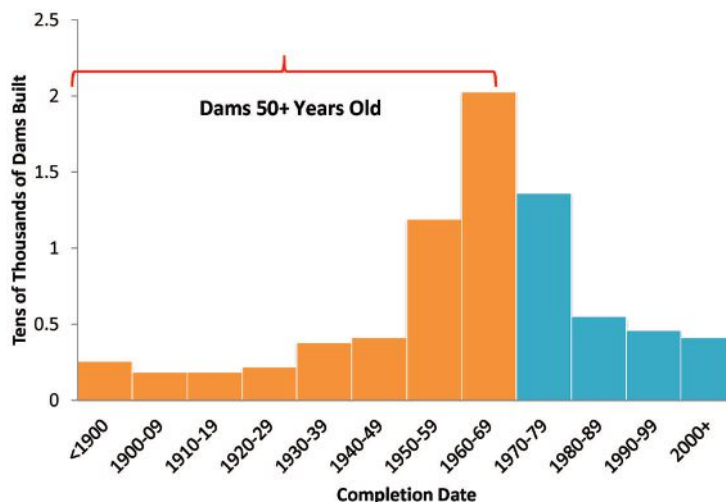
[Fig. 2] About 14% (2,171) of the 15,498 high hazard potential dams in the NID are rated poor (red) or unsatisfactory (black). Moreover, the condition of another 23% (3,442) is not rated, either because it is unknown or undisclosed;²⁰ however, if the same proportion (14%) of the unrated dams also is in poor or unsatisfactory condition, then another 500 or so of the unrated dams likely are also deficient. (Numbers do not total to 100% due to rounding.)

Fig. 3. ASCE 2013 Infrastructure Report Card grades for U.S. dams (90,580 total in NID 2016)



[Fig. 3] In nearly a third of states (16), the ASCE awarded dams (of all hazard potentials) grades of D+, D, or D- in 2013; information was insufficient for dams to be graded in another third of the states (17).

Fig. 4. Age of U.S. Dams (NID 2016)



[Fig. 4] Of the 76,361 dams in the NID (of all hazard potentials) giving completion dates, 63 percent (48,516) were built before 1970, so are now at least 47 years old.²⁸ Moreover, well over 15 percent are 75+ years old (built before 1942), including some of the largest U.S. dams (Hoover, Grand Coulee, and Fort Peck, with Shasta hard behind).

less of hazard to human life.²⁷ As of the 2016 update, the NID included 90,580 dams, half of which (45,402) are under 25 feet high [Fig. 1].

Dams in the NID are categorized by hazard potential. Hazard potential is not condition; it is purely an assessment of the likely severity of downstream damage should the dam fail, given its location, size, reservoir capacity, downstream assets and population, etc. A high hazard potential dam—also called Class 1 (or I) by some states—is one whose failure would probably result in loss of human life regardless of property damage. A significant hazard potential dam (Class 2 or II) is one whose failure would likely result in severe environmental or property destruction and possibly result in the loss of human life. A low hazard potential dam (Class 3 or III) is one whose failure is not expected to endanger human life and whose damage might even be limited to the owner's property.

Smaller Dams = Bigger Hazard

Some 17%—15,498—of the dams in the NID are categorized as high hazard potential. They do not have to be big to threaten lives. According to a 2011 statistical analysis by the U.S. Department of Homeland Security, at least two-thirds of fatal dam failures since 1900 resulted from the collapse of dams considered “small” or “intermediate” between 20 and 49 feet high. Indeed, most were considerably lower and smaller than Ka Loko, with half a dozen impounding less than 100 acre-feet.³⁰

The number of high hazard potential dams is inexorably growing—a phenomenon called “hazard creep.” One cause is increasing population around the country, which encroaches into previously uninhabited downstream hazard zones of dams originally built in comparatively isolated areas. Another cause is the decades-long increasing trend toward exceptionally heavy rainfall events.¹⁹ Both factors are forcing regulators to reclassify dams. Indeed, across the country, the number of dams now classified as high hazard has grown by nearly 60% in less than two decades, up from 9,281 in 1998.⁴

Dams in the NID are also rated by condition or structural soundness. The USACE and the Association of State Dam Safety Officials (ASDSO) use a five-point scale: satisfactory, fair, poor, unsatisfactory, or not rated.²⁹ As of the 2016 NID update, 14% of high hazard potential dams are considered deficient—having not only potential to take lives, but also being at significant risk of failure²⁰—and another 23% are not rated [Fig. 2].

Independently, the American Society of Civil

Engineers (ASCE) in its quadrennial Infrastructure Report Card reports, awards letter grades (A, B, C, D, F, plus ?) for condition² of various types of infrastructure in each state. [Table 1]. For the nation as a whole, the ASCE assigned dams a grade of D, meaning “Poor: At Risk” [Fig. 3]. (Note: The letter grades in this article are those given in the ASCE’s 2013 report card. ASCE’s 2017 report card was to be published on March 9, and they declined to share

any updated state grades in advance; however, it is hard to imagine that many—if any—of the ASCE dam grades would have improved over the past four years.)

Age and Neglect

By 2020—just three years hence—nearly two-thirds of U.S. dams will be older than half a century [Fig. 4]. Since many dams, like much other heavy infrastructure (such as interstate highways and power plants), are built with a nominal design life of 50 years, that means a “staggering percentage of our dams... have either just surpassed the extent of their intended design lives or will do so in the very near future,” noted the Center for American



The 59-foot-high Lake Delhi Dam in Iowa failed in 2010 when it was overtopped during record rainfall. A 2009 inspection of the 80-year-old dam had revealed one of three spillway gates was inoperable; also, a strengthening concrete core wall did not reach the embankment’s maximum height, allowing seepage to weaken the dam. Emergency responders evacuated downstream residents fast enough that no lives were lost. PHOTO: Iowa Department of Natural Resources.

Progress (a public policy think tank) in 2012.⁹

Heavy infrastructure can long outlast its design life if it is well-maintained. But, therein lies the rub. Age exacts a heavy toll with neglect.

According to the Federal Emergency Management Agency (FEMA), an analysis of 656 U.S. dam failures from 1975 to 2011 reveals that the single greatest cause of dam breaches (70.9%, 465 incidents) is flooding and overtopping from heavy rainfall. The second biggest cause of failure (14.3%, 94 incidents) is piping or seepage through or under a dam.¹⁴

Overtopping can happen to a dam of any age, but how well the dam withstands it depends also on the soundness

U.S. Army Corps of Engineers Rating in National Inventory of Dams (NID) ²⁹		ASCE 2013 Infrastructure Report Card Grades ³	
Rating	Definition (abbreviated)	Grade	Definition (abbreviated)
Satisfactory	No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions (static, hydrologic, seismic).	A	90-100%: Exceptional, fit for the future. Excellent condition, new or recently rehabilitated, meets future capacity needs. Resilient to withstand most disasters and severe weather.
Fair	No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency.	B	80-89%: Good, adequate for now. Some elements show signs of general deterioration that require attention. A few exhibit significant deficiencies. Safe and reliable with minimum risk.
Poor	A dam safety deficiency is recognized for realistic loading conditions. Remedial action is necessary.	C	70-79%: Mediocre, requires attention. Fair to good condition, general signs of deterioration. Some elements exhibit significant deficiencies. Increased vulnerability to risk.
Unsatisfactory	A dam safety deficiency is recognized that requires immediate or emergency remedial action.	D	50-69%: Poor, at risk. Poor to fair condition, mostly below standard. Significant deterioration; many elements approaching end of service life. Strong risk of failure.
Not Rated	The dam has not been inspected, is not under state jurisdiction, or has been inspected but, for whatever reason, has not been rated.	F	<50%: Failing/critical, unfit for purpose. Unacceptable condition, widespread advanced signs of deterioration. Many components exhibit signs of imminent failure.
		?	Incomplete; data available are insufficient to provide a grade.

[Table 1] The ASCE grades for condition by state—grades intended to apply to all kinds of national infrastructure ranging from airports to highways—approximately but not exactly correlate to the USACE and ASDSO ratings for the condition of dams. Colors shown are the ones used in the pie charts in Figs. 2 and 3 (in 2013, the ASCE did not grade any state’s dams either A or F).

of its internal structure and maintenance of its exterior. Risk of overtopping increases if a reservoir's capacity is diminished due to the deposition of sediments, or if runoff increases from pavement and other impermeable surfaces from subdivisions and businesses later built upstream, stressing the dam's original design.¹⁵ Dams can also be weakened by the burrowing of rodents, the penetration of tree roots, or the rusting of metal pipes or structural components. Such risk factors can be managed only through thorough inspections and timely maintenance.

Underfunded and Understaffed

ASDSO keeps tabs on state dam safety programs, including their annual budgets and full-time equivalent state employees (FTEs). Nationwide, in 2015 state dam safety programs collectively received \$49.4 million—which sounds pretty good until you realize that more than a quarter of that was the budget for California alone (\$13.2 million). Another 13 states have budgets ranging between \$1 and \$2.6 million, subtotalling another \$19.5 million. But the remaining \$16.7 million in state budgets is split unevenly among 35 states—and Alabama has no dam safety budget at all.⁴

But wait, there's more. Six states (Oklahoma, Iowa, Kansas, South Dakota, Missouri, and Mississippi) have dam safety budgets so tight that they translate to between \$22 and \$93 annually per dam—scarcely enough to reimburse mileage for travel to/from a dam, much less the costs of the inspection itself or any needed maintenance.³²

Similarly, out of the nation's 395 FTEs responsible for the safety of all state-regulated U.S. dams, nearly half (195) work in the 14 top-funded states. The other half are spread among 35 states (with 0 in Alabama). Nationwide, each dam safety FTE must oversee an average of 205 dams (of all classes)—indeed, more than 1,000 dams in Iowa, Oklahoma, and South Dakota. The result, predictably enough, is that some states are chronically behind in dam safety inspections—meaning that even high hazard dams can go longer than five years between inspections.⁹

The federal situation is only marginally better. Repeatedly throughout federal agency reports in FEMA's most recent (fiscal years 2014–15) biennial report to Congress on the National Dam Safety Program (NDSP), the theme was lack of resources. Despite the fact that since 2008 the National Dam Safety Review Board passed a requirement for all federal agencies and participating states to establish an emergency action plan (EAP) for every high hazard potential dam (inundation maps, warning systems, evacuation plans, community emergency shelters, etc.), by 2015 not even high hazard dams under federal regulation had achieved 100% compliance.¹⁶

Secrecy vs. safety and liability

FEMA's 32-page booklet *Living With Dams: Know Your Risks* states that anyone near a manmade lake "requires an understanding of what that proximity entails." Even if property lies above any potential inundation zone, "in many cases the dam is owned by a neighborhood association of lakeside property owners who are responsible for

the dam's maintenance and are liable for any risk posed by the dam." The booklet recommends asking state officials about the dam's hazard potential classification, when it was last inspected, what is its condition, whether the owner is financially capable of properly maintaining the dam, and whether there is an emergency action plan (EAP) in place in the event of a dam failure.¹⁵

Although such information was long a matter of public record in the NID, after the terrorist attacks of September 11, 2001, the USACE redacted downstream hazard potential and condition assessment from the publicly accessible version of the NID because of national security concerns.¹² To be sure, only one incident near a U.S. dam seems a possible candidate for a terrorist attack: two Molotov cocktails were detonated on an access road to the embankment Black Rock Dam in Thomaston, CT, on July 4, 2010; neither the dam itself nor any people were harmed.³¹ However, in 2002 some laptop computers confiscated from Al-Qaeda in Afghanistan indicated plans for launching cyber-attacks on control systems for U.S. dams. And in 2013, a USACE database containing the hazard and condition information redacted from the NID was hacked.⁸

Similarly, some states no longer disclose basic safety data about hundreds of small to intermediate individual dams—even though such literally life-or-death information is crucial for both informed public policy and nearby residents. For example, North Carolina restricted access to EAPs and inundation maps for coal ash dams [see sidebar *Five Times Bigger Than Deepwater Horizon Spill!*] to the general public and even to first responders.¹¹ Other states have no requirements for acquiring such data. Texas has 7,395 dams (of all classes), the most of any state; but in 2013, state legislators exempted nearly 3,000 dams (close to 40%) from inspections—216 of them of significant hazard potential and impounding up to 500 acre-feet when full—and freed the owners from meeting safety requirements of the Texas Commission on Environmental Quality.⁷ And Alabama collects no dam safety data so has no data to share.

The inaccessibility of data about the hazard potential and condition of thousands of U.S. dams concerns some citizens and groups more than national security. "Far more worrisome, factual, common, and fatal have been actual dam-failure disasters caused by poor engineering, shoddy construction, poor geological information, human error, neglected maintenance, cost-cutting, lack of inspection, political pressures, government corruption, captive regulators, ice floes, bad weather, mud slides, and flooding," noted the Society of Environmental Journalists (SEJ) in 2013. "And today, earthquakes are increasingly a concern."²⁴

The specific concern is earthquakes induced by the high-pressure injection of hydraulic fracturing wastewater into disposal wells. A study of induced seismicity in central Oklahoma and Kansas found that induced earthquakes can occur up to 21 miles away from a wastewater injection site, potentially damaging the structural integrity of dams.³³

Upshot: in the absence of information, any location below the elevation of a nearby dam should be assumed to be at some physical risk.

Moreover, upstream property owners may unknowingly be at legal risk for downstream damages. “Today, virtually all states impose some form of strict liability on owners of water control structures that cause harm to others even if the owner utilized utmost care,” concluded an Association of State Floodplain Managers (ASFPM) white paper.²⁶ In some states (e.g., Montana), liability extends to owners of land on which the dam sits or to a homeowners association of residents around a reservoir, even if they do not own the actual dam.¹⁷

What will it take?

Four years ago, the estimated tab for rehabilitating the nation’s dams was of the order of \$54 billion.⁵ That’s a good 1,000 times more than the nation’s collective state and federal annual budgets for dam safety. But as every longtime homeowner knows, ignored deterioration doesn’t go away: it inexorably grows more extensive and expensive.

The most recent NDSP report was blunt: “FEMA... strongly believes...that many Americans are living below structurally deficient high hazard dams; Americans are unaware of the risk; there is no plan in place to evacuate them to safety in the event of a failure; or there is a plan in place but they are not aware of it.”¹⁶ As daunting as the magnitude of investment to rehabilitate U.S. dams may be, CAP warned: “...the costs of inaction are exponentially higher and will likely not be measured only in dollars spent but, more importantly, in lives lost.”⁹

References

To save space, only references quoted or from which numbers were cited appear below; many more were also consulted. Acronyms spelled out in the article are not repeated below. URLs can be found for most references by searching on the title.

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- ⁴ ASDSO, “State and Federal Oversight of Dam Safety Must Be Improved,” Oct. 2016.
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¹³ Erikson, Kai T., *Everything In Its Path: Destruction of Community in the Buffalo Creek Flood*, Simon & Schuster, 1976.

¹⁴ FEMA, *Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures*, P-946, July 2013.

¹⁵ FEMA, *Living With Dams: Know Your Risks*, P-956, 2013. See also a different document with the same title by ASDSO, *Living With Dams: Know Your Risks*, April 2012.

¹⁶ FEMA, *The National Dam Safety Program, Biennial Report to the United States Congress, Fiscal Years 2014–2015*, P-1067, Aug. 3, 2016.

¹⁷ Lemieux, P.E., Michele, “Legal Liability of Dam Ownership in Montana” [presentation in 2013].

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²⁷ USACE NID welcome page.

²⁸ USACE NID National tab (bottom bar chart).

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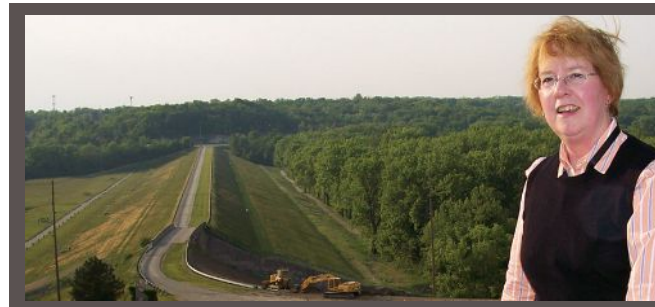
³⁰ U.S. Department of Homeland Security (DHS), *Dams Sector: Estimating Loss of Life for Dam Failure Scenarios*, Sept. 2011.

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Postscript: This article was completed before the February evacuation of nearly 200,000 people below Oroville Dam in California after record rainfall damaged both the regular and emergency spillways. The fact that concerns raised in 2005 official documents about needed safety measures (e.g., armoring the emergency spillway with concrete) were not pursued is yet another clarion warning for all high hazard dams nationwide.



Trudy E. Bell, M.A., (t.e.bell@ieee.org) is a former editor for *Scientific American*, senior editor for *IEEE Spectrum*, and senior writer for the University of California High-Performance AstroComputing Center (UC-HiPACC). She is the author or coauthor of a dozen books, including *Weather* (Smithsonian/HarperCollins 2007) and *The Great Dayton Flood of 1913* (Arcadia 2008). She curates the research blog ‘Our National Calamity’: *The Great Easter 1913 Flood* at (<http://trudyebell.com/1913flood.php>). This is her 27th feature for *The Bent*. She is shown here near Huffman flood-control dam built in Ohio after the 1913 flood.



THE TAU BETA PI CHAPTER ENDOWMENT INITIATIVE WAS LAUNCHED IN SPRING 2014 TO FUND ASSOCIATION ACTIVITIES THAT SUPPORT THE COLLEGIATE CHAPTERS. MAJOR GIFTS OFFICER SHERRY D. JENNINGS-KING, TENNESSEE ALPHA '93, SHARES PROGRESS AND DEVELOPMENTS.

Chapter Endowment Update

Steady progress is being made on our Chapter Endowment Initiative, by which alumni, companies, and foundations can permanently endow the Association's activities that support any of our 245 student chapters. Last year we reported 30 gifts/pledges to either fully or partially endow chapters and this year we add 43 to the list as we strive to endow all of our chapters.

To date, 101 alumni have stepped forward with gifts/pledges in support of 62 of our collegiate chapters.

At this time, endowed chapters include:

IN Gamma	Univ. of Notre Dame	\$125,000
VA Alpha	University of Virginia	\$115,000
IA Alpha	Iowa State University	\$110,000
MI Gamma	University of Michigan	\$104,912
CA Delta	Univ. of S. California	\$100,000
CA Upsilon	CSU, Sacramento	\$100,000
MI Epsilon	Wayne State University	\$100,000
MI Zeta	Kettering University	\$100,000
NY Delta	Cornell University	\$100,000
OH Gamma	The Ohio State Univ.	\$100,000
SD Alpha	SD School of Mines & Tech.	\$100,000
TX Beta	Texas Tech University	\$100,000

While gifts of a minimum of \$5,000 are being accepted, a donation of \$100,000 is required to fully endow a chapter. A naming opportunity is available for giving at the \$100,000 level and such gifts may be made over a period of 3-5 years. In cases where a group of individuals pool their funding to reach \$100,000 within a one-year timeframe, a naming opportunity can be created to honor or memorialize a trusted advisor, former professor, friend, etc.

Any collegiate chapter can be endowed—you can designate your gift for your initiating chapter or another one that is important to you. In some cases, alumni have voiced a preference for allowing their gift to support “any” chapter. So, we have decided to establish a designation specifically for this.

Permanent Funding

As stated under the terms of the Chapter Endowment Initiative, investment income from the endowments will provide permanent funding for students of the endowed chapter to: attend the annual Tau Beta Pi Convention;

receive officer leadership training through the District Program; obtain professional development through Engineering Futures sessions; participate and facilitate MindSET activities; support Headquarters operations; and conduct chapter-directed activities on campus and in the community.

To date, we have conducted challenge matches on behalf of two chapters: CA Gamma at Stanford University and IA Alpha at Iowa State University. In each of these cases, an individual stepped forward with a pledge of at least \$20,000 and matched gifts from former classmates and alumni in amounts of \$5,000 minimum. Plans to conduct a third challenge match on behalf of CA Alpha at University of California, Berkeley, are underway for this summer.

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

Tax-deductible

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

Thank you to everyone who has already stepped forward or is considering supporting your home chapter or any other chapter. We look forward to adding more chapters to the list of those being supported in next year's spring issue of *The Bent*.

For more information on the Chapter Endowment Initiative, please check out our website at <http://www.tbp.org/give/chapterEndowment.cfm> or contact Sherry Jennings-King, Major Gifts Officer, by phone at (612) 226-2922 or by email to sherry.jenningsking@tbp.org.

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

New Gifts and Pledges Received

Michigan Gamma Chapter for MI Gamma at University of Michigan	\$100,000	Arthur J. Beutler, WI A '48 for WI Alpha at University of Wisconsin-Madison	\$5,000
Lee A. Hennis, CA Δ '65 for CA Delta at University of Southern California	\$80,000	Alan V. Dausman, P.E., IN E '77 for IN Epsilon at Trine University	\$5,000
Anonymous, IN Γ '78 for IN Gamma at University of Notre Dame	\$50,000	Richard A. Derbes, OH A '68 for OH Alpha at Case Western Reserve University	\$5,000
Anonymous, IN Γ '87 for IN Gamma at University of Notre Dame	\$50,000	Ronald J. Drnevich, IN Γ '63 for IN Gamma at University of Notre Dame	\$5,000
John W. Bolender, WI A '51 for WI Alpha at University of Wisconsin-Madison	\$28,120	LeVern W. Faidley, Ph.D., IA A '67 for IA Alpha at Iowa State University	\$5,000
Jason B. Ditman, IL A '91 for IL Alpha at University of Illinois	\$25,000	Reed H. Freeman, MA B '61 for MA Beta at Massachusetts Inst. of Technology	\$5,000
Mark A. Stevens, CA Δ '81 for any chapter	\$25,000	William H. Gardiner, IA A '55 for IA Alpha at Iowa State University	\$5,000
Robert and Hilda C. Chow, both CA E '85, for CA Epsilon at University of California, L.A.	\$20,000	Michael P. Gigliotti, PA Θ '73 for PA Theta at Villanova University	\$5,000
Franklin M. Fong, CA Δ '69 for CA Delta at University of Southern California	\$20,000	Richard C. Gross, IL Γ '80 for IL Gamma at Northwestern University	\$5,000
Lester M. Holland Jr., IL A '66 for IL Alpha at University of Illinois	\$10,000	Lawrence J. Hollander, P.E., NY E '51 for NY Mu at Union College	\$5,000
for AZ Alpha at University of Arizona	\$5,000	Howard E. Jessen, CA B '46 for CA Beta at California Institute of Technology	\$5,000
for AZ Beta at Arizona State University	\$5,000	Mary Jo & Dick (CA Γ '65) Kovacevich Family Foundation for CA Gamma at Stanford University	\$5,000
David E. Kepler II, CA A '75 for CA Alpha at University of California, Berkeley	\$20,000	Robert E. Levin, Ph.D., CA Γ '53 for CA Gamma at Stanford University	\$5,000
Anonymous, NY B '80 for NY Beta at Syracuse University	\$20,000	Stewart C. O'Dell, TX Γ '78 for TX Nu at University of Texas-Rio Grande Valley	\$5,000
Anonymous, MI Γ '78 for IL Gamma at Northwestern University	\$5,858	Robert W. Peters, CA Z '61 for CA Zeta at Santa Clara University	\$5,000
for MI Gamma at University of Michigan	\$4,912	Bobby S. Shackouls, MS A '72 for MS Alpha at Mississippi State University	\$5,000
John A. Hopkins, TN A '88 for TN Alpha at University of Tennessee	\$10,000	William F.H. Sinclair, MS A '63 for MS Alpha at Mississippi State University	\$5,000
David D. Kilzer, IA A '96 for IA Alpha at Iowa State University	\$10,000	Carl M. Stahle, Ph.D., MD B '81 for MD Beta at University of Maryland	\$5,000
Philip W. King III, TN A '66 for TN Alpha at University of Tennessee	\$10,000	Anonymous, MI Γ '82 for PA Delta at University of Pennsylvania	\$5,000
Robert F. Sykes, PA H '47 for PA Eta at Bucknell University	\$10,000	Anonymous, NY K '68 for NY Kappa at University of Rochester	\$5,000
R. Dudley White, VA A '76 for VA Alpha at University of Virginia	\$10,000	Anonymous, WI A '50 for WI Alpha at University of Wisconsin-Madison	\$5,000
Paul M. Adamo, TX A '85 for NH Beta at Dartmouth College	\$5,000	Anonymous, WI A '64 for WI Alpha at University of Wisconsin-Madison	\$5,000
John "Fritz" Angle, NY Δ '82 for NE Alpha at University of Nebraska-Lincoln	\$5,000		
James S. Balloun, IA A '60 for IA Alpha at Iowa State University	\$5,000		

John J. Uhran Jr., Ph.D., *IN A '63*

Endowment for the Indiana Gamma Chapter at University of Notre Dame

“*d* O WHAT YOUR PASSION IS” notes John J. Uhran Jr., Ph.D., professor emeritus, in the department of computer science and engineering at University of Notre Dame. That is what he has done since leaving graduate school 50 years ago and it has served him well. “Teaching is a wonderful profession. Although most of my students have gone into engineering, many have gone into business, law, medicine and education.”

Uhran is a much-loved figure in the halls of Notre Dame and his students certainly have not forgotten him. TBI Headquarters was contacted by two former students who went on to successful careers and each recently contributed \$50,000 gifts to support the Chapter Endowment Initiative for Indiana Gamma at Notre Dame in honor of Uhran. Discussing this generous gift, Uhran shared that he was, “Surprised and grateful.”

Born in Flushing, NY, he lived there for 25 years, attending high school and college in the metropolitan area. Living a 1½ hour subway ride away, he learned to study while being a “strap-hanger.” Uhran shared that he was aware of the field of engineering as a child since his father was a civil engineer. He was able to work several summers on large highway projects in New York and at one electronics defense laboratory.

Uhran received his undergraduate degree in electrical engineering from Manhattan College and admits that graduate school was not on his mind. “In those days, people did not talk much about post graduate work.” While working as an engineer on Long Island, he started taking business classes in the evenings, but realized he needed more education and began engineering night classes in preparation for going full-time to graduate school. At the time, most of the engineers he worked with had received degrees from schools in the metropolitan New York area and at Purdue in West Lafayette, Indiana. After four years, he decided to head to Purdue and began full-time studies for a master’s. Receiving a teaching assistant position and interacting with students, he decided to pursue a Ph.D.

Teaching Award

Uhran became an instructor and won the Tau Beta Pi Graduate Teaching Award. During his last year, he was an NDEA Fellow. This was when he was inducted into Indiana Alpha at Purdue as there was no chapter where he did his undergraduate work at the time.

1966 was a busy year: completing and defending his research, getting married, and job hunting. His love of

teaching, nurtured while at Purdue, made the decision easy, and he finally accepted an assistant professor of electrical engineering position at Notre Dame. Communications was Uhran’s main area of interest and in 1977, he took a sabbatical and worked at MIT Lincoln Laboratory in Lexington, MA, doing theoretical research work in satellite communications.

One of his early proposals brought the first minicomputer, a PDP-8, to Notre Dame. He co-developed a software package, NDTRAN, which became popular for modeling courses in a number of universities, with a colleague in economics and several students.

Having held several administrative positions in the department and college, as well as officer positions in ASEE, he was appointed associate engineering dean in 1996. His background and interest in engineering education made him the logical choice to chair a committee to make first-year studies more relevant for the engineering students at Notre Dame. The result was a number of recommendations subsequently adopted there and by others.

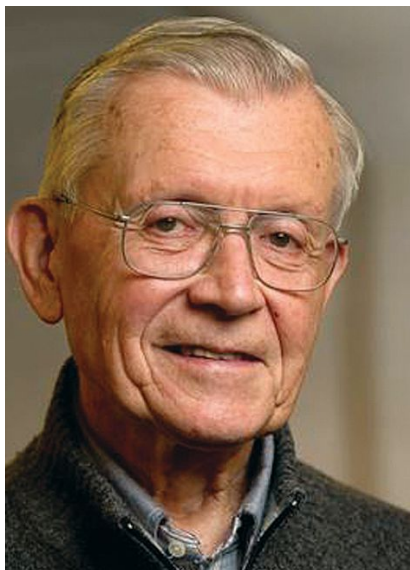
Main Purpose

Nine years ago he started a conference on first-year engineering education (now called FYEE). Involving colleagues on both coasts, the conference was expanded and the most recent one was held last August at The Ohio State University, involving 220 faculty and professionals. The main purpose of this meeting continues to provide an opportunity for educators and administrators who work with first-year engineering students to gather and share.

Uhran has been involved with the Accreditation Board for Engineering and Technology (ABET) as a program evaluator for over 30 years. He also continues to be involved with the Indiana Gamma Chapter and was Chief Advisor until his retirement.

A highlight in his career was when he became a fellow of the American Society of Engineering Educators (ASEE). Uhran was involved with ASEE for over 30 years in various capacities, including four years on the Board of Directors.

His advice to the engineering students of today includes, “Stick to it. It’s a great profession. Work hard because it’s worth it. Besides learning what makes the world around us work, an engineering degree leads to many interesting and varied careers.” He adds that students now have opportunities to expand their horizons, such as study-abroad programs and internships.



Michigan Gamma, est. 1906

Endowment for the Michigan Gamma Chapter at University of Michigan

IN JUNE 2016, THE MICHIGAN GAMMA Chapter of Tau Beta Pi decided to join alumni across the country and support the effort to endow the Association's activities that support all 245 student chapters...by endowing themselves at the level of \$100,000. Encouraged by the support of an anonymous donor who stepped forward in May 2015 with a gift of stock to kick-start support of their chapter through the Chapter Endowment Initiative, the Michigan Gamma student officers and advisors stepped forward in a unanimous move.

While the overwhelming majority of student chapters do not have the financial capacity to do the same, raising only modest support for their activities each year through charging for EIT preparation sessions, as well as candy bar and bake sales, Michigan Gamma is in a different position. Over the last 30 years, the chapter has become on some levels synonymous with the SWE/TBPI Career Fair to which its name is attached. By far the chapter's largest event, the career fair also serves as a recruiting event, publicity opportunity, and, perhaps most importantly, fundraiser. The fair was first mentioned in the 1983-84 Chapter Survey. The chapter project description indicates that the idea of the career fair evolved from the annual industry banquet that SWE and TBPI had organized in previous years. According to the 1984-85 Chapter Survey, the first SWE/TBPI Career Fair was to have been held on January 21, 1985. Unfortunately, poor corporate response led the organizing committee to cancel the event and focus on making a more successful attempt during the following academic year.

Sound Economic Footing

The first fair was held on January 20, 1986. It hosted only 19 companies and provided little (if any) income for the chapter. Since then, the event has grown to host nearly 350 companies and the proceeds have grown accordingly. In large part, due to the success of the fair, Michigan Gamma has found itself to be on exceptionally sound economic footing and awards scholarships to aspiring students each year.

Keeping an eye on the future, in early 2014 the

chapter's Advisory Board investigated ways of reducing its economic impact on the broader Association and of safeguarding its economic stability. The creation of the Chapter Endowment Initiative in June 2013 presented them with an opportunity. In October 2015, the chapter officers voted unanimously to authorize the creation of the endowment with Headquarters, to provide the initial \$100,000 contribution, and to make additional contributions each year as chapter finances allow.



Mike Hand, who is now a District 7 Director, notes, "I had the fortune to be involved in the planning and decision making for the chapter endowment from the beginning. While the process wasn't as straightforward as I had initially thought it would be, knowing that I was helping to ensure the financial future of the Association as a whole and of the Michigan Gamma Chapter in particular, all while being a part of something relatively unprecedented in the organization, was a very rewarding process."

"I worked alongside several Michigan Gamma officers (especially the treasurers) who went to great lengths to make this happen. While these officers deserve a great deal of credit for their role in making this happen, it would not have been possible without the work put in by every Michigan Gamma initiate over the last 30+ years who helped pave the way for the current success that the chapter enjoys. I look forward to seeing the Chapter Endowment Initiative continue to grow, both for Michigan Gamma and for chapters across the Association."

Portions of this article were contributed by Elson Y. Liu, Ph.D., AZ A '01, MI Γ President Fall 2006, and Advisor 2007-14 and Michael J. Hand III, MI Γ '11, MI Γ President Fall 2012, Advisor 2013-16, and currently a District 7 Director.

New Challenge Match Issued

Tau Beta Pi has received a challenge match of \$20,000 from alumnus, **David E. Kepler II, CA A '75**, pictured,



a former executive vice president for business services of The Dow Chemical Company, chief information officer, and chief sustainability officer.

This gift is in support of our Chapter Endowment Initiative, by which alumni, companies, and foundations can permanently endow the Association's activities that support any of our 245 student chapters.

While gifts of a minimum of \$5,000 are being accepted

for this effort, a gift of \$100,000 is required to fully endow a chapter—and we are trying to reach this amount for California Alpha at University of California, Berkeley!

To date, we have \$10,000 through this effort for CA A, and David was the first member to step forward in 2014 with a gift of \$5,000 followed by **Richard W. Karn, CA A '50**, in 2015 with \$5,000.

In order to encourage more support, David has generously stepped forward again to finance a new \$20,000 challenge match. While the first \$5,000 of his new \$20,000 challenge match constitutes a gift toward this, the remaining \$15,000 is a pledge that will be paid out in increments of \$5,000 to match the next three gifts made by others who come forward with gifts of this minimum amount designated for CA A.

For more information on this opportunity or to learn more about the Chapter Endowment Initiative, please see our website at www.tbp.org/give/chapterEndowment.cfm or contact Sherry Jennings-King, Major Gifts Officer, by phone at (612) 226-2922 or by email to sherry.jenningsking@tbp.org.

California Gamma Needs One More

Franklin "Pitch" Johnson Jr., CA Γ '50, founder of Asset Management Company in Palo Alto, CA, was the first member to step forward and support our California Gamma Chapter at Stanford University through our Chapter Endowment Initiative



with a \$20,000 challenge match, as reported in the Spring 2016 issue of *The Bent*. A mailing was sent to CA Γ alumni in June 2016 and the result was two gifts of \$5,000 in support of this chapter. We still need one more gift of \$5,000 to complete this match, so please consider helping us finish this challenge!



Iowa Alpha Hits Target

Thanks to the generosity of an anonymous donor, plus **William H. Gardiner, IA A '55**, **LeVern W. Faidley, Ph.D., IA A '67**, and **James S. Balloun, IA A '60**, Iowa Alpha at Iowa State University reached \$100,000 to endow the chapter. We would also like to thank **David D. Kilzer, IA A '96**, who is making a gift to get the chapter to \$110,000!



California Delta Reaches Total

Thanks to the generosity of **Franklin M. Fong, CA Δ '69**, and **Lee A. Hennis, CA Δ '65**, the California Delta Chapter at the University of Southern California is now at \$100,000. Thank you both for your support of the Chapter Endowment Initiative!



Wisconsin Alpha Progress

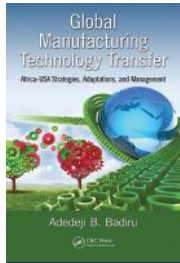
The first step to endow the Wisconsin Alpha Chapter at University of Wisconsin-Madison was taken by **John W. Bolender, WI A '51**. John came forward with a \$20,000 challenge match as reported in the Summer 2016 issue of *The Bent*.

A mailing was sent to WI A alumni in June 2016 and the result included three gifts of \$5,000 which completed the match and inspired John to increase the size of his original gift. We are now at \$43,120 for this chapter as we strive to the final goal of \$100,000!



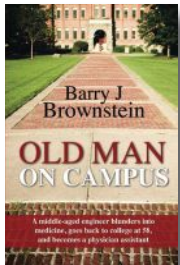
AUTHORS

Adedeji B. Badiru, Ph.D., P.E., Tennessee Gamma '79, has authored *Global Manufacturing Technology Transfer*, which presents practical strategies for issues like economic development through manufacturing for developing nations.

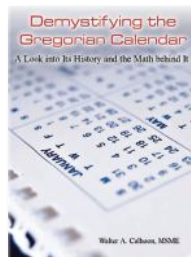


Badiru is dean and senior academic officer for the graduate school of engineering and management at the Air Force Institute of Technology. Publisher is CRC Press.

Barry J. Brownstein, Maryland Beta '68, is a former air force officer and engineering manager who went to an open house at his new local hospital. This led to him going back to college at aged 58 and becoming a physician assistant, who sometimes make 911 runs in the middle of the night. Brownstein has put it all in a memoir entitled *Old Man on Campus*. Publisher is CreateSpace.

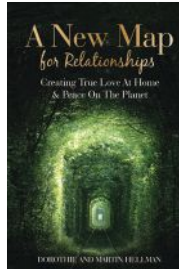


Walter A. Calhoon, Ph.D., P.E., Illinois Delta '64, has written *Demystifying the Gregorian Calendar*. It details the origins, precursors, and competitors, as well as the mathematical treatment and accuracy of the system much of the world uses today. Publisher is Llumina Press.

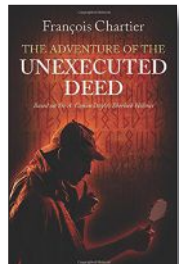


Martin E. Hellman, Ph.D., New York Epsilon '66, and wife Dorothie, have

written *A New Map for Relationships*, subtitled *Creating True Love at Home and Peace on the Planet*. It reveals the secrets that allowed them to transform an almost failed marriage into one with the love of when they first met fifty years ago. They believe that working on global issues proved critical to bringing magic back into their marriage, and truly loving personal relationships provide the model for a peaceful, sustainable planet. Published by New Map Publishing.



Nils E. Nilsson, P.E., Ohio Beta '71, has authored *The Adventure of the Unexecuted Deed*, subtitled *Based on Sir A. Conan Doyle's Sherlock Holmes*. Writing under the nom de plume Francois Chartier, he has Homes summon Dr. Watson for a case that goes international and draws in some old cases, as well as Moriarty. Publisher is Outskirts Press.



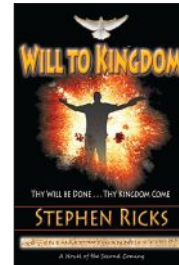
Michael J. Massimino, Ph.D., New York Alpha '84, is a retired NASA astronaut and has written *Spaceman, An Astronaut's Unlikely Journey to Unlock the Secrets of the Universe*. It chronicles his journey from a working-class Long Island childhood, through Columbia University and MIT, to astronaut selection and spacewalk fame. Publisher: Penguin Random House.



Johnroy Messick, P.E., Alabama Alpha '68, has a career which includes over 60 years of studying and practice in the energy sector. He has written *Stop the "Fuelishness"*. The book presents Messick's self-funded research and a solution to transitioning away from fossil fuels "based on truth, honesty, and knowledge, not based on money from Big Oil and the Koch brothers." Publisher is Xlibris US.



Stephen W. Ricks, Indiana Alpha '63, has written *Will to Kingdom*—30 years from inspiration to publication—aimed at exposing, in fictional form, some of the most damaging logical problems in Christianity. What is needed is a civil engineer to make a few critical adjustments to set things in order. Ricks believes if we get the right understanding, Christianity will work to promote peace on earth. Publisher is CHB Media.



Taylor J. Smith, Ohio Alpha '62, has authored *Into the Air*, a scientific detective story. He tells of an engineer who tries to play it straight as a series of events lead him through every aspect of a polymer industry, from raw materials to finished products. He is stunned by the human cost of the business to which he has committed his life. Publisher is LifeRich Publishing.



Profiles in Leadership #10

Irwin Jacobs: Engineer, Entrepreneur, and Philanthropist

Irwin M. Jacobs, Sc.D., New York Delta '56, co-founder of Qualcomm

by Alan S. Brown

don't let Irwin Jacobs' unassuming demeanor fool you. He may look and speak like the MIT professor he once was, but beneath his unassuming exterior beats the heart of a gambler.

Jacobs' company, Qualcomm, was only four years old in 1989 when it challenged the wireless industry's communications standards. His team had done trailblazing work in satellite and military communications but had no wireless experience. His proposal involved difficult technology. The industry was already committed to another standard.

Wireless providers faced problems. Mobile phone sales were booming and analog technology could not handle the traffic. Rather than build new towers, the industry wanted to digitize and compress conversations so it could fit more data into the existing spectrum.

But first they needed to agree upon a communications standard. After several fractious years of debate, they opted for TDMA. Time division multiple access earns its name by slicing each frequency channel into time slots. It allocates those slots among several phones, which send short bursts of compressed data during their slot. This boosts the amount of traffic each channel could handle, but Jacobs thought there was a more efficient way.

What does it mean to be a leader? In this series "Profiles in Leadership," Tau Beta Pi is exploring that essential question through the lives of member engineers who attained leadership positions in their fields.

Jacobs knew TDMA. His previous company, Linkabit, had developed time-based modems for satellite and military communications, starting in the 1970s, and an early specialized TDMA wireless phone.

Jacobs discovered an alternative after founding Qualcomm in 1985 when Hughes Communications asked his firm to review a technical proposal for a satellite-based

mobile phone system. Hughes had proposed a TDMA-like approach to share satellite bandwidth. While returning from a meeting with Hughes, Jacobs and two of his partners, Andrew J. Viterbi, Ph.D., *MA B '57*, and Klein Gilhausen realized there was another option that no one had considered.

Code Division Multiple Access

It was called CDMA for code division multiple access. Developed during World War II, it used a technique called frequency hopping to keep enemies from jamming or listening to Allied radio transmissions. By sharing a code, two radios could shift from one frequency to the next in tandem. Without knowing the code, it would be extremely difficult for someone to follow or jam the conversation. This made it secure, and with trillions of potential codes, it all but eliminated radio interference

from nearby cell towers.

Qualcomm ran the numbers and found CDMA might triple satellite capacity over time division. Hughes was skeptical but paid for a prototype. It worked as predicted, but Hughes eventually dropped the project.

Jacobs wanted to move forward, but Qualcomm lacked the resources until it commercialized Omnitrac, a satellite truck monitoring system, in September 1988. With a steady source of revenue, Jacobs turned to CDMA. He was willing to bet his company that he could make the telecoms listen.



Jacobs meets with Yang Xianzu, chairman of China Unicom, the world's fourth largest telecom operator in terms of customer base. The company embraced Qualcomm's CDMA standard for its wireless network.

Jacobs was never afraid of taking the bold step. Born in New Bedford, MA, he learned early about hard work and limited resources. Yet his entrepreneurial streak showed through even as a teen when he recycled war surplus chemicals and paper to rebind books for sale.

He excelled at math and science and constructed small devices from cigar boxes and milk bottle wires. Yet when it came time for college in 1950, his guidance counselor told him there was no future in engineering. Jacobs, whose parents owned a restaurant, opted for Cornell University's school of hotel administration.

He wanted more math and science, and he felt annoyed by his roommate's ribbing about how he would never get such good grades in engineering. In his second year, he changed majors, even though he would have three semesters of engineering to make up. Even so, his hotel training gave him skills, such as accounting and business law, which he would draw upon later.

Information Hotbed

After Cornell, Jacobs entered graduate school at MIT, a hotbed of information and communications theory. "People like Claude Shannon (Claude E. Shannon, Ph.D., *MIT '36, dec.*) were just beginning to think about how we might get the maximum amount of information through a noisy channel by converting analog to digital," Jacobs recalled.

Jacobs received his Sc.D. in 1959 and stayed on at MIT as an assistant professor. This was when the first integrated circuits were moving into the mainstream, transforming digital theory into commercial practice.

After seven years at MIT, Jacobs' life changed again. He spent a sabbatical at the Jet Propulsion Laboratory in Pasadena, CA. There he met Viterbi, a UCLA professor with whom he would found Linkabit and Qualcomm.

He and his wife fell in love with Southern California, yet Jacobs turned down an offer to help create the engineering program at the new University of California, San Diego. "For two days, I was unhappy," Jacobs recalled. "Then I came home in a heavy rainstorm, and my wife told me about a great suburban home she had read about. Then she said, 'There's only one problem. It's in San Diego.'"

Jacobs took the plunge.

At MIT, his interactive style of communication guided graduate students. At UCSD, he became a leader. He put together a curriculum, hired faculty, attracted students, and landed research grants. "Those skills helped me when I started two companies," he said. Jacobs also began consulting. He and John Wozencraft, a pioneer in coding theory, had just published a book, *Principles of Communication Engineering*. It was the first textbook on digital communications, and it emphasized the practical aspects. This attracted many clients.

By 1968, Jacobs had formed Linkabit with Viterbi and another UCLA professor. "I had been saying that digital communications theory would be useful in real world, and here was a chance to prove it."

He was willing to consult as long as he did not have to



This Leader In Brief

Full professional name: Irwin M. Jacobs.

Most recent positions: chairman and CEO emeritus, Qualcomm Inc., 1985—retired March 2009.

Birthplace: New Bedford, MA, 1933.

Highest degree: Sc.D., Electrical Engineering and Computer Science, Massachusetts Institute of Technology (MIT), 1959.

Major career highlights: MIT, assistant and associate professor, electrical engineering, 1959-66; Co-author, *Principles of Communication Engineering* (still in use today), 1965; University of California, San Diego, professor of computer science and engineering; Linkabit Corp., founder and president, 1968-80 (acquired by M/A-COM); Qualcomm, founder, president, and chairman, 1985-2009.

Board memberships: Salk Institute for Biological Studies, chair, board of trustees; Pacific Council on International Policy; Technion (Israel Institute of Technology), international advisory board.

Honors: National Academy of Engineering, member, 1982 (chairman, 2008); Institute of American Entrepreneurs, High-Tech Entrepreneur of the Year, 1992; American Electronics Association, Inventing America's Future Award, 1993; National Medal of Technology and Innovation, 1994; IEEE Alexander Graham Bell Medal, 1995; American Academy of Arts and Sciences, fellow, 2001; Dorothy I. Height Chair's Award, Leadership Council on Civil Rights, 2004; IEEE/Royal Society of Edinburgh Wolfson James Clerk Maxwell Award, 2007; American Association for the Advancement of Science fellow, 2009; Marconi Prize, 2011; and IEEE Medal of Honor, 2013.

Greatest accomplishment: Worldwide successful deployment of CDMA and next-generation data communications.

Family: Married Joan Klein in 1954; sons Gary, Hal, Paul, and Jeff.

Leader most admired: Claude Shannon, a leader in information theory. Albert Einstein, for his thought experiments.

Hobbies: Reading, traveling, music, art, and theater.

Favorite books: Tends towards biographies and politics.

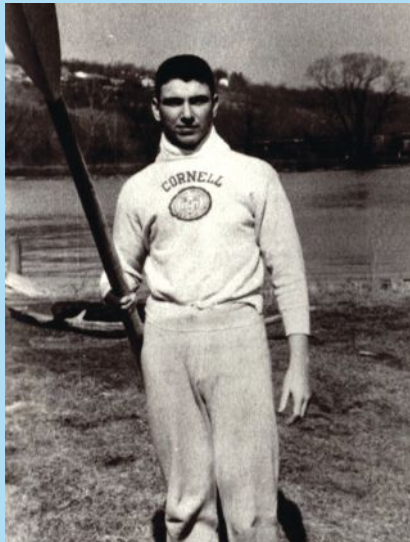
Personal motto: Lead by example, not by dictation. Integrity is the highest aspect of leadership.

If you could do one thing over: Things worked out successfully for me.

Irwin M. Jacobs



Above: Jacobs as a one-year old in New Bedford, MA, a fishing and textile center near Cape Cod. **Center:** Jacobs as a student at Cornell. **Bottom:** Jacobs married the former Joan Klein in 1954. They have four sons, Gary, Hal, Jeff, and Paul, who succeeded his father as Qualcomm CEO and chairman.



manage. Linkabit's success at landing NASA and defense contracts changed his mind. He took a sabbatical to organize the business and never looked back.

Like many entrepreneurs, Jacobs filled every job, including sales. He learned the intricacies of promoting new technology early on when Linkabit proposed a better satellite decoder to a government agency.

"We did a great job on the technical description, but our contact used some curse words to describe the parts of our proposal that dealt with reliability, manufacture, support, and training," Jacobs said.

"I spent the next two weeks reading military specifications and engaging people who could help us deal with them. When we came back, we could answer all his questions. It just goes to show that if you take each issue seriously and think it through, you can do a good job selling."

The project called for Linkabit to manufacture its first product, a greater risk than Jacobs realized. Linkabit had never manufactured any hardware before. The company built a printed circuit prototyping line, which caught fire. Fortunately, an engineer in the building called the fire department before the flames reached the decoder chips.

Linkabit went on to develop or implement many new technologies. It built modems for satellite-based Internet and jet aircraft. It commercialized VideoCypher, which descrambled satellite TV signals. It was a leader in very small aperture earth terminal (VSAT) business satellites, and it created one of the earliest commercial uses of a reduced instruction set computing (RISC) processor.

As the company grew, Jacobs went after top engineering talent. He knew that if he hired the right people, they would attract even more talent. This must have worked because Linkabit alumni directly or indirectly went on to start 75 other companies.

In some ways, he ran the business like a university, bringing in outside speakers and encouraging open discussions of new technologies and business areas. Wages were fair, but Jacobs told employees the real payoff would come from stock options.

That led to the 1980 merger with communications devices and components maker M/A-COM. It was a good fit at first, but then headed south. After five years, Jacobs, Viterbi, and several Linkabit alumni left to found Qualcomm.

Jacobs' bet on CDMA was a near thing. He brought his CDMA and TDMA projections to a local telecom, Pactel. Pactel got Jacobs on the agenda of the June 1989 meeting of the Cellular Industry Association.

"Companies were already moving ahead on TDMA," Jacobs said. "We did a slide show, and we thought for sure that someone would interrupt and say, 'Here's a point you missed.' No one found anyone wrong, but they didn't believe us either. CDMA is much more complicated than TDMA, and many people thought it would never work. We needed to build a demonstration system."

That September, Linkabit sent out invitations to see a live demo. "It was not working yet, and the engineers didn't think it would be done in time," Jacobs said. Days and nights of hard work prevailed. The system was

"I was about to tell our visitors to go out to the lab when one of the engineers told me to keep talking while they traced the problem," he said. "I had been a professor, so talking another 50 minutes was no problem."

To raise funds, Jacobs licensed CDMA to users for an up-front fee and a royalty if the system reached commercialization. It was one of the first deals of its type. His first customer was AT&T Labs, which also provided some development funding. The Qualcomm founders also added funds they received from the sale of Linkabit.

In October 1995, Qualcomm rolled out commercial CDMA systems. In just seven years, Qualcomm had gone from industry outsider to a pace-setting telecommunications company that was making its own chips and phones.

Qualcomm had made Jacobs rich. *Forbes* puts his fortune at \$1.2 billion. In 2010, he signed The Giving Pledge, a promise by 40 American billionaires to give away more than half their fortune to philanthropic causes.

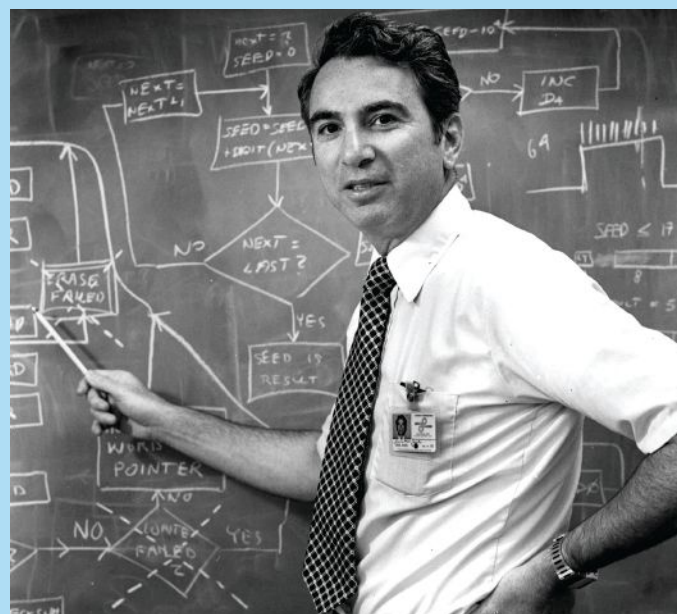
Jacobs is well on his way to doing that. He has pledged \$120 million to both UCSD's Jacobs School of Engineering and the San Diego Symphony. He will spend tens of millions of dollars more on schools (UCSD, Cornell, MIT, and Technion) and San Diego's central library, public radio station, and natural history museum.

Jacobs also chaired the Salk Institute for Biological Studies' board of trustees through 2016, raising \$330 million in new funding.

It was a fitting coda to Jacob's career. Jacobs never shied away from risks, yet they were always calculated risks. He chose California over MIT, but both were great options. He left academia only because Linkabit was growing so rapidly. He bet on CDMA because he fully understood the technology's advantages.

"That's why a high-tech company wants a CEO who is an engineer," Jacobs said. "They need someone who wants to do new things, and who is able to ascertain the risks and costs." Jacobs is proud of where those risks led: "I can go anywhere in the world and see the impact mobile phones have on health, education, and economic progress. It's good to see an idea used so well."

Alan S. Brown has been an editor and freelance writer for more than 30 years and lives in Dayton, NJ (insight01@verizon.net). 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.



Above: Jacobs working through an early project at Linkabit, his first startup. **Center:** Jacobs at Qualcomm Stadium in 2010. His company bought the naming rights in 1997. **Below:** In 2010, the Jacobs School of Engineering at UCSD rededicated its building to Jacobs and his wife Joan. He has pledged \$120 million to the school.



2016 Alumni Giving Program November-January Contributors

The names of 3,550 Tau Beta Pi alumni who made donations to the Association in the 2016 Alumni Giving Program appear in two separate sections on the following pages. Their gifts totaling \$375,847 arrived between November 1, 2016, and January 31, 2017. **Gifts received after January 31 do not appear here but will be published in the Summer 2017 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 2,616 Tau Bates appear in this first section. They made donations to the 2016 Alumni Giving Program between November 1, 2017, and January 31, 2017, 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	Founder's Club	250
Heikes Club	50,000	Zeta Club	2,500		

MATTHEWS CLUB

CA † Forge, Charles Otis '56

WILLIAMS CLUB

MI † Brems, John Henry '46
NY E Lynnworth, Lawrence C. '58
SD A Simonson, Larry A. '69

HEIKES CLUB

IA A Anonymous '69
MI E Anderson, James Anton '66
RI A Anonymous '72

ALPHA CLUB

AZ B Myers, Jerry Elwyn '70
CA A Stevens, Mark A. '81
CA E Pappone, Daniel Charles '77
IN A Newcomb, Robert Wayne '55
IN A Koller, David Christ '62
MI Z Thebert, Alan Wilbert '57
NY B Anonymous '80
PA A Goldstein, Steven Saul '65
TX A Rothrock, Ray Alan '77
WI A Bolender, John William '51

BETA CLUB

CA B Schlinger, Warren Gleason '44
CA † Johnson Jr., Pitch '50
CA E Goodin, William Rex '75
CA Z Grigsby, David A. '84
Peters, Robert William '61
CO A Armentrout, Michael Lee '94
CO B Kayse, Kevin Stewart '78
Anonymous '78
DE A Gutshall, Thomas Lee '60
FL B Crews, Renard Calvin '70
IL A Spitzer, Robert Edward '61
IN A Ford, Steven Richard '80
Griffin, Abbie J. '74
Sarkisian, Nancy Louise '77
IN † Lucey, Jo Ann '80
IN E Dausman, Alan Vernon '77
IA A Kilzer, David Darrell '96
Moyer, James Hardy '51
MD B Stable, Carl Michael '81
MA A Keogh, Brian James '84
MS A Shackouls, Bobby Stone '72
MO B McHenry, Dale '81
NH A Sherman, John Lincoln '54
NJ A Bezos, Jeffrey Preston '86
NY E Manticalco, Thomas Louis '67
NY K Knox, Keith Thomas '70
NC A Johnson Jr., Jim William '77
OH A Robe, Richard '55
RI A Vigor, Judith Wells '83
SD A Gomulinski, Tricia Elizabeth '98
TN A King III, Philip Woodson '66
TN † Hall, Kristofer Brian '98
TX A Adamo, Paul Magness '85

Brill, Arno William '71
Kothmann, Richard Edward '59
Yates Jr., Peyton '65
WI A Anonymous '64
WI B Hurlbert, Gordon Charles '46
WI † Cronce, Richard Gordon '77

DELTA CLUB

AZ A Milan, John M. '67
AZ B Story, Franklin H. '81
Stout, Roger Paul '77
CA B Jessen, Howard Ellsworth '46
Shombert, Lee A. '79
CA † Johnson, F. Martin '58
Tyson Jr., James Jordan '58
CA A Davis, John Leo '60
CA E Tozaki, Ronald Yuji '74
CA H Crotchett, Denton Robert '71
Noble, Gary D. '96
CA † Koblit, Gordon Frank '66
CA I Pickett, Stephen Euan '75
CA A Domning, Edward Ernest '84
CA M Fewell, Thomas J. '72
CA N Caddock, Jr., Richard E. '72
CA O Turhollow, Charles B. '81
CA T Fable, Scott Edward '96
CO A Musser, Jack William '72
CO B Harris, James Robert '68
Harris, Karen L.W. '74
Kinzie, Edward Ottis '64
CO A Laughlin II, George Thomas '75
FL A Bolton, Charles H. '62
Kalter, Howard L. '66
IL A Ditman, Jason Blair '91
Fue, Harold '57
IL Z Allendorfer, Robert Kevin '83
IN A Barker, Kenneth Dale '64
Sedlack, Warren Richard '45
IN A Stechholz, Jonathan M. '72
IN A Carlson, Mary Terese '88
Peterson, Michael L. '89
KS A Mitchell, James Edward '85
LA A Comeaux, Keith A. '89
Longwell Jr., Harry J. '63
LA † Samuels, Katie '86
MA A Duris, Robert A. '74
MA B Freeman, Reed Harlow '61
MA A Fenton, Harvey Albert '58
MI A Colby, Katy Luchini '99
Colby, Dirk Joel '06
MI † Crouch, Dennis Eugene '62
Simmons, Charles David '50
MI E Frye, James Henry '51
Gomulinski, Curt Dennis '01
MO † Gibbs, Kenneth Paul '76
MT B Samuels, Blake Robert '84
NJ A Post, Edwin Lewis '62
NJ † Petrich, Raymond A. '84
NJ A Mendelsohn, Andrew J. '77

NY † Gorin, Ralph Edgar '70
NY A Swanson, John Arthur '62
NY I Judd, Robert Paul '78
NC E Linney, Ronald Jackson '86
OH A Derbes, Richard August '68
OH B Throckmorton, Dean William '82
OH † Beans, Bill '53
Ross, Elliot Bennett '69
OK A Edwards, Paul Arnaud '87
Hall, Ralph Roy '64
Morris, Jay Kevin '81
OR A Lynch, Stanley Clark '73
PA † Gigliotti, Michael Philip '73
SC A Roat, Suzanne D. '85
SC B Daley, Leslie N. '71
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SC † Davis Jr., Emmett Irwin '50
TN A Dallas, Bradford B. '45
Pih, Norm '82
TX A Knight, Graham B. '48
TX B Ingram, Wesley Warren '77
TX † O'Dell, Stewart Conn '78
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TX A Rushing, Jay Alan '76
TX H Schmidt, Robert William '84
TX † Barrett, Jerry George '70
TX A Beal, Barry A. '65
UT A Morrison, Michael George '88
VA A Brown, Lee Merry '88
Pitzer, William Groh '75
VA B Carpenter, Joseph Andrew '63
WA A Gunter, Robert A. '62
Okita, Richard Y. '56
WA B Cass, Robert Dennis '83
WV A Landes II, Junior Hamilton '64

ZETA CLUB

AL A Rowell, William Johnston '69
Talbot, Thomas E. '52
AL B Acree, Elaine S. '76
AL A Koelbl, Terry Gene '84
AK A Dombrowski, Roger Alan '69
AZ A McIntosh, Duncan M. '65
Mensch Jr., William D. '71
Seabury, David G. '82
AR A Biggadike, Robert Holden '58
Newtown Jr., Glenford Andrew '69
CA A Edgar, Tim Matthew '08
Kuo, Meng-Han '08
McCune Jr., Earl William '79
Meyer, Jack Andrew '56
CA B Lippie, Gerald Zee '55
CA † Clikker, William Hamilton '41
Hardison, R. Logan '57
Marks, Stuart Warren '84
CA A Sekimura, Gerald Takashi '73
CA E Miller, Jeffrey Clark '83
CA † Smith, Gregory W. '75
CA A Horn, Jeffrey Ben '79

Pickles, William Raymond '80
CA O Treinen, James Patrick '85
CO A Abell, Joe Markwell '56
Van Dinter, Jennifer Ann '97
CO B Shapiro, Robert Joseph '47
CO A Landseid, Mark Eugene '82
CT B Chatfield, Larry Allen '71
Killingbeck, David R. '77
Klopfenstein, Rex Carter '59
DE A Hyer, Frank Sidney '58
DC A Belcher, Wade D. '70
Griffin, Earl H. '57
DC B Youssef Mir, Paul '78
DC † Altamore, Annette '79
FL A Newlands, David Michael '62
FL B Tilles, Arno William '84
FL A Palm, William Howard '55
GA A Driggers, Herbert H. '63
Fawcett, Clinton Douglas '92
Rogers, Don E. '63
Snare, Daniel M. '80
IL A Pfeifer, Bernard Lee '47
Robertson, John Allen '65
IL B Jares, Anthony A. '67
IL A Hachtel, Dale Arnold '68
IL Z Woyna, Mark Anthony '87
IN A Carlson, Richard Alan '70
Mason Jr., Lowell B. '48
Murdock, Jay Homer '51
Taylor, Harold LeRoy '51
Weigand Jr., Karl Russell '66
IN B Badger, Jerry Delon '62
Mills, Matthew D. '87
Powell, Robert Lowell '51
IN † Buran Jr., Joseph Edward '75
IN A Spring, Bradford Hall '59
IA A Feisel, Lyle DeWard '61
KY A Dunning, William E. '61
Howe, Richard Samuel '59
LA A Williams, Colleen D. '82
LA B Mullins, Peter Lake '57
LA † Poole, Ronald Gene '69
LA E Champagne Jr., Pierre '76
MD B Burdick, Martin Myrl '56
Rowland, Wilson '51
Schaefer Jr., William Joseph '70
Valencia, Jaime Alfonso '74
MD † Merritt Jr., Charles Raymond '85
MA A Snively, Fred S. '60
MA B Dettmer, Robert Gerhart '55
Giaino III, Edward Charles '74
Gilkes, Alan M. '68
Goldstein, Andrew C. '69
McKim, Thomas Francis '75
Poduska Sr., John William '59
MA A Carter Jr., Arthur Alfred '51
Kulpinski, Richard J. '59
Patkin, Murray S. '64
MA E Sladek, John Richard '77

MA Z Stevens, Janet M. '72
Cetti, Richard P. '70
Grzeslak, Kazimierz T. '88
Harrison, C. Brett '64
Poulin, James Edward '66
Smith, Richard G. '78
MA H Maneval, Daniel C. '82
MI B Jenecke, Samson A. '77
Stromp, John Edward '78
MI † Allaben, Elizabeth Ann '79
Battel, Steven J. '79
Bell, Lawrence David '68
Frederick, Frank Thomas '71
Niednerfur, Francis William '50
Padzieski, Robert Joseph '70
Seidel, David Allen '81
Trankle, Thomas Lynn '71
MI A Cook, Clifford C. '69
MI E Thompson, George W. '55
Timmings, William Dean '62
MI Z Pettiford, Steven D. '75
MI I Allen, Michael Peter '85
MI A Repke, Wesley Ryan '09
MN A Peters, Timothy Gene '78
MS A Jerome, Dennis C. '67
MO A Weary, Franklin Grimm '70
MO † Kilert, Albert Harold '63
Rossetti, David Joseph '74
MT A Collins, Douglas M. '71
Royer, Erlind G. '61
NE A Hannon, Gregory Michael '86
NJ A Gorog, Russell M. '70
Skowronski, Victor J. '71
NJ B Fletcher, Leroy S. '58
NJ † Mauermeyer, Henry A. '72
NM A Smith, Jeffrey A. '84
NY B Carr, Donald Joseph '77
Phillips, Glen E. '71
NY † Chamberlin, Donald Melsom '67
Cole, Marie Sayre '84
NY A Anderson, Woody '59
Aylesworth, William A. '65
Kemp, Thomas Ward '59
NY E Hellman, Martin Edward '66
NY Z Frohman, John E. '72
NY H Pollack, Herbert William '50
Varon, Michael '73
NY † Taylor, James M. '88
NY I Calkin, Edwin Theodore '61
Dujmich, Louis Charles '78
NY A Abrardo, Joseph M. '72
Schmitt, Robert E. '71
NY M Czuba, John Stanley '78
NY E Runowich, Carl Joseph '84
NY II Stalzer, Jeffrey '74
NC A Vercaemert, Gary Starnes '76
Walker, Carol Kenneth '70
NC † Anapol, Edward '76
Linker, Edward Markham '47

ZETA CLUB, CONTINUED

OH A Linsalata, Frank N. '63
OH G Alberly, James Orestes '59
Hagenlocker, Edward Emerson '62
Howland, Smith Eugene '69
Monter, George C. '60
OH Z Zelms, Charles Michael '73
OH H Senyk, Joseph Michael '67
OH M Bowers, Keith Allen '91
OK B Bobo, James Edward '77
OR A Carlson, Burton Carter '53
Hansen, Steven W. '69
Milton, Stuart W. '84
Paynter III, W. Burton '74
PA A Nisley, Elmer E. '74
Wagner, Theodore Walter '71
PA B Anderson, Charles Alfred '57
Stockburger, Richard '73
PA I Robb, Frank Jay '73
PA A Bordogna, Joseph Raymond '55
PA Z Pecsvardi, Thomas '64
RI B Luz, James L. '80
SC A Jones, Walter Fleming '78
SC B Endler, Elizabeth Elaine '98
TN A Baker, Jon P. '74
Froula, Jim Dewayne '67
Jennings-King, Sherry Denise '93
King, Gregory Tyler '93
TN B Marianelli, Walter David '75
TN A Knight, Joseph Brent '93
TX A Dorr, Lawrence Daniel '68
Klump, D. Craig '77
Wilson, Randy Wayne '97
TX Z Wint, Stephen Peter '83
TX H Fairchild, Jack Elmer '53
Lin, Kuo-Chiang '80
Warden, Sue Janine '78
TX O Stokes, F. Xavier '83
UT A Davidson, Stuart W. '78
Eide, Eric Norman '89
VA A Anderson, Robert Steven '80
Hardy Jr., Edward Ira '69
Orphan, Victor John '62
VA B Fetter, Robert Barclay '47
Harris, Edgar D. '67
Jones, John Hamilton '73
Lovell, Lale Deniz '96
Lovell, Matthew Bruce '96
Sloan, Forrest Eugene '83
Glass, Christopher Earl '83
WA A McDonald, Bruce G. '91
O'Byrne Jr., Michael Edward '61
WA B Grossman, Robert J. '59
WV B Ashman, Michael D. '84
Dehart II, Robert Elwood '72
WI A Debbink, John Dirk '49
Delucca, Gregory James '59
Derusha, James R. '55
WI B Hayes, John J. '82
WY A Gallensky, Neil E. '82

CHI CLUB

AL A Cowles, Gary D E '87
Hartley Jr., John T. '55
Trapane, Karen L. '82
Vollberg, Walter K. '73
AL B Delorenzo, Joseph David '57
Shields, Clark R. '71
AK A Braun, David R. '74
Cline, Bo Robert '81
Robinson, Wayne M. '80
AZ A Bailey, Harold E. '71
Berg, Jeffrey Roy '93
Da Silva, Eduardo G. '58
Davis, Robert Allen '79
Erickson, Kenneth Lynn '68
Fronder, U. George '69
Lundquist, Thomas George '72
McLaughlin, Dennis P. '80
AZ G Bruening, Brenda L. '82
Bruening, Gregory Wilfred '80
Heaton, Janet Day '84
AR A Jones, Michael D. '67
Peters, Brett Avery '87
Zaleski, Michael Ernest '63
CA A Dozier, J. Ronald '54
Gottwald, Carl H. '48
Kirschman, Randall Keenan '66
Panichelli, Paul Albert '83
Ravenscroft, Dewey '63
Richman, Mitch I. '77
Trezek, George James '61
Wilhoite, W. Clinton '85
CA B Creutz, Michael J. '66
Lee, Roland R. '75
CA I Cotton, Thomas A. '65
Dohner, John Walter '72
Edmundson, Bruce James '71
Elliott, Dennis M. '68
Hess, Kenneth Lafferty '74
Inouye, Lance M. '68
McClendon, Scott '60
Palmer III, Everett Arthur '65
Rodriguez, David A. '58
Samsbury, James Douglas '66
Ullman, Marc A. '83
CA A Agajanian, Shoshanig Diana '79
Hedin, Richard A. '69
Mallis, Richard K. '52
CA E Gaunt, Arnold J. '86
Karagozian, Ann R. '78
Masumura, Robert A. '62
Simsarian, Gregory G. '82
Testa, Lori Ann '01
Woo, Raymond '72
Young, See C. '74
CA Z Benson, Chris Alan '84
Cancilla, Charles E. '59
Downey, James B. '62
Greenley, Dale Robert '86
CA H Battersby, Leslie Charles '98
Broadston, Robert Dean '94
Burrows, Stanford '63
Trebao, George Olivier '75
CA K Humphreys, Evan '75

CA A Hafer, Edward Henry '70
Holl, Sue '76
Snyder Jr., Roland C. '74
Stanley, Richard Loren '79
Yamamoto, Ko '84
CA M Barth, Todd Vincent '79
Keiser, Randy Jay '73
CA N Chew, James S B '84
Emery, Linda Renelle '82
Reukauf, Paul J. '70
Ruud, John E. '73
CA E Hart, Laura Jean '82
Henry, James J. '75
CA O Elliott, Pamela Ann '88
Fitzsimons, Michael Joseph '79
Page, John A. '61
CA P Kraft, Lyle David '87
CO A Crichton, David Drewry '97
Kranzler, Irvin '54
Peters, Richard Duane '80
Roberts, Christopher R. '78
CO B Aronson, Haskell Harold '52
Bartlett, E. '51
Blackwelder, Ron E. '64
Colonell, Joseph M. '58
Eason, Ernest Day '71
Guss, William C. '68
Tinnan, Mitchell Todd '76
Turner, Edward W. '50
Wood, John E. '71
CO I Hough, H. Vernon '52
CO A Clark, John R. '92
Fisher, James Eberly '78
CO E Gunderson, James P. '94
CT A Fischer, Edward Michael '89
McLeod, Christopher Kevin '77
Terry, Elene Sharon '01
CT B Ezzio, Louis A. '77
Lancraft, Roy E. '76
Taylor, Kenneth Doyle '71
Engram, Robert Louis '69
Gathungu, Peter Maina '93
Karydas, Apostolos Evangelou '62
Long, Michael Edward '72
DC B Maggio, John Joseph '81
DC I Adams, Ann Halstead '83
Haldeman, Paul Metz '70
Joyce, James W. '61
FL A Danilher, Peter Michael '66
Dao, Solange C. '95
Evans Jr., Andrew J. '75
Hayden, James George '69
Perrygo, Charles Maurice '75
Roberts, Richard '67
FL B Ault, Richard H. '64
Elnaggar, Suzanne '93
Jennings IV, Tipton Davis '54
FL I Copeland Jr., Edwin '73
Lancor, Barbara Jean '79
Shimura, Mitsuo '74
FL E Stierlen, Lorelei Beth '97
GA A Backhaus, George P. '83
Cooms, Louis Whitley '81
LeCroy Jr., Edwin Potat '67
Monk, Robert Franklin '63
Mowrey, Daniel B. '65
Negro, James Eugene '68
Oslick, Rochelle '83
Parker, Jonathan Edward '59
Siemens III, John Frederick '75
Wetenhall, Paul David '73
IL A Bein, Robert W. '56
Boehm, Ronald J. '81
Daughters, Timothy Edward '81
Flitman, Jeff Edward '82
Gromala, Edward Joseph '79
Hanus, Daniel Joseph '86
Hebenstreit, Richard Henry '45
Jones, Douglas Warren '80
Kasik, Phillip M. '68
Ostrodka, David Leon '70
Pubentz, Lawrence James '81
Saltzman, Jay Adam '90
Vogel, Frederick M. '80
Williams, Allan Richard '71
Zielinski, Edward Lee '74
Gurney Jr., Donald P. '59
Hughes, Joseph L. A. '79
Kinaast, John Arthur '79
Lewis, Burton A. '48
I G Aagard, James Stuart '53
Guest, Howard Brandon '81
IL A Klasing, Wayne Gill '65
Zeller, Sean Michael '92
IL E Hopkins, Mark A. '89
IN A Beal, Dick H. '49
Bullions III, Robert J. '64
Delleur, Jacques William '49
Eglsrud, Richard L. '81
English, James Allison '57
Good, Larry David '67
Hanover, Marilyn Kay '78
Heirman, Donald Nestor '62
Jicha, Albert John '52
Kettering Jr., Floyd Firman '63
McGraw, Earle Phillips '50
Orr, Donald J. '61
Roth, Robert H. '72
Rushworth, James Lynn '58
Scharlach, Richard M. '49
Schwiesow, Ronald Lee '62
Shulaker, Edward Ray '72
Sosnay, Richard Gordon '66
Sublette, Ivan H. '49
Williams, Kenneth W. '73
Yoder, Norman Everett '71
IN B Martin, Jeffrey V. '78
Nichelson, Scott Michael '84
Noblitt, Niles Leonard '73
Waterman, Robert C. '70
IN I Fitzgerald, Edward John '86
Heidrich, Steven John '82
Kast, Steven James '69
Kukla, James Alfred '72
Lombard, Michael Gerard '76
Schuster, Gregory M. '77
IN A Brems, Robert R. '63
Hartman, Richard Carl '63
Runge, Lambert J. '58
Schmalz, Peter B. '69
IA A Boshart, David John '80
Coffey, Leo Frederick '64
Coffman, Vance D. '67
Crawford, Brian Matthew '04
Dagestino, Kathryn Ann '79
Derr, Curtis R. '85
Drumm, Alfred W. '64
Henderson, James Allen '70
Kuivanen, David Paul '78
Reinhardt Jr., William Harvey '48
Sellew, Roger Franklin '59
Zwiebel, Jeffrey L. '82
IA B Coe, Roger N. '57
Corrao, Debbie G. '93
Glasgow, Justin Matthew '05
Krusse, Dennis R. '79
KS A Knapp, Roy Marvin '63
Leamon, Rich Gaylord '67
Metzger Jr., James L. '60
Seamans, David Alvin '50
Shankles, Larry Earl '69
KS B Howe, Donald Craig '75
KS I Brockway, Michael David '92
McKinnis, Steve R. '74
Scarborough, Kirk Delbert '82
Bauer, Aaron Robert '63
Rhoads, Harold Spencer '68
KY B Hundley, John Smith '87
Hundley, Theresa Elizabeth '87

LA A Angelo Jr., Ernest '56
Compton, Ronnie R. '72
Franklin Jr., Duard D. '74
Kleinpeter, Joseph A. '65
Richardson, John Daniel '72
LA B Buesinger, Robert Ford '78
Perrin III, Shepard F. '83
LA I Ball Jr., Pete G. '61
Sigmund, John Allan '75
Wright, Cameron H. G. '83
LA E Mims, Jason Charles '95
ME A Blackstone, Bradford Earl '91
Palmer, Gerald Milton '61
Plesset, Robert Jordan '81
MD A Becker, William Henry '65
Reynolds Jr., Joseph R. '89
Scheinin, Warren M. '74
Shinham Jr., Charles Robert '71
Tate, David Marshall '84
Zehner, James Warren '80
MD B Bromley, Ralph Weaver '44
Chase, Ronald John '71
Cook, Gordon Douglas '81
Dinkle, Ralph Edward '65
Ewing, R. Alan '67
Greville, Edgar M. '67
Hardesty, Donald R. '64
Himes, Doug Lamar '82
Jansen, Russell Onas '74
Kirschbaum, Alan Ira '71
Lambrechts, James Russell '73
Perkins, Michael Joseph '95
Rast, Robert Morgan '70
Toense, Robert E. '76
Werneth, Russ Lee '64
MA A Bernacki, Stephen Edward '70
Bujaicius, Jerry Alan '79
Chace, Brian D. '69
Downs, Allen Gybbon '75
Fenner, Peter Richards '64
MA B Bennett, Kenneth Harold '89
Claus Jr., John Seebold '54
Dickey, Robert L. '74
Ditmeyer, Steven Roland '63
Evans, Lary Lewis '67
Hazen, Nathan L. '56
Hilbing, James Henry '86
Patterson, John Bryan '68
Slifka, Richard Barry '61
Smallwood, Richard Dale '57
Smoot, William N. '56
Vlahakes, Gus J. '71
MA A Colen, Frederick Haas '69
DiPerna, Richard Arthur '66
MA E Lichtig, John Forrest '83
MA Z Bak, Dennis Carl '79
Cain, John Francis '61
Flynn, John Callahan '59
Gusciora, Kenneth H. '69
Meurer Jr., Glenn William '86
MI A Griffin, Albert Walter '80
Houthoofd, Janet Marie '76
MI B Bohrer, Timothy Henry '71
Leven, Peter Johannes '93
Sandretto Jr., Peter Patrick '64
Scott, Kenneth John '55
Wacker, Don Herbert '52
MI I Albrecht, Terry Erwin '67
Cameron, John Joseph '66
Capelli, Ronald B. '73
Drago, Gary Alan '75
Friess, John G. '57
Grants, Valdis '64
Hammond, Donal Dwight '52
Isackson, Robert Michael '78
Maker, Pamela Allyn '81
Prescott, Thomas J. '69
Reines, Jose '59
Sheets, Alan '81
Stagner, Charles Evan '86
Toliver, Christopher Michael '74
Walker Jr., H. '58
Zuk, David Michael '70
MI A Culver, Walter '60
Di Cicco, Dominic Armand '61
LaBella, Salvatore A. '63
Minnich, Katherine Patricia '78
MI E Durisin, Michael John '81
King, James Bartholomew '65
Mutzelburg, Ronald E. '68
Tillinger, Steven Jay '68
MI Z Lachele, Roger Eric '75
Scarlattelli, Michael George '76
MI H Johncox, Robert Allen '83
Pascany, Kenneth Michael '86
MI O Edwards, Steven C. '80
Garriety, Stephen Daniels '72
MN A Ashley, Gary Charles '69
Duscha, Lloyd Arthur '45
Hanson, Henry A. '66
Hennen, Harry Anthony '66
Lapacko, Kim Alan '76
McLeod, Gary W. '70
Severson, John Albert '72
Stryk, Robert Anthony '60
Thompson, Richard A. '77
Tucker, Randolph Lewis '83
MS A Hatmaker Jr., John William '79
Linder, Richard A. '57
McDonald Jr., Harold R. '65
Mills, Marvin Leon '65
Siler, Raymond David '83
Sutphen, Fred Marshall '73
MS B Miles Jr., John Hubert '71
MO A Crabbe, Emmanuel E. '81
Donaldson, Adam L. '75
Farrell, Albert John '99
Myles, Thomas D. '82
Stieffermann, Michael Charles '86
MO B Ash Jr., Richard Lawrence '70
Benson, William Alan '77
Bondi, James O. '71
Campbell, John Robert '74
Derbak, Charles Bernard '84

Eldred, Benjamin Todd '96
Ernest, Terry Lee '82
Frankenberger, Richard Brett '93
Hacker, Alden Gerock '41
Herndon, Richard Sanders '56
Peat, Robert James '79
Schmidt, Thomas Edward '70
Weber, Albert L. '53
MO I Burgi, Charles E. '51
MT A Osgard, Dennis M. '62
MT B McDonnell, Kathleen Gayel '83
NE A Criswell, Marvin Eugene '65
Doerr, Eric Arthur '88
Kiebreath, Donald Robert '85
Kaminski, Wayne Alan '79
Langford, Susan Kathleen '90
Stransky, David Wayne '92
NV A Levine, Larry Allan '85
NH A Hildreth, Howard Russell '56
Kieffer, Roger Alan '61
Scharfe, Alan Charles '78
NJ A MacMillan Jr., Duncan J. S. '66
Murphy, Kevin Jay '78
Schell, Robert D. '74
Schmidt, Arthur Joseph '68
NJ B Cohen, Robert B. '77
Kaufman, Peter Andrew '84
Plant, Stephen Irving '65
Tanner, Robert Brand '64
Wollmann, Norman P. '81
NJ I Branco, Maria dos Milagres '74
Constantino, Stephen Joseph '79
Goodrich Jr., Robert Rhoades '70
Kunz Jr., Joseph J. '73
Padgett, Richard J. '72
Raia, Lawrence A. '65
Reitano Jr., Anthony James '72
Youssef, George '01
Zygo, John P. '70
NJ A Garing, John Davis '80
Lisle Jr., Thomas K. '69
Meyer, John E. '81
Pruzman, Robert Austin '72
Wolff, Richard J. '72
NM A Smith, B. Wayne '88
NM B Busch, Robert D. '72
Gonzales, Michael Anthony '74
Turner, Diane B. '78
NY A Cohen, Adam Barrett '85
NY B Fedoroff, Oleg Vsevolod '61
Spearot, James Anthony '67
NY I Blakemore II, Robert Denis '89
Bornhorst, Bernard Richard '60
Brand, Terrance Alan '90
Gardner, John Herbert '66
Hue, Joseph A. '52
Lequar, James Kay '87
Lynch, Karen Michelle '86
Mohr, Wendell C. '53
Pennis, Joseph Michael '89
Roberts, John Walter '86
Sacks, Alex Hiram '90
Schultz, Stephen '70
Spengler, Stewart R. '52
Stallman, Thomas F. '59
Staudinger, James Robert '77
Thal Jr., Herbert Ludwig '53
Walczak, Dennis J. '76
Walter, Buff Arthur '60
Weinberg, Richard Sheldon '81
NY A Harris, Dennis George '70
Johnson, Eric Tanner '00
McCloskey, Charles C. '71
Teng, William L. '74
NY E Dobbins, Bob Mark '73
Kammenzind, Henry A. '50
McCaifrey, Ronald Walter '52
Niebank, Charles E. '54
Rosen, Fredric Kenneth '62
Rubin, Lowell '61
NY Z Chu, Lawrence Joseph '71
Keller, Norman K. '58
Sindel, Fred H. '59
NY H Bergh, Gerald Kenneth '58
Beron, Michael '71
Lauer, Spencer David '67
Minton, Evelyn Apicella '73
Pasqualelli, Louis Ralph '73
Valcourt, Jean-Mary K. '85
Wu, Randall '75
NY I Fischer, George Andrew '54
Grant, Richard Joseph '88
Koch, Peter Matthew '79
Ronan, Gregory J. '81
Telesco, John Charles '69
NY K Ablowitz, Mark Jay '67
Alcaro, Domenic John '87
Brown, George Albert '48
Hinshaw, David John '86
Ball, James Edward '75
NY A Fillo, John P. '74
Kamme, Robert W. '85
Rigert, John A. '70
Silverman, Joel Stuart '74
NY N Gluszk, Timothy John '88
Morris, George Craig '63
NY E Haller, Marc Frederick '85
Mathews, Joseph R. '81
Rorke, George Leo '71
Rubano, Vincent Francis '73
NY O Courter, Jeanne Lynn '75
Putnims, Zigmunds Andis '78
NY I DeVoe, Charles George '76
Wong, Richard Yee '94
NY P Curran, Paul J. '83
Roldan, Mark J. '85
Solaski, Thomas P. '85
NY T Hughes, Michael Kevin '97
Olenik, Anthony Michael '08
NC A Baer, Richard Tobias '63
Burkart, Alex Raymond '72
Crotts, Marcus Bowman '53
De Haas, Cynthia '91
Freeman, Theresa Mooney '85

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The Heritage Society was established in 2001 to recognize and honor those who continue the tradition of outstanding support by remembering TBPI in their plans. Heritage Society members, listed below, have included a provision in their estate plans to benefit the Association and have informed TBPI of this commitment. Their support is gratefully acknowledged, and their names will appear each spring.

Aagaard, Ph.D., James S., <i>IL</i> 1953	Forslund, Donald C., <i>NJ</i> 1960	Regula, Ph.D., Donald W., <i>MI</i> 1963
† Alford, Henry M., <i>MS</i> 1927	Froula, P.E., James D., <i>TN</i> 1967	Reinhardt Jr., William H., <i>IA</i> 1948
† Althouse, Ernest E., <i>PA</i> 1926	Fue, Harold, <i>IL</i> 1957	Sax, Franklin S., <i>MO</i> 1955
† Anderson, Marshall, <i>MI</i> 1932	Gendron, Roger J., <i>IL</i> 1955	† Scheffler, P.E., Paul H., <i>PA</i> 1948
Anonymous, <i>IL</i> 1955	Gent, Michehl R., <i>TX</i> 1963	Schmoller, Ralph H., <i>OH</i> 1961
Anonymous, <i>MA</i> 1966	Gomulinski, Curtis D., <i>MI</i> 1901	† Scribner, A. Clayton, <i>NY</i> 1929
† Arm, David L., <i>PA</i> 1930	Gomulinski, Tricia E., <i>SD</i> 1998	† Sickafoose, Robert D., <i>IL</i> 1950
† Banner, Charles E., <i>OH</i> 1947	† Hanley, Edward P., <i>IL</i> 1942	Siller Jr., Ph.D., Curtis A., <i>TN</i> 1966
† Barnes, Raymond H., <i>MI</i> 1940	† Hart, Jack B. & Arline I., (<i>ST</i>)	† Skaggs, Glenn A., <i>MD</i> 1957
Basta, Edward D., <i>OH</i> 1982	Haynes, Ph.D., P.E., Charles D., <i>AL</i> 1962	Slafer, Loren I., <i>CA</i> 1968
Bateman, Terry S., <i>CA</i> 1958	Herke Jr., Frederick P., <i>OH</i> 1954	Smith, Andrew L., <i>MS</i> 1948
Beans, Ph.D., E. William, <i>OH</i> 1953	† Heymann Sr., Andrew P., <i>FL</i> 1939	Smith, Rodger F., <i>WI</i> 1944
† Bossert Jr., Warren H., <i>PA</i> 1945	Hord, William E., <i>MO</i> 1959	Soderberg, Peter H., <i>CT</i> 1968
† Bratcher, Colleen D., <i>KY</i> 1955	Jackel Jr., Henry E., <i>IN</i> 1957	† Stechmeyer, John P., <i>OH</i> 1948
† Brems Jr., John H., <i>MI</i> 1946	Jackewicz Jr., Joseph I., <i>IN</i> 1975	Stella, P.E., Damien F., <i>AK</i> 1982
Brill, Arno W., <i>TX</i> 1971	Jennings-King, Sherry D., <i>TN</i> 1993	† Strom Jr., George J., <i>CA</i> 1956
Budd Jr., Col. Roger, <i>IL</i> 1962	† Johnsen, Roy L., <i>MI</i> 1957	† Swalin, Ph.D., Richard A., <i>MN</i> 1952
† Burg, Stoddard S., <i>PA</i> 1951	Johnson Jr., James W., <i>NC</i> 1977	Swanson, P.E., Hilmer S., <i>WA</i> 1976
Burns, Carlisle V., <i>NY</i> 1950	† Jones, David S., <i>KS</i> 1949	Swanson, Ph.D., John A., <i>NY</i> 1962
Campbell, P.E., Cleveland L., <i>IA</i> 1947	Kern, Jack C., <i>CA</i> 1971	Taber, Norma J., <i>MO</i> 1980
Cancilla, Charles E., <i>CA</i> 1959	Kirschman, Ph.D., Randall K., <i>CA</i> 1966	Tarwater, James P., <i>MO</i> 1951
Chamberlain, Ph.D., P.E., Adrian R., <i>MI</i> 1951	Kitchens, Philip H., <i>LA</i> 1967	† Taylor, Paul D., <i>KS</i> 1958
Chute, Richard, <i>MI</i> 1949	Kogut, Ph.D., P.E., Kenneth J. <i>MI</i> 1971	Tolson, Robert H., <i>VA</i> 1958
Colbry, Ph.D., Dirk J., <i>MI</i> 1906	† Kolff Van Oosterwijk, H.L.J., <i>CA</i> 1950	Tydemann, Frederick J., <i>CA</i> 1973
Colbry, Ph.D., Kathleen Luchini, <i>MI</i> 1999	† Liggett, John A., <i>MI</i> 1943	Tyson, Samuel E., <i>PA</i> 1948
Cook, Norman L., <i>WY</i> 1949	Luce, John W., <i>FL</i> 1950	Weissman, Martin J., <i>NY</i> 1958
† Curtis, Ph.D., Richard A., <i>OH</i> 1964	† Luchini, Ph.D., P.E., John R., <i>MI</i> 1971	Wetenhall, Paul D., <i>GA</i> 1973
D'Avignon, Edward J., <i>NY</i> 1988	† Lucken, Ernest G., <i>NY</i> 1942	† White, Robert C., <i>IL</i> 1956
† Donoghue, Leonard W., <i>MA</i> 1937	McDonald, Capers W., <i>NC</i> 1974	Widmann, Bradley H., <i>NY</i> 1969
Dooley, George H., <i>NH</i> 1953	Maniscalco, DEN, Thomas L., <i>NY</i> 1967	Williams, David C., <i>TX</i> 1947
† Duenweg, Col. Louis, <i>IN</i> 1936	† Marks, Edwin M., <i>TX</i> 1949	† Wilson, Charles N., <i>WA</i> 1970
† Dulles, John W.F., <i>AZ</i> 1943	† Nelson, Thomas A., <i>CA</i> 1949	† Winkler, Albert H., <i>AZ</i> 1975
Feisel, Ph.D., P.E., Lyle D., <i>IA</i> 1961, & Dorothy	Orkins, James E., <i>OH</i> 1966	† Wisner, Benjamin G., <i>CA</i> 1949
Fellner, Kenneth M., <i>AZ</i> 1984	Peterson, Charles C., <i>UT</i> 1968	† Zimmerman Jr., Marlin U., <i>MD</i> 1944
Fisher, James E., <i>CO</i> 1978	Pierce, Russell W., <i>WA</i> 1970	Zuurbier, George W., <i>IL</i> 1953
Fleming, John R., <i>IA</i> 1950	† Ray, Frederick H., <i>OH</i> 1949	(† indicates that member is deceased)
† Forge, Charles O., <i>CA</i> 1956	† Reed, Ph.D., Charles E., <i>OH</i> 1934	

Please contact Patricia McDaniel at pat@tbp.org if you wish to be included as a member of the Heritage Society.

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Hutcherson, Rodney N. '82	Walter, Kenneth L. '63	RI B	Brady III, William James '80	Stanbery, Sam R. '64	Fosberg, Theodore Michael '59
MacHnik, Nicholas J. '76	OH I Strausbaugh, Patrick Dennis '86		Rose, Vincent C. '52	Sweet, Paul A. '70	Oren, Kjell '79
Maybee, Clarion Lee '77	OH K Duffy, Stephen F. '78		Treault, David E. '63	TX B Newkirk, Todd L. '87	Reichel, Jere Dave '66
Redano, Richard T. '78	Maki, Luke Richard '78	SC A	Alexander, Samuel David '73	Stinson, John Michael '66	Rosen, Donald G. '58
Shepherd, Steven Olin '94	OH A Murphy, Charles James '77		Curlee III, Thomas O. '64	TX I Johnson, Terry R. '55	Royalty, Christina '85
Skinner, James Orville '73	OK A West, Earl Ray '59		Scherer, John H. '65	Rachford Jr., Henry H. '45	Searing, John Emery '68
White, Samuel Ernest '67	OK B Davis, Linda Rae '77	TX A	Speed, Penelope Ann '87	Crosser, Robert Earl '50	Simpson, David Paul '76
Yohman, Donald Ernest '73	OK I Basore, Paul Alan '78		SC B Bradley, Jeffery Ervin '85	Dokos, Nick George '57	Smith, Jeffrey F. '82
NC I Ando, Robert Ryoichi '73	OR A Beard, James L. '61		Feldmann, Andrew Russell '89	Garner, Scott Jahrand '77	Ward, David Lester '65
Chambers, William E. '60	Bishop, Donald Lee '65		Harris, Raymond E. '87	Goodson Jr., Alfred Wesley '70	Hudspeth, James Charles '88
Flowers III, George Horace '65	Cantwell, Gary Kenneth '80		McCaskey, Harold Orr '79	Knowles, David Wayne '80	Langley, Duane D. '55
Franks, Mark Jane '79	Ewing, Robert Clark '43		Prunty Jr., Robert Wayne '71	Lam, Carroll E. '58	Spencer, Paul N. '51
Hansen, Mikkel Anders '78	King, Warren Edward '69		Skovretz, Jonathan Maxwell '95	Madeley, Hulon Matthews '58	Washburn, Arthur King '67
Powell, Bayard Lowery '76	Marsa, Arnold Ray '49		Thomas Jr., Cunningham P. '58	Muldrow, Grady M. '89	Yates, David A. '53
NC A Daemer, Gary G. '92	McCormick, Gary Allen '74	SC I	Mello, William James '97	Newton, Philip Lynn '67	WV A Blackshaw, George Lansing '58
ND A Dahlin, Earl Charles '58	Robinson, Alan H. '56		Reed III, Henry McDavid '85	Smith, Manning D. '64	Engle, Geoffrey Stuart '94
Jacobsen, John W. '69	OR B Buchanan, Marlowe James '92		Rogers, Cranston Robinson '49	Swink II, Marvin Neel '80	Fleischer, Charles John '70
OH A Bondor, Paul L. '63	PA A Barndt, Ronald LaMar '58	SD A	Beacom, E. Kevin '82	Thomas, Richard E. '51	Gould, Marvin Burl '63
Brichford, Thomas K. '55	Bradley Jr., Charles William '51		James, Karleen Kaye '86	Herrmann, Edwin Peter '67	Koval, John Stephen '78
Hamilton, Joshua James '09	Brownlie, Thomas John '71	SD B	Bocklund, Lori Sue '83	Hon, Wai-Leung '67	Morgan, Kim W. '87
Heyman, Duane Allan '63	Errickson, Richard Keith '85		Ufford, Donald A. '87	TX H Guinn, Douglas E. '78	Tompkins, Joseph Andrew '76
Shape, Frederick M. '54	Fowler Jr., W. Beall '59		Chambers, George Philip '58	Keck, John C. '95	WV B Payne, Michael Eugene '81
Smialek, Jim L. '68	Hernjak, James Gregory '96	TN A	Conner Jr., Harold Tilton '68	Mathews, Douglas J. '81	Raines, Linda N. '83
Thro, Stuart W. '64	Ring, Robert Brex '55		Ellis, Jeffrey Thomas '93	TX Θ Chee Fong, Maria D. '91	WI A Forkner, Stacey L. '96
Weddell, James Kenneth '76	Sherman, William Joseph '60		Kaminsky, Lawrence V. '81	Fong, Keith Batchelor '88	Lee, Jun Wai '68
Zeis, John Frederick '62	Talhelm, Donald Lee '59	PA B	Layman, Ronald Terry '77	TX A Rosenwald Jr., John Andrew '88	Page, Chris Scott '90
OH B Burger III, George Dean '68	Ciuca, James Allen '72		McCaskey, Suzanne D. '80	UT A Dewey, William Alonzo '67	Polo-Amo, Luis Mariano '79
Fazzoni, Gregory Francis '76	Gasda, David Charles '70		Mynatt Jr., Roy L. '58	Piccolo, John Frank '58	Schultz, Carolyn J. '78
Hamilton, Edward L. '73	Magnus, John C. '48		Totten, Barry Nelson '82	UT B Enke, Glen Graham '62	Sieker, Frederick A. '70
Olt, Richard A. '80	Ross, David Stanley '69	VT A	Trundle, Max Don '72	Butterfield, William F. '67	Wellauer, John C. '65
Pick, Gregory Allen '84	Smyth, John '61		TN B Bass, Jay Kevin '87	Cimonetti, William James '59	Wulf, Kurt H. '63
OH I Au, Ralph D. '71	Weston, Matthew Wayne '93		Convery, Thomas Patrick '02	Ketcham, Kenneth James '68	Yuen, David P-K '73
Becher, Charles David '72	PA I Helfer Jr., Arleigh Pritchard '67		Helfinger, Richard Scott '72	VT B Berkman, Richard L. '69	WI B Grotheuschens, James H. '73
Fling, Russell Sharon '49	Licht, Robert B. '55		Johnston, Julia Wallace '81	Cobb, Eben J. '66	Hughes, Philip J. '66
Guins, Thomas S. '69	PA Δ Sheker, Robert E. '91		Johnston, Stephen Jay '76	VA A Anderson, Willie Corevis '75	Kleinbeck, Lynn Allen '65
Hohman, Charles M. '67	Sokal, Allen M. '68		Morrison, William Harvey '70	Evans, Gary Kyle '77	McMorrow, Daniel Patrick '98
Hollenbaugh, Roger Edward '71	PA E Mansfield, Brian David '91		Paxson, Daniel E. '84	Fair, Robert Richard '50	Mooney, Thomas J. '79
Kovach, Kar David '85	PA Z De Maio, Joseph Anthony '75		Petersen, Eric Scott '84	Garner, Patrick L. '72	Panning, Martin H. '49
Mendelsohn, Richard H. '71	PA H Boldt, Charles M. '73	TN I	Britton, Thomas Carter '88	MacKay-Smith Jr., Alexander '59	Raasch, William Glenn '81
Milligan, George Clarence '50	Gilman, Thomas Carter '66		Bromenshenkel, Wendy K. '89	Matthews, Nancy N. '81	Siontek, Thomas John '69
Orkins, James E. '66	Hills, Frederick James '61	TN E	Wilcox, Leslie M. '77	Miller, Lloyd Frank '43	WI I Lerch, Stephen James '89
Pass, Brian C. '86	Swartz, William E. '54	TX A	Cardwell, John Wesley '68	Powell, Joseph Broun '78	Simon, Anne Anne '83
Zeller, Hugh J. '66	PA Θ Daniels Jr., Harold E. '66		Glasow, Brian Scott '99	Tietjen, Jill S. '76	WY A Cavalli, Matthew N. '98
OH A Moore, Mathew Franklin '62	PA Δ Hennessey III, John L. '73		Hicks, Frank M. '82	VA B Dirling Jr., Raymond B. '64	Cook, Norman L. '78
Nussbaum, Lael Edward '68	PA K Beseler, Jan W. '88		Kopecky, Johnny Anthony '65	Doughty, Gary S. '77	Lester, Robert N. '87
OH E Cull, Ronald Carl '70	PR A Blasini, Francois Rene '82		Kuenast, Walter Ulrich '78	Lester, Jason Edward '96	Scharton, Craig Allen '85
OH Z Frederick, Wm G. D. '58	Irizarry, Arcelio '86		Kuenemann, Wesley B. '59	Long, David A. '91	
Panning, Daniel W. '79	Sanchez, Hector Luis '76		Le Bleu, Robin Boyce '65	McGowan, David Michael '89	VA I Wood, Travis B. '83
OH H Hager, Douglas Scott '85	SA A Pezzutti, David A. '69		Lyle Jr., Fred F. '62	VA A Gehr, David R. '68	VA A Confer, Peggy Jean '81
Kohlhaas, Richard L. '62	Saharian, Alexander '56		Marshall, James L. '72	WA A Eastman, James Scoville '53	
Nelson, James Ralph '65			Moorman, Charles T. '59		
Sweeder, James '82					
OH Θ Luhan, John Bernard '70					

SECOND CENTURY CLUB

AL A	Farlow, James Clifford '49
	Phinney Jr., Thomas Wesley '66
	Singlet, John C. '73
AL B	Babcock, Roger Lee '57
	†Dodson, Gene Austin '57

SECOND CENTURY CLUB, CONTINUED

	Gachet, Thomas H. '60	Eastman III, Frank H. '63	Sommers, Steven Raymond '78		Weigand, Christopher Dirk '77		Caruthers, James Ronald '69
	Moore, Robert A. '54	Lehman, Philip Lester '76	Southam, Robert E. '78		MA E Jurczyk, Thomas W. '71		Henderson, Betsy A. '84
	Moore, Ronald A. '69	Ljung, Michael Allen '92	Tucker, James A. '66		Levesque, George E. '70		Herman Jr., Donald Louis '84
	Sims, Kenneth L. '71	Mengwall, Martin Lennart '94	Weakley, Thomas Lionel '55		Payne, Robert Joseph '86		Hibner, Dale Vern '74
AL I	Hamilton, George Seaton '89	Montemoso, Juan P. '69	Welch, Alan James '71		Sarafinas, Aaron '82		Salerno, Michael Joseph '84
	Jacobs, James Ralph '86	Zydney, Andrew L. '80	Wessel, Donald '74		Thompson, John W. '72	MO B	Taylor, James Stuart '77
	Little, George A. '61	Alschuler, Stephen '54	Zimmer, Clarence L. '57		Travers, Harvey C. '68		Bobnar, William B. '75
	Sahawneh, Mary C. '76	Berg, Kenneth Paul '73	IN B Jones, Philip S. '56		MA Z DiMambro, Richard A. '78		Cavens, Albert Edward '59
	AK A Leonard, Leroy Edward '72	Follette, Jean M. '73	Klaus, R. Alan '53		Hellyar, Kenneth George '69		Edgington, Antony N. '51
AZ A	McSpadden Jr., William Robert '56	Kramer, Steven M. '79	Rinker, Robert Gene '51		Seus, John D. '84		Elfrink, Lindell Herman '62
AZ B	Gayle, William R. '78	Pennella, John Joseph '67	IN I Foley, Dan Joseph '70		Walsh, James Edward '76		Hardebeck, Harry Elmer '57
AZ I	Adler, James Robert '84	Seymour, Deborah Anne '86	Hawes, William Michael '78	MA H Daniels, Susan C. '81			Jenkins, Glenn Willard '59
AR A	Brady, Mark J. '83	Halfen, Charles W. '80	Henry, Eugene Walter '54	MA Ø Allen, Karen M. '89			Kyser, Dale Anthony '83
	Cofer, Larry W. '61	Maloney, Francis George '73	MAKarewicz, Peter James '73		Moran, James Edward '83		Meyer, Gene R. '84
	Hensley, Edward K. '52	Seitzer, Kenneth E. '78	IN A Eisenbart, Thomas R. '78	MI A Beck, Maureen E. '03			Preston, Scott Steven '97
CA A	Bruemmer, Timothy Michael '84	Hawkes, Mavis Beverley '77	Hessler, Glenn B. '61	Hole, Kevin Michael '90			Riley, Kenneth Gene '56
	Griswold Jr., Thomas Franklin '72	Wimberly, Mark Oliver '77	Steffen, John R. '66	Hoshaw, Susan J. '86			Sedovic, Pete Stephen '81
	Leung, Cissy S. '80	DC B Burns, Richard Stephen '59	IN E Lund, Stephen R. '80	Meckler, Carrie Lynn '98			Shank, Donald Russell '67
	Morihiro, Steve '79	DC I Kee, Orron Eugene '57	IA A Cerwick, Joel A. '66	Nastas III, George '66			Wilreker, Victor Francis '72
CA B	Clough, Gene Alan '69	Mayo, Henry C. '60	Hicks, Roger Dale '57	Payne, Lynnette Marie '95			Zimmick Jr., Harold E. '64
	Hearn, David Russell '64	Schmidt, Jon Alan '92	Houston, Melissa Jay '95	Ruhl, Scott Alan '88	MO I		Briner, Charles Dean '52
	Wassel, Gustav N. '60	FL A Byrum, Bruce Banks '77	Huber, Robin '93	Ruth, Gregory Philip '86			Klein, Milton '44
CA I	Dunham, James G. '73	Hunt, James David '78	Leonard, Randall C. '77	Ryckman, Jim James '38			Ladewig, Scott James '90
	Ellgas, Robert Alan '74	Ohland, Matt William '96	Maifield, Christopher James '95	Tscharnner, Christopher G. '83			Levy, Donald Jack '47
	Gordon, Matthew Howard '86	Schnitzler, Bruce Gordon '69	Mehrdad, Moigan '82	Bekins, Randell L. '80	MI B		Mills, Robert Allen '57
	Landers, Carl Francis '88	Shelton, Mark R. '80	Olney, Patrick Robert '85	Fayas, Duane George '58			Patterson, James Glen '99
	Likins, Peter W. '57	Tinsley, William Charles '77	Owens, David Andrew '91	Kranz, Paul Richard '63			Wildermuth, Amy Joelle '94
	Love Jr., Ralph Edwin '57	Townsend, Frank Charles '62	Radkins, Andrew P. '47	Ohlrogge, Kevin Charles '83	MT A		Egeland, Monte Dean '81
	Madden, Christopher J. '85	FL B Gatica, Rafael E. '80	Van Horn, David Alan '51	Pelletier, Douglas Peter '89			MacKin, Peter '81
	Rasmussen, Nicholas R. '68	Gonzalez, Cristina Maria '79	Van Zante, Dale Eugene '90	Skaugen, Borg '63	MT B		Jackson, Darron Boyd '86
	Volk, Robert D. '51	FL I Anderson, Barry Jay '75	Veenstra Jr., Henry R. '71	Stone, David G. '69	NE A		Fuchser, Fay Eugene '51
	Warner, Richard Harold '82	FL A Curtis, Fred Glenn '52	Wolfmeyer, Paul Albert '66	Whitman, Brian Edward '92			Hofler, Diane Sue '82
	Weaver, James A. '71	Sieck, Robert B. '60	IA B Dawson, Robert J. '60	Zollinger, Howard Allison '51			McFarland, Andrew Steven '86
CA A	Brooks, James Ray '72	FL E Guerin, Jim J. '92	Hunstad, Norman Alan '49	MI I Andersland, Mark Steven '83			Nott, James '09
	Burley, Christian Hale '55	Hansen, Christian Michael '88	Rathjen, Keith Richard '56	Anderson, Richard Walter '66	NV B		Charron, Ronald Harvey '64
	Hamilton III, Edsel Poston '72	FL Z Fricke, Steven Allen '93	Stevens, Stephen Arthur '77	Berno, Jeffrey William '63	NH A		Cloyd, Joseph R. '02
	Shields, David J. '78	Stewart, Robert Glenn '84	KS A Calhoun, Myron Ammon '63	Bloomer, Craig D. '80			Price, Alexander Daniel '05
CA E	Beguvala, Moiz '67	FL Ø Burrow, Gregg Dunkin '11	Carvell, Lee Arthur '84	Bloomer, Kristine K. '81	NJ A		Boardman, Thaddeus J. '52
	Goodkin, Mitchell Arthur '68	GA A Allen, Myron B. '58	Hinton, Robert Alan '61	Boettner, Donald W. '62			Ciccolella, Sergio A. '72
	Harvill, Lawrence R. '58	Brown Jr., Harry Jay '65	Pack, Garrett Edwin '60	Caminer, Morris Harold '50			Elhardt, William Christopher '68
	Hollar, Ray R. '78	Brush, Gary Stoddard '80	Viigen, Paul '87	Dalby Jr., John C. '68			Haid, David A. '57
	Ito, Roy A. '58	Drawdy, Jean Elizabeth '78	KEY A Goerz, Jerry Walter '75	Douthitt, Douglas A. '79			Sussmann, Kenneth Philip '72
	Kastenberg, William Edward '62	Horne, Carey John '70	Lettion Jr., George C. '57	Earl, George Clayton '66			Tompetrini, Kenneth Frank '65
	Nelson, Alphonzo G. '69	Lee, George Henry '70	Lockhart Jr., Zane Duane '86	Fishback, James Allen '74			Trippa, Steven J. '66
	Quan, Alan Chung '00	Lyons, Laura Christine '84	MCIntosh, Rickley D. '75	Fox, Michael T. '73			Wolosky, Irwin Stephen '68
	Stein, Eugene P. '68	Pipkins, Daniel Scott '78	KEY B Baldock, Steven Hugh '01	Gniewek, Kenneth John '77	NJ B		Anders, Gerald R. '75
	Struhl, Stanley Frederick '61	Russell, Richard Charlesworth '56	Hauenstein, Bruce Robert '76	Goodenough, Richard D. '74			Brandenburg, Dan Saul '72
CA Z	Egan, Thomas '88	Seay II, Charles Tomlinson '63	Raderer, Thomas K. '73	Gross, Paul Henry '83			Capasso, Michael Anthony '82
	Masnada, Dante Angelo '75	Sullivan, Francis Joseph '86	LA A Domino, Joseph Frank '70	Hand III, Mike J. '11			Kiser, Donald Owen '52
CA H	Bahr, Alfred Joseph '58	Barchenger, Kimberly '06	Levert Jr., Freddie Joseph '62	Hedding, Dale Paul '61			Palko, John R. '69
	Puig, Carlos Manuel '94	Brown, Harold Thomas '68	Miller, John S. '68	Hickcox, Timothy E. '65			Peoples, Robert '63
CA Ø	Gerwien, Phillip Harvey '77	Dowden, Douglas C. '73	LA B Boyle Jr., William M. '62	Lisiecki, Gayle Barill '79			Schar, David P. '77
	Gilman, Larry '73	Ellis, Paul D. '66	LA I Barron, Tim C. '81	Lisiecki, Robert Joseph '78			Valk, Stephen B. '77
	Hoekstra, Gerben N. '66	Hang, Kenneth Warren '66	Clary, Dennis M. '73	Lugten, John B. '76			York, Brian J. '82
	Saunders, Kenneth L. '81	Herning, Joel Gregory '69	Harvey, Irvin M. '69	MAier Jr., Edward L. '77	NJ I		Gagliardo, Reginald Saverio '70
	Smith, John Mervin '70	Jackson, Victor Guy '49	LA A Garber, James D. '66	Malloch, Charles Delridge '57			Kobylarz, Thaddeus John '58
	Stone, Ronald E. '66	Jacobson, Jerome '53	ME A Baker, Elaine M. '83	Miller, Richard N. '67			Rij, Jerry Jerome '72
	Strawbridge, Joy Wetherbee '83	Jones, Barclay George '54	Degon, Robert J. '66	Poy, Alfred Lim '91			Sulzberger, Carl Lewis '62
	Wiering, Larry Arthur '77	Kent, Michael E. '64	Jones Sr., Jeffrey A. '75	Sherman, Larry G. '66	NJ A		Beatty, Douglas Nellis '57
CA I	Dovala, Richard John '71	Kipp, Lyle Dean '86	Larson, Reginald E. '55	Siewiorek, Daniel P. '68			Moore, Christopher C. '87
	Wrigley, Chris J. '96	Kuhn, Paul A. '54	MCBurnie, Jeffrey C. '82	Smith, T. Murray '72			Stern, Hal Lawrence '84
	Yoshida, Gerald Toshiaki '68	Kuske Jr., John Anthony '61	McKusick, James E. '82	Stuart, John K. '53	NM B		Mills, Kenneth J. '76
CA A	Chargin, David Anthony '97	Lipinski, Paul Richard '60	Musk, Jeffrey Hill '86	Upham, Donald Lee '58	NM I		Gollman, James Alan '95
	Sanicky, Susan Rudy '72	Wilhelm, Dale R. '80	Simerl, James Henry '70	Weber, Michael E. '78	NY A		Bishop, Bruce Scott '80
	Webb, Margaret A. '79	IL B Knorowsky, Gerald A. '70	MD A Chan, Louis A. '84	MI A Arjeski, Eugene H. '51			Feuerstein, Stewart E. '80
CA M	Clark, David James '99	Schluter, Richard Paul '83	Leith, Robert Stanley '51	Byrne, William J. '62			Repetti, Ronald Victor '57
CA N	Jordan, Patrick Anthony '87	Stocker, Danny Lee '86	Piedrafitra, James L. '87	Cairns, J. Robert '54			Richter, Stephen L. '63
	Newberry, Conrad Floyd '57	Thomas Jr., Stanley R. '72	Sniegowski, Gary Howard '78	Gallagher, James A. '68			Silbert, Glenn Richard '75
CA E	Curry, Monica Marie '92	IL I Bryan, Jon Jasper '61	MD B Anonymous '77	Lajeunesse, Robert P. '74			Zimmerman, Robert W. '77
	Curry, Robert Stanley '94	Davis Jr., Charles F. '48	Bohse, Michael Edward '85	Lee, Albert W. '62	NY B		Bolstad, Richard L. '80
	Nicoloff, Louise Devere '82	Gosnell, John R. '61	Cuesta, Ernesto '71	Marino, Joseph Anthony '72			Engel, Howard Denton '50
	Nicoloff Jr., Nicholas '83	Kazmar, Richard Charles '71	Jochum, Thomas Andrew '77	Schleiter, Thomas G. '52			Smith, Kelvin Curtis '55
	Schroeder, Steven Albert '78	Kimmel Jr., Robert Raymond '75	Kale, Linda T. '80	MI E Benci, John Edward '83	NY I		Brown, A. Windsor '66
CA II	Barchichat, Emile Nissim '79	Ono, Craig M. '81	Lawrence III, Joseph Parran '68	Lapchak, Markian '73			Bushell, Michael '60
	Nieraeth, Donald George '77	Rauh, Donald A. '70	Roberts, Victor David '64	Mahanes Jr., Harold Patrick '65			Covello, Joseph '63
CA P	Koehn, Cameron Ray '81	Koehn, Lisa T. '82	Taylor, Patrick David '03	Mertz Jr., Harold J. '61			Curtis, Justin Allen '60
	Mandrell, Nathan Keith '92	Zimmerman, Jerald Robert '76	Tracy, John S. '74	Moses, Michael Joseph '00			Gordon, Benjamin Bruce '97
	Motogawa, Bruce J. '75	IL A Gilles, James Edward '75	Tracy, Anita Lynne '89	Witt, Jason Alan '98			Greaves, Charles Joseph '60
	Wells, Toby Eugene '94	Kobiella, Anthony Robert '77	Yourshaw, Sheryl Lynn '99	Yee, Kingman Ethan '77			Hirschman, Gordon Bradley '78
CA S	Black, Stephen H. '85	Toon, James Bertram '87	MD I Hamilton, Patrick John '87	Z Grubbs, Ronald Dean '73			Ives, Jon Robert '61
	Frankel, Craig Alan '86	IL Z Murray, Daniel A. '93	A Griffith, Rebecca Anne '91	Wozniak, Curtis Steven '78			Loewy, Robert Gustav '47
	Rubino, Kimberly Christine '95	Villasenor, Jaime Salgado '87	Mitschang, George W. '65	MI H Johnston, Richard '78			Lyden, Michael Joseph '78
CA Y	Lindauer, John Arthur '90	IN A Anderson, Kenneth R. '55	Zlotek, David Alan '69	MI Ø Kaiser, Stephen Gerald '76			Lynch, Michael Francis '87
CA X	Michaels, Philip George '91	Bach, Gary R. '74	MA B Bangser Jr., William '48	MI I Curry, Crystal Rae '83			Walter, Robert W. '64
CO A	Benton, John H. '78	Becker, Kenneth A. '81	Charpie, David Wayne '82	MN A Ball, William L. '70			White, Andrew H. '71
	Case Jr., Walter S. '59	Behr, Susan Rona '88	Goldman, Barry '76	Braaten, David Laverne '75			Williams IV, Carter N. '66
	Miks, Kathryn E. '87	Bower, William Walter '67	Halstead, Robert Hunter '75	Cavanagh, Stephen Patrick '89	NY A		Gordon Jr., James P. '83
	Pinkham, Joe N. '62	Carter, Eric L. '72	Margulis, John R. '54	Larson, Michael L. '59			Hui, Eric C. '90
CO B	Ashwood, Edward Ross '75	Cheesman, Mark William '81	Nelson, Percy Lyon '47	Magney, Mark C. '99			Jurell, Steven Francis '87
	Brueck, Robert Lewis '59	Cundiff Jr., Bruce T. '65	Russo, Gilberto '69	Olsen, Daniel J. '85			Lampell, David Mark '73
	Castleman, Curtis Hulen '67	Danner, David L. '70	Savage, John E. '61	Osen, John Walter '81			Logan, Joseph Skinner '56
	Chapman, Terry Charles '69	Flanigan, David L. '66	Shedd, Walter Milo '66	Petrich, Gale Sean '86			Waring, Michael D. '65
	Davis, Gregg Randal '77	Forster, Allen V. '72	Topolic, Claudio '76	MS A Anderson, Shirley Lee '90			David R. '82
	Furman, Michael Lee '80	Foss, John F. '61	Tou, Frederick N. '81	Barnett, Kerney L. '71	NY E		Jaasma, Edward '59
	Sorensen, Chris David '79	Hedegard, Alan Harald '64	van Raalte, John A. '59	Bell, Charles V. '56			Lombardi, Francis A. '70
	Walker, John Sherwood '53	Holwager, Thomas '57	Hamby, Genevieve D. '92	Bufkin, Jimmie Anthony '70			Pines, Edward L. '71
CO I	Altman, Donald Clyde '57	Johnson, David Harley '63	Iovanna, Paul R. '78	Corley, Katrina Lynn '89	NY Z		Pollack, Martin Larry '72
CO Z	Bridges Jr., Roy Dubard '65	Lin, Jeffrey Eugene '97	Murch, Robert Emery '58	George, Jim Fredrick '71			Seider, Warren D. '62
	Crews, Mark Conrad '82	Maselli, Stephen A. '68	Poppole, Richard Elwood '58	Steele Jr., W. Glenn '68	NY H		Davidoff, Donald A. '72
CT A	Berger, Toby '62	Noah, Max Wilbur '58	Savage, Paul David '77	Tyner, Fred Mack '93			Le, Phuog Dang '90
	Bugel, Robert Harry '45	Schmertzler, Alvin Louis '45	Stanhield, Robert B. '53	MO A Adams, Charles R. '65			Schlein, Robert G. '72
		Simnick, James John '74	Surtees, Robert Elliott '55	Baker, Gerald M. '63			Beckman, William Jerauld '79

Special Gifts

Special gifts were received in memory of Alan J. Airolidi, CA A '58, from his wife, Kathleen; David C. Davis, GA A '51, from Charles R. Davis; Ramsey W. Farley, TX A '61, from his wife, Eva; Richard D. Ellsworth, UT A '48, from his daughter, Cynthia J. Jonas, PA A '82, who shared how proud he was that his daughter, son-in-law, and grandson were all Tau Beta Pi members; the Hurlbert Family Foundation in memory of Gordon C. Hurlbert, WI B '46, and in honor of David R. Volpe, MI Z '74, and Michael D. Volpe, TN B '06. Tamara W. Luchini made a special gift in memory of her husband, John R. Luchini, Ph.D., P.E., MI I '71, who passed away in September 2013. Patricia B. McDaniel, TBI Director of Development made a gift in support of Engineering Futures. Mary M. Perry's gift is a memorial to her husband, Hal G. Perry, KY A '57, who passed away in May 2008. James L. Russell, IN A '93, made a gift in memory of Elisiemae Russell; Diane and S. James Ryckman Jr., made a gift in memory of Professor Seymour J. Ryckman, MI A '38; Padmavathi V. Sanampudi made a gift in honor of her parents SVS Narayana Rao and Satyavathi; Charles D. Simmons, MI I '50, from Daniel Doyle through the Joyce & Charles Simmons Memorial Foundation; and Jerald J. Stratton Jr., TX A '86, sent a gift in memory of Melvin & Violet Peterson and Howard & Bernice Stratton.

SECOND CENTURY CLUB, CONTINUED

Franz, John William '70
Free, Albert P. '78
Gronosky, Clifford E. '58
Hopkins, Robert C. '76
Hunt II, William E. '59
Lester, John Welch '52
Marvin, Mayne Drew '80
Schwind, Daniel Richard '76
Stone, Robert Edward '76
Wesler, Philip '48
Zagrobely Jr., Thadeus John '76
NY I Charleston, Carl Richard '87
Jovanovic, Adrian Burton '89
McCutcheon, William John '66
Orans, Robin M. '71
Zwillenberg, Melvin Leslie '60
NY K Dennis, William John '74
Epstein, Benjamin Ross '78
Hutchings, Donald W. '61
Isaacson, Morton Sanford '66
Levy, Cynthia A. '82
NY A Ganetis, George L. '78
Killeen, Michael James '73
Monroe, Charles W. '53
Passut, Charles Albert '67
NY M Hurewitz, David Lewis '64
Wilcox, Robert E. '73
NY N Darroch, Michael Edward '84
Havas, Donald William '67
NY E Ball, Michael J. '72
Drewitz, Edwin W. '77
Elkaslasy, Samy '10
Kehrerberger, Patricia M. '69
Mercando, Anthony Dominic '76
Snyder, William Joseph '81
Steinle, Kathleen Susan '77
NY O Blomberg, William J. '82
Swidler, Susan C. '78
NY P Richenderfer, Tommie G. '77
NY P Hartmann, Martin Robert '83
Ramos, Dennis J. '03
NC A Buckner, Harry Benjamin '92
Galyon Jr., Luther Ellis '67
Trivette, Wendell A. '82
NC F Block, Norman G. '54
Board Jr., John Arnold '82
Davidson, Lindell A. '49
Farr, Douglas Edson '79
Moulton, Paul R. '80
Thor, Philip W. '74
NC E Craft, William J. '63
ND A Geller, Harry '50
Herther, Terry Dai '60
McLaughlin, Jenny Louise '84
Vastag, Harold James '69
OH A Cross, Matthew David '05
Fernbacher, John Matthew '62
Hecker, Siegfried S. '65
Honious, Robert Todd '89
Kirkland, Earl J. '75
Strawbridge, Charles Everett '81
OH B Greene, Stephen '75
Hart, Thomas Russel '66
Hatch, Jeffrey A. '74
Kojola, Scott Alan '95
Nair, Suresh Neelakantam '83
Rex, Clinton Owen '92
Shields, John L. '75
Smelser, Ronald Eugene '71
OH G Case, William Frederick '64
Condit, Dale Osborne '66
Engen, Todd Christian '81
Facer, Roger Glen '85
Hoover, Thomas Edwin '56
Kirner-Prbe, Susan M. '85
Kohls, Thomas Carl '81
O'Neal, Joe Edward '55
Sattler, Frank Joseph '62
Slawson, Robert Eric '88
Wiegand, Frederick G. '72
Yacher, John M. '67
OH A Davidson, Lee A. '65
Felice, Conrad William '79
Hild Jr., Wilbur Henry '64
OH Z Folgate, Carl Roland '58
Matta, Lisa A. '97
OH H Ballenger Jr., Wesley Allan '83
Duvall, David John '88
Jumper Jr., George Y. '66
Merkle, Laurence Douglas '92
Tannen, Peter D. '57
OH E Crispino, David J. '80
Sink Jr., Robert Dean '87
Unverferth, R. S. '74
OH I Nelson, Lori Rae W. '84
OH K Lee, Sunggyu '74
OH A Sarantopoulos, Athanasios D. '86
Wilson, Joshua David '06
OH M Dull, Daniel D. '90
Montgomery Jr., William Lee '86
OK A Bray, Fred Martin '68
Kleinstein, Stanley Warren '78
Spangler, Jon A. '90
Wolf, Jerald Michael '88
OK B Harper, Lois Marie '86
Janowski, Susan T. '80
OK K Lewis, William Jeffrey '84
Miani, Lino M. '86
Morgan, Johnny J. '88
OR A Wilt, Jay N. '74
OR B Sutton, Carolyn Ann '08
PA A Albright, Carl H. '55
Branting, Katrina Louise '80
Brunt, Thomas Barry '62
Frey, P. Wayne '51
Groff, Ronald Parke '62
Hjorth, Beverly E. '79
Leach, Jeffrey Daniel '77
Link, Roderick Wylie '44
Parsons Jr., Donald F. '70
Shuey, David Edwin '78
Swartwout, John Baxter '73
Vogel, Stephen M. '61
PA B Cohen, Bruce Alan '72

Kutz, Michael Ralson '88
Mumma, Jeffrey Scott '80
Walker, Kurt Melvin '77
PA G Cooley, Wils Lahugh '64
Pierce, Amy M. '80
PA A Sack, John Stuart '75
Besser, Gilbert M. '49
Lewis, Timothy M. '74
Turner, Michael Bryan '89
PA E Kulicki, John M. '65
Odenwelder, Dale G. '73
PA Z Chmielewski Jr., Thomas A. '77
Georges, George C. '63
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Howe, Howard Joseph '63
Jastrzembski, Joseph S. '64
Phillips, Stephen G. '69
Rummel, William David '59
PA H Grier, Bruce H. '77
Pedersen, Neil Jon '74
PA E Barron, William Robert '60
Corradino, Joseph Carmen '65
Griffin, Michael Vincent '74
Hilditch, John Michael '83
McElhenry, James Edward '70
Volkay-Hilditch, Christine M. '83
PA I Eveler, Nathan Troy '07
Haigh, Bruce Whittemore '71
Henry, Martin W. '72
PA K Siddiqui, Faruq M. '76
PA A Andes, John A. '83
Kaplan, Kenneth J. '84
Kvitkovich, James Francis '81
Leiss, Wayne Guy '76
Cancio, Hugo M. '74
PR A Hilario-Sanchez, Josuan '07
Novomestky, Frederick '69
Perez, Juan A. '78
Perez, Luis A. '88
Rivera, Fernando Osvaldo '68
RI A Campbell, Neal Stone '68
Edgar, Richard Baxter '47
French, Harry Banks '47
Garrett, Scott L. '57
Olding, Duncan R. '55
Ritter, Charles J. '73
RI B Bershtein, Margaret '85
James, Charles Franklin '58
Lebeau, Andrew Joseph '79
Procaccini, David A. '65
SC A Drennan Jr., Robert E. '70
Harmon, Leon Carroll '71
Lancaster, Harry Lloyd '80
Marley, Brian Lee '89
Paskel, Sheila Ann '86
Stecker, Marc Kevin '82
SC B Bailey, Mickey James '82
Haggerty, N. Kent '72
Hidlay, Charlene Marie '96
Pendley, Howard A. '93
Rippy, Crystal D. '93
SC F Burton, Kevin Lane '90
Cauthen Jr., Lewis Jackson '54
Evans Jr., Samuel Godfrey '53
Fralix Jr., James Theodore '59
Julich, Thomas Frank '76
Langston, Ronald E. '64
Sullivan, Jack L. '79
SD A Bier, James J. '84
Eizember, Thomas R. '76
Stieha, John Kevin '80
Strobel, Julius Walter '67
TN A Blazier, Stephen Draper '74
Bowden, Bryant B. '68
Cavender, James Milton '66
Jenkins, Alvin Leigh '61
Tang, Alice Hunsanchem '86
Welch, David O. '60
Williamson, James Moore '79
Witt, Teddy C. '90
TN B Campbell Jr., Henry Grady '59
Cross, Mary E. '77
Hall, Steve D. '84
Lyle, Stephen Michael '79
Petersen, Stephanie Otis '84
TN G Badiru, Adejebi B. '79
Pedigo, Donald B. '83
TN Z Carney, Terrance Magoun '56
Badgwell, Thomas Alan '92
TX A Behrens, Paul D. '47
Caudle, Brian Hall '77
Cole, James Walter '80
Givens, Kent B. '72
Hight III, Terry Hodges '70
Huang, Lawrence Peter '81
Machemehl Jr., Charles Albert '57

Mast, Thomas Rush '60
Meers, Steven W. '72
Parent, Laurence Edward '81
Wilkes, Chester Peyton '50
TX B Easterday, Mark Louis '84
Gates, Robert Douglass '72
Houston, Scott Lee '96
McNair, Michael K. '79
Moore, Rebecca F. '47
Olson, Bruce J. '75
Palmer, Jim Brown '64
TX F Hobbs, William E. '65
Jackman, Alan Parker '64
Turner, James Ward '76
TX A Carta, James K. '83
Caso, Gregory Scott '87
Dowling Jr., Cloyd James '51
Hall, Robert Arlin '63
Hillman, Thomas A. '69
Jordan, Kirk Gerald '80
Nasset, Donald A. '70
Murphy, Prahlad N. '92
Nuccio, Robert Peter '51
Schwierze Jr., Perry Julius '60
Sullivan Jr., Samuel L. '57
TX E Bair, Alan Roy '77
Lim-Smith, Yee Lan '82
Smith, Kevin George '81
TX H Clute, Gregory Stephen '85
Godwin, Albert Eugene '84
Motley, Edward Milford '76
Norwood Jr., Edwin Bosworth '67
Potvin, Alfred Raoul '64
Sanampudi, Padmavathi V. '95
Shirazi, Behrooz A. '80
TX E Hippens, Ralph D. '72
Pearsall, Katherine June '71
Van Reet, Leo J. '70
TX K Miles, Gerald P. '75
TX A Perez, Romeo R. '82
Schultz Jr., Alvin Frederick '73
UT A Spong, Robert Neil '58
UT B DeCarlo, Armando '95
Hardy, Mark Douglas '84
Hart, Robert Evan '73
UT F Clyde, Eric S. '75
UT A Sleeper, Gregory Douglas '86
VT B Henry, Thomas Arthur '70
VA A Binder, Ronald W. '74
Byers, Duane Michael '80
DeYoung, John Howie '99
Johnson-Payton, Lori Renee '97
Wyant III, Thomas Raymond '71
VA B Beard Jr., Frank H. '64
Bucklen, Jerry Coleman '62
Dalton Jr., Eddie Gene '86
Davidson Jr., Charles A. '70
Ernest Jr., Charles L. '70
Kern, David Paul '98
Mayer, D. Stephen '49
Myers, Kenneth S. '53
Spangler, C. Leigh '82
Wayne, Jennifer Susan '83
VA F Rausch, Leonard Earl '80
Swats, Charles Frederick '74
WA A Berry, Douglas Ward '71
Bucknell, Richard Lee '53
Davis, Beverly Z. '80
Levin, Marc E. '80
Melton, Ronald Benjamin '77
Miller, Stefan John '63
Purdy, Catherine Patricia '72
WA B Elliot, Robert Charles '88
Hyde, Gary M. '64
Saries Jr., Daniel A. '83
Saries, Vivian Beatriz '80
Simon, Terry W. '68
Stephens, John Lawrence '51
Wahl, David John '62
WA F Brooks, Forest C. '70
WA A Campion, Paula JoAnne '00
WV A Britton, Barry Kevin '85
Glass, David R. '75
Harbaugh, Gerry Wain '71
Kacic, Richard J. '84
Mongold Jr., Guy Earl '50
Pellegrin, John Daniel '73
Rowe Jr., Eldridge Eugene '68
Zimmerman Jr., Albert R. '58
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WI A Christenson, Solveig Ann '86
Diedrich, Donald L. '69
Fahrbach, David R. '69
Frazier, Clive '66
Johnson, Peter Andrew '64
Meister, James Richard '78

Nesbitt, John David '82
Tausche, Paul Everett '48
WI B Bella, Robert A. '65
Jaye, Deborah Ann '03
Lenz, Marsha Joann '86
Pelt, Thomas Eugene '70
Pickett, Mark Allan '72
Wick, Paula B. '81
Wilhelmi, James Joseph '69
WI F Hanson, David L. '86
WY A Hill, Janet Lynn '95
Meacham, Scott Alan '88
Scott, Barbara Jean '73

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Vickers, William Korth '88
AK A Keiser, Jan Ann '76
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Brusch, Richard Gervais '65
Fish, James J. '50
La Roche, David Frederick '86
Malvick, Arnold Joseph '92
Shaver, Frederick W. '55
AZ B Marsalla, Joy '12
Rasmussen, Brenda Kay '91
Reedy, William J. '82
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Whitson, James Everett '80
CA A Chew, Richard Sung '85
Chu, Jeffrey M. '82
Holland, Kenneth Murray '50
Lee, Chittam '65
CA B Jensen, Pauline H. '77
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Manatt, Stanley Lawrence '55
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Ma, Conlan Liang '99
Miller, William C. '50
Nagel, John Frederick '91
Richardson, John L. '56
CA A Schneider, Kenneth J. '58
Ung, Evelyn Fay '83
Van Der Laan, William Frank '62
CA E Bienenstock, Bernard Joel '68
Forman, Ronald J. '60
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Bauerle, Richard Dennis '59
Boessow, Daniel Shernood '57
Jones, Donlan Francis '52
Mei, Anthony Louis '70
Sabbatini, Julian '68
CA H Khalili, Azita M. '83
Kruusmagi, Daniel Thomas '13
Tang, Jimmy '07
CA E Cook, John R. '76
Tran, Giang T. '82
Young, Allen Paul '73
CA I Garcia, Rodrigo T. '72
Kwong, Ray S. '65
CA K Shepherd, Thomas Jerome '83
Smoots, Neil Randall '78
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Sherwood, Robert J. '68
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Smith, Michael P. '84
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CA P Eberly, Barry Lynn '81
McPherson, Glenn Allen '79
CA Y Burns, Michael Thomas '88
Eke, Kechy N. '02
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CO A Darling, Edwin E. '68
Gibbs, Frank Edward '84
CO B Brenner Jr., William O. '59
Hora, Keith Yoshio '87
Matsuuo, Roy Minoru '59
Morgan, James Irving '53
Olson, David Roderick '79
Richards, Lawrence Garnold '61
Van Wyk, Macklin F. '61
CO F Goodish, Michael Irvin '70
Whissen, Robert E. '56
CO A Dadd, Jeffery Scott '97
Dadd, Susan Valentino '96
Longino, James L. '81
CO E O'Fallon, Sean Emmett '95
CT A Feinman, David Mayor '49
Ronalds, Hugh C. '58
CT B Conaty, Gerald Francis '56
Jacoby, Ronald '87
McKinstry, Robert J. '72
DC A Coleman, Dor Michael '60
Grayson, Rodney M. '71
Rosen, Arye '63
Sharpe, Irene White '63
DC B Bonuccelli, Hugo A. '73
Kosnik, Christine Josephine '95
Ratto, Christopher R. '07
DC F Young, Cliff Mark '93
FL A Adams, Donald W. '89
Good Jr., Thomas J. '91
Hoxie, Chris Lloyd '75
Talbot, Michael Thomas '71
FL F Bowman, Harold Jackson '77
Osman, Jeffrey S. '78
FL A Bowman, Roger D. '79
Dobbins, Kathy Lynn '93
FL E Morales, George Jason '06
Sinibaldi, John Claude '85
FL Z Mazurek, David Francis '82
FL O Leon, Felipe Antonio '99

FL I Passarelli, Brian L. '10
GA A Anderer, Joseph Henry '47
Caraway III, Willie D. '85
Croft III, Jay James '66
Daniel, John Kent '70
Houser Jr., Marion Emmett '54
Petrie, Lester Marshall '59
Pressly Jr., William Harlan '51
Taylor Jr., George Brown '75
ID A Hatter, Marjorie M. '80
IL A Allison, Herman D. '69
Jacobson, Paul A. '80
Kareken, Ronald S. '57
Kennedy, Kevin Bernard '90
Loos, James E. '51
Resman, John Charles '86
Ross Jr., William Charles '82
Stubenrauch, Carl Frederick '62
Stutzman, Byron William '60
IL B Hinman, Clyde D. '49
Kozlik, John Francis '59
IL F Asbury, Michael George '83
Bardach, Paul C. '85
Borden Jr., Roy H. '80
Derlacki, Walter R. '45
Gamble, Robert B. '53
Henze, Edward Durand '50
Ho, Benjamin '87
Moore, Jeffrey Austin '73
Nudd, Oliver R. '92
Pector, Scott Walter '78
IL E Finocchia, Samuel Dominic '73
Levitano, David Mark '80
IL Z Restis, Jude H. '89
IN A Bottis, Beth Antoinette '79
Brumund, William E. '64
Carpenter, Randall W. '82
Dykes, James Alfred '50
Edelson, Charles R. '48
Ewart, Howard Lee '58
Foster III, John I. '74
Hammond, Joel Charles '83
Kawaguchi, Ray S. '69
Long, Harold T. '59
Lott, Charles Philip '48
Meier III, Lewis '67
Meyerson, James '77
Miller, James Richard '86
Mills, Michael Stephen '69
Oberghell, Mark N. '80
Olin, David B. '52
Pearson, James A. '55
Rayshock, Alexander '48
Riley, Daniel Wayne '71
Russell, James Long '93
Schoendorf, Joseph Paul '66
Shimp, Alan Burke '55
Snook Jr., Carl Thomas '63
Srinista, Sunthorn '57
Stepro, Dennis C. '71
Stiffler, William Theodore '84
Thompson, Curtis Brooks '51
Tyrell, David H. '58
Vanderbilt, Vern Corwin '42
IN B Bechtel, Morris Alan '64
Raff, Barry E. '67
Repp, Brent Thomas '88
IN F Armstrong, Ashley A. '15
Charbonnet, Edward C. '71
Chou, Robert V. '61
Dickens, Michael Loren '10
Geer, Ivan Daniel '94
Lykins, David Rickert '96
Mantey, Philip M. '65
Tragarz, Michael Aloysius '65
Turek, Joseph Anthony '79
Turek, Mary Beth '79
Walsh, John S. '80
IN A Duncan, Scott '90
Kastman, Kenneth Herbert '66
IN E Nagielski, Lawrence S. '81
IA A Feamster, R. Scott '67
Gauger, Robert H. '49
Nieman, Richard L. '64
Patrou, John P. '51
Rowe, Alvin G. '63
Stammer, Russell D. '79
IA B Braet, Ronald Lee '63
Dodge, Robert Duncan '76
Gozali, Paul '85
Gurnett, Donald Alfred '62
Nicomedeus, Keith Lynn '52
Workhoven, Robert M. '59
KS A Asher, Gary Lee '65
Bowles, Barry J. '79
Flood, Patricia S. '74
Rock, Brian Allan '85
KS B Golobay, Gary Leon '72
KS F Doud, Galen Charles '90
Gudenkauf, Wayne Anthony '93
Heronemus, Daryl L. '77
Jackson, Bruce D. '74
Kottwitz, Donna Dale '75
KY A Emrath, Richard M. '78
Krebs, Mark Edward '88
Ogden, William R. '65
White, Garey Lee '51
KY B Gray, John H. '75
LA A Bourgeois, Karl Francis '75
Bouvier Jr., Maurice Joseph '59
Bullard, Salem C. '63
Edgerton, Michael T. '66
LA F Blanche, Brian James '87
ME A Fradette, Marc Yves '71
Gagnon, John R. '62
Goodine, Paul J. '65
Miller, Stanley John '49
Sproul, Otis Jennings '52
MD A Belaga, Myron W. '50
Leimbach, Wendell Byrd '71
Sabater, Juan Miguel '60
MD B Cicotte, Anthony Thomas '71
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Dunnigan, Gerard Joseph '62

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MA A	Obstnik, Paul Edward '86 Bassett, Leon Hiram '51 Frankie, Gene Louis '73	MO A	Amigoni Jr., Alex Joseph '66 Campen, Kenneth Wilbur '55 Sandridge, Jack Richard '65	NY II	Weiss, Robert Aaron '86 Bailey, John W. '65 Bell, Brian D. '96
MA B	Goodhue, William Donald '71 Hopf, William Herbert '58 Manning, Robert James '88	MO B	Bach Jr., Wilbert Edward '50 Gonzalez, Al '07 Hanser, Andrew David '92	NY P	Ames, Vincent P. '76 Hoffman, Mark Eldon '98 Benge, G. Gregory '83
MA C	Menard, Paul R. '75 Schurzky, Kenneth George '67 Slaughter Jr., Herbert H. '45	MO C	Hord, William Eugene '59 Katz, Manfred '53 Vandergriff, Leland E. '71	NC A	Borden, Laura H. '82 Hagarty, Edward Patrick '77 Ingram, William Prentiss '70
MA D	Buncher, Charles R. '60 Chang, Nancy Tien-Tien '87 Foster, Edward T. '63	MO D	Ward, Terrence Ray '70 Wussler, Alfred Julius '71 Borgwald, Kenneth Joseph '65	NC E	Keith, Alan Randall '82 Willis, John Keith '78 Smith, William A. '61
MA E	Frassinelli, Guido J. '48 Fuhrman, Linda Sophie '86 Harris, Marvin Sims '55	MO E	Stephens, Mary Elizabeth '88 Weber, Walter Herman '48 Wessling, Donald R. '60	NC F	Thompson, Renee C.D. '98 Franson, Alvin David '65 McCormack, Fred Eugene '76
MA F	Kinzinger, Walter C. '51 Longley, Lester Anderson '78 Post, Allen Edward '61	MT B	Wessling, Donald R. '60 Jones, Sharon Alane '93 Schlauman, Mark Alvin '84	ND A	Nelson, Lyle David '58 Schmidt, Wayne Joseph '50 Solberg, Bruce Jerome '69
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MA H	Wampler, Charles Weldon '79 Weston, Theresa A. '80 Zukowski, Charles A. '81	NH A	Plamondon, Maynard A. '62 Russell, Earl David '57 Schackel, Scott Edward '78	OH A	Dale, Scott Allan '85 Diederich, Norman Francis '64 Hartwell, Debra Lynn '90
MA I	Anderson, Thomas T. '57 Levin, Neil '80 Orenstein, Mark Allan '66	NJ A	Schackel, Scott Edward '78 Chen, Kevin Emmanuel '06 Daugert, Richard David '88	OH B	Herman, Zele S. '67 James, Michael David '91 Lund, Jeffrey W. '69
MA J	Raisler, Richard Allen '72 Field, Leslie Ann '83 Johnson, David Norman '77	NJ B	Stein, Gary Richard '67 Tensfeldt, Thomas G. '81 Horowitz, Daniel Austin '99	OH C	Proctor, David George '52 Radke, Charles Edwin '55 Ricart, D. Glenn '71
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MA L	Tremontozzi, Ralph '85 Tremontozzi, Venus K. '84 Tsang, Janis Chan '87	NJ D	Berkowitz, Ellsworth Dean '81 Busch, Robert Edward '68 Della Rovere, Richard '10	OH E	Wilke, Raymond Joseph '81 Boggs, Kelly Jean '95 Cory, Warren Eugene '76
MA M	Beerman, Maxim Victor '86 Corn, Frederick E. '85 Hazelton, Arthur R. '66	NJ E	Foehner, Michael D. '63 Lerner, Marshall Aron '62 Mulligan, Michael A. '80	OH F	Keller, Philip S. '84 Over, Ann Patricia '83 Ballinger, Charles W. '72
MA N	Jeane, David Charles '73 Steenstra, Curtis William '88 Wu, Huiyi '96	NJ F	Sulzberger, Virginia Claire '62 Chen, Ephraim Jonathan '09 Maisenschein, Jon Lee '74	OH G	Hupp, William M. '69 Andrews, William Edwin '57 Bennett, William R. '80
MA O	Zarbo, Richard M. '85 DeMartinis, Guy Bernard '08 O'Melia, Sean Ryan '05	NM B	Buck, Cindy Jo '93 Gallegos, Floyd R. '82 Tubby, Alan '13	OH H	Borst, Richard A. '64 Heckelman, James D. '62 Larson, N. Kenneth '61
MA P	Smith, David Robert '87 Zawacki, David Vincent '98 Conklin, Daniel L. '65	NY A	Jung, Dick Y. '77 Moody, J. Roger '58 Stamm, Robert C. '50	OH I	Shanik, Thomas J. '85 Badik Jr., Thomas B. '85 Jones, Barbara J. '82
MA Q	Heimiller, Wayne R. '80 Lipsitt, Harry A. '52 Logan, William S. '75	NY B	Church Jr., Richard E. '84 Gounalis, Anthony John '81 Jeffers, Richard D. '73	OH J	Randolph, Brian Walter '82 Carlson, Lonnie '07 Christian Jr., Thomas Franklin '68
MA R	Salisz, Albert A. '75 Su, William Perry '90 Towne, Ramon M. '72	NY C	Kosboth, George L. '59 Leight, David M. '75 Olson, John Frederick '64	OH K	Haritos, George Konstantinos '69 Jumper, Eric J. '73 Begovich, John Michael '74
MA S	Barnhart, Kent Thomas '83 Dykema, Adrian Henry '44 Gosling, Christopher David '79	NY D	Rubinstein, Ian Z. '69 Thomas, Henry Howard '62 Beesley, Arthur H. '75	OH L	Wong, Dominic '75 Hurtig, Michael Lee '91 Lemaster, Bruce E. '87
MA T	Ilax, Susan B. '77 Kuhn, Jonathan L. '92 Lindberg, John R. '52	NY E	Goldstein, Arthur L. '57 Hruda, Prokop V. '83 Lenney, Robert V. '62	OH M	Foust Jr., Tilman Harrison '02 Bunnell, Robert Lee '76 Strawman, Steven E. '81
MA U	Luttfinen, Gail Lee '68 McNeil, Michael T. '86 Oliver, Bruce L. '63	NY F	McAninch, Ian Matthew '02 Patsos, Daniel Alexander '05 Smith Jr., Martin G. '59	OH N	Beck Sr., Clark E. '55 Stinson, Donald L. '50 Zink, James G. '74
MA V	Whipple, Kristina Gretchen '87 Badalament, Michael Anthony '91 Boeve, Norman Virgil '63	NY G	Timour, Sune E. '52 Wedgwood, Janet E. '80 Beaubien, Robert Patrick '90	OR A	Gibbs, Bruce E. '79 Gruber, James B. '94 Quigg, Joann M. '94
MA W	Buer, William J. '68 Duncan, T. Michael '75 Durbin, James Robert '66	NY H	Wedgwood, Janet E. '80 Beaubien, Robert Patrick '90 Brown, Matthew Alan '85	OR B	Danner, Joseph Calvin '59 Munch, John Herbert '82 Jonas, Cynthia Joy '82
MA X	Frantz, John A. '75 Gelb, Arthur J. '44 Jones, Bruce Elliott '81	NY I	Lazar, Dale S. '74 Munch, William Dexter '76 Ng, Benjamin '81	PA A	Alstad, Richard Harold '76 Binford, Jack C. '53 Getson, William J. '60
MA Y	Mehlhorn, Thomas Alan '74 Mohr, Dale '56 Passman, Thomas A. '44	NY J	Reilly, Philip M. '53 Sawchuk, John Andrew '71 Hauptman, Marvin Howard '59	PA B	Handshue, James David '03 Matlack, James L. '84 Pollock, Andrew M. '72
MA Z	Plechta, David Anthony '83 Schepis, Deborah Kalef '83 Totten, Halden Curtiss '61	NY K	Maglien, Robert Z. '63 Choi, Stephen '73 Gold, Harris '58	PA C	Smith, Randy Earl '84 Trochiano, James T. '82 Weida, David Edwin '71
MA AA	Zelenka, Jerry S. '58 Dierker Jr., Joseph B. '85 Hemming, Joseph Anthony '69	NY L	Guckner, George C. '54 Baginski, Alfred John '62 Biesiadecki, Glenn J. '78	PA D	Zahora, Kenneth Richard '76 Bloom, Jeremy Alan '73 Frisson, Bradley Joseph '82
MA AB	Grant, Robert M. '75 Sagert, Harold Henry '68 Yarne, Victor Carl '68	NY M	Greenfield, George '51 McClellan, Jomo L. '92 Oslen, Arthur '52	PA E	Kaplan, David Seth '03 Bartusick, R. Donald '77 Brenner, Donald '75
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American Ref-Fuel Company	Duke Energy Foundation	M/A Com Inc.	Sempra Energy
American Transmission Co. LLC	Duracell USA	Macy's Foundation	Shell Oil Company
Amgen Foundation	Dynegy	Markman Inc.	Silicon Laboratories Inc.
Amsted Industries Foundation	Eaton	Massachusetts Financial Services Co.	Southern California Gas Company
Analog Devices	Ecolab Foundation	Massachusetts Mutual Life Insurance Co.	Southwest Power Pool
Anchor QEA	EG & G Chandler Engineering	McDonald's Corporation	St. Jude Medical
Apache Corporation	El Paso Energy	McGraw-Edison Company	Stanley Black & Decker
Apple Inc.	Elsevier Science	McGraw Hill Financial	The Sun Microsystems Found. Inc.
Applera Corporation	Emerson Electric Company	Mead Johnson Foundation	TCF Foundation
Armstrong Foundation	Engineering Design & Testing Corp.	Meadwestvaco Foundation	T-Mobile
ARS Products LLC	Enterprise Products Company	Medtronic	Tellabs Operations Inc.
ASARCO Foundation	EOG Resources Inc.	Merck Foundation	Tesoro Corporation
ASC Geosciences Inc.	Equistar Chemicals, LP	Metso Automation	Texas Instruments Foundation
Ashland Inc.	Ericsson Inc.	Microsoft Corporation	Textron *
Atlantic Richfield Foundation	Erie Manufacturing Company	MidAmerican Energy Company	Thomson Reuters
Atmos Energy	Esterline Technologies	The Millipore Foundation	The Toro Company Giving Program
AT&T Foundation	Eversource Energy Foundation	Mizuho	Toyota Technical Center, USA Inc.
Automatic Data Processing *	Exelon	Mobil (Retirees)	Transamerica Corporation
Avago Technologies Inc.	Expedia Inc.	Mondelez International Foundation	TransCanada PipeLines
BAE Systems	Exxon Mobil Foundation	Motorola Foundation	Tribune Company
Ball Corporation	Fair, Isaac and Company Inc.	Motorola Mobility	Turner Industries, Ltd.
Battelle	Fannie Mae Foundation	National Instruments	Tyco
Bay Networks Inc.	FleetBoston Financial Corporation	NEPERA Inc.	TyCom (U.S.) Inc.
Bemis Company Foundation	Fluke Networks Inc.	Network Associates	UFE Inc.
BHP Billiton	FM Global Foundation	Newmont Mining Corporation	Unilever U.S. Foundation Inc.
The Blount Foundation	Freeport McMoRan Foundation	Nissan North America Inc.	Union Pacific Corporation
BNY Mellon	The Gap Inc.	Nokia Inc.	United Technologies
The BOC Group Inc.	Gartner Group	Nordson	The UPS Foundation
The Boeing Company	GE Foundation	Northrop Grumman Foundation	Verizon Foundation
Boston Scientific Corporation	General Atomics	NOVARTIS	Virginia Power/North Carolina Power
BP Foundation Inc.	Genentech	NRG Energy Inc.	W.K. Kellogg Foundation
Bristol-Meyers Squibb Foundation	General Reinsurance Corporation	Nuevo Energy Company	Wachovia Foundation
Buckeye Pipe Line Co.	General Signal	Nvidia *	Washington Mutual
C.I.T. Financial Corporation	GenRad Foundation	Occidental Petroleum Corp.	Waste Management Inc.
Callaway Golf Company	Goodrich Foundation	Owens-Illinois	We Energies Foundation
Carolina Power & Light Co.	Google	Pacific Enterprises	Wheelabrator Air Pollution Control Inc.
Centerpulse Orthopedics Inc.	Guidant Foundation	Pathfinder Global Group Inc.	Williams
CertainTeed Corporation Fdtn.	Harcourt General Inc.	Pella Rolscreen Foundation	Wisconsin Energy Corp. Found. Inc.
Champion International Corp.	Hewlett Packard	Penguin Random House, LLC	Workday, Inc.
Charles S. Mott Foundation	Illinois Tool Works Foundation	The PepsiCo Foundation	WPX Energy
Chemical Bank	IMCERA Group Inc.	Petrotech Inc.	WRC Inc.
Chevron	IMO Industries Inc.	The Pew Charitable Trusts	Xcel Energy Foundation
Ciba Corning Diagnostics Corp.	ING Foundation	Pfizer Inc.	XE Corporation
CIENA Communications Inc.	Ingersoll-Rand Company	PG&E Corporation Foundation	Xilinx
Cingular	Ingredion, Inc.	Phillips 66	Yarway Corporation
Cisco Systems Inc.	Instron Corporation	Pitney Bowes	Zeon Chemicals L.P.



Volunteers in 'Foster a Stream' Cleanup Drive

RESEARCH TRIANGLE ALUMNI Chapter and North Carolina Alpha members gathered for a souvenir photo after a recent volunteer project.

They joined City of Raleigh employees to take part in the storm-water management division's semi-annual Foster-a-Stream Cleanup. This particular event took place at Walnut Creek Wetland Center in an area that was significantly impacted by Hurricane Matthew.

Over a three-hour period, they removed large amounts of trash and debris from the stream and flood-plain along the Walnut Creek Trail, including over 50 bags of trash, tires, bedding, and furniture.



Join an alumni chapter near you!
Contact Director of Alumni Affairs,
Tricia Gomulinski,
at tricia@tbp.org.

Survey Responses Rewarded

The Association held a random drawing from the 2,271 Tau Bates that completed the 2016 Membership Survey. The two winners received a \$50 gift card. They are Taylor J. Carter, *FL Z '16* and David B. Knorr, Ph.D., *PA A '74*. Thank you to all who provided feedback!

In addition, the names of two Convention attendees were drawn from the nearly 200 surveys submitted regarding the 2016 gathering in San Diego. Winners are Caden J. Holzer, *SD B '17* who received a \$50 gift card, and a \$25 card went to Valentino G. DiCerto, *CA X '18*.



New York City Alumni met up for an interactive workshop where they discussed their 2016 goals, and shared their 2017 goals on colorful post-it notes to see how they could help each other.



Alumni from the Central Florida area met up for a social at Sea Dog Brewing Co. on February 18. Some 20 people took the opportunity to meet with the Director of Alumni Affairs and Executive Director.



Front Range Alumni Chapter members gathered at their Christmas party in Arvada, CO.



IN THE COLLEGES

SPOTLIGHT

China Joins Accord

China's engineering accrediting body has been admitted to the Washington Accord, an agreement recognizing equivalency among engineering programs internationally.

The accord admits members who demonstrate that their accreditation standards, policies, and procedures are substantially equivalent to those of other accreditation bodies. Applicants must have the initial support of two signatories and hold a provisional status for two years. Final admission requires unanimous approval.

According to the China Association for Science and Technology (CAST), becoming a signatory is important to help the country's engineering community "cope with... international competition and open to the world."

The Washington Accord was first signed in 1989 by ABET (U.S.); the Canadian Council of Professional Engineers; the Engineering Council United Kingdom; the Institution of Engineers Australia; the Institution of Engineers, Ireland (now Engineers Ireland); and the Institution of Professional Engineers New Zealand.

Grads Top Pay Scale

Students earning a master's or bachelor's degree in fields such as engineering and computer science are expected to make the highest salaries among their peers after graduation this year, according to a report from the National Association of Colleges and Employers.

The projected average starting salary for engineering majors overall is \$66,097, almost 2% more than that for Class of 2016. The catalyst for this nudge is that the projected average salaries for all of the individual engineering majors exceed \$60,000.

Humanities graduates also can expect to see an increase in their salaries, which are projected to rise 5.8% over 2016's average.

- New data from the National Student Clearinghouse Research Center shows the number of students enrolled in an engineering major jumped 4% between 2015 and 2016. This compared with a drop of more than 3% in students majoring in history and English and a drop of 6.1% in students majoring in foreign languages, literatures, and linguistics.

Gender Bias

Research published in the journal *Nature* has found there is a gender disparity among peer reviewers, which is but one example of gender bias identified in STEM fields.

The article suggests that identifying the gender gap in peer reviewers, and understanding where it comes from, could help guide scientific fields move "toward greater gender parity."

Direct Entry Pathway

The Hawaii Department of Education, partnering with the University of Hawaii, is creating a college-focused pathway for students to pursue direct acceptance into the college of engineering at UH-Manoa on Oahu.

High school students will be able to take two engineering technology courses consistent with the college's entry-level course objectives.

California State Polytechnic University, Pomona, since 2011. Amouzegar has also been associated with the RAND Corp. since 1998, where he has served as senior policy analyst and adjunct staff, leading projects related to national security and more.

David C. Munson Jr., Ph.D., Delaware Alpha '75, has been named



as Rochester Institute of Technology's 10th president. He had been dean of engineering at University of Michigan from 2006-16, serving two five-year terms, the

maximum allowed by U-M. Munson's teaching and research interests are in signal and image processing.

Neville G. Pinto, Ph.D., Ohio Beta '80, has been appointed as the



University of Cincinnati's new president. Pinto spent 26 years as a faculty member and dean at UC. Beginning in July 2016, he served

as the University of Louisville's acting president. He served as interim executive vice president and provost at UofL starting in May 2015 before being named provost in June 2016. His research has focused on purification of genetically engineered drugs, bio-membranes, and air and water purification.

PEOPLE

Mahyar A. Amouzegar, Ph.D.,

California Nu '89, is the new provost and senior vice president for academic affairs at the University of New Orleans. He had been dean of the college of engineering at Cali-



Julia Myers Ross, Ph.D., Indiana

Alpha '90, has been named as the new dean of Virginia Tech's college of engineering, one of the largest U.S. engineering programs. She was dean of engineering and technology at the University of Maryland, Baltimore County. Virginia Tech cited her "collaborative leadership



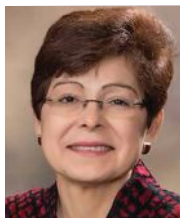
experience from one of the nation's top universities for innovation," adding that she "has worked diligently to advance opportunities for women and underrepresented minorities" in engineering and IT.

Kirk H. Schulz, Ph.D., *Mississippi Alpha '86*, has been selected as the



11th president of Washington State University. He was president and professor of chemical engineering at Kansas State University. He previously served as dean of engineering at Mississippi State University. In addition, Schulz is the chair of the NCAA board of governors, the association's highest-ranking decision-making body.

Zulma R. Toro-Ramos, Ph.D., *Kansas Beta '82*, has been appointed



president of Central Connecticut State University. She previously served as interim chancellor, executive vice chancellor, and provost at the University of Arkansas at Little Rock.

A. Scott Weber, Ph.D., *New York Nu '77*, has become the vice presi-



dent for student life at the University of Buffalo. He was the university's vice provost and dean of undergraduate education and senior vice provost for academic affairs. In his new role, he will lead more than 20 units at Buffalo. Weber joined the UB faculty in 1983 and has twice been named professor of the year by New York Nu.

FACILITIES

University of Delaware is receiving \$250 million from the Federal government as part of a project aimed at mass producing biopharmaceuticals.

The grant will fund the establishment of the National Institute for Innovation in Manufacturing Biopharmaceuticals, which will unite more than 150 universities, private companies, and nonprofits from across the country. UD will lead the effort and house its headquarters.

The Department of Commerce is contributing \$70 million, which the legion of other partners has matched by more than \$140 million. The grants will be paid out over five years.

The program will also help fund efforts to train more students in the skills they will need to get jobs in the biopharmaceutical industry.

That includes science programs in K-12 schools, teacher training, new curricula, and internships.

Rowan University has opened the engineering hall of The Henry M. Rowan college of engineering. The 88,000-square-foot, three-story building connects to the first building of the engineering campus by a third-floor bridge.

This \$70.6 million building will help the college educate its nearly 1,500 students, who have almost doubled in the past five years. It features project labs that open to the outdoors, a sustainability wing, designated space for clinics, and a number of other research laboratories.

It took 18 months to build and was funded in part by the 2012 New Jersey Building Our Future Bond Act and by bonds issued by Rowan.

Southern Methodist University is preparing to offer a master's degree in engineering entrepreneurship. A news release said the program "will focus on shaping a small cohort of elite students, providing them the skills and experiences to have impact in the competitive world of high-tech startups."

Candidates are required to hold a bachelor's degree in engineering, although some outstanding candidates from other STEM fields will be considered for admission. Only 12 candidates will be accepted into the program initially, with plans to grow to 16 annually.

Stanford University and the **Massachusetts Institute of Technology** are partnering with Toyota to research artificial intelligence and robotics to bring greater autonomy to Toyota cars.

The car maker will contribute \$50 million over five years to two research centers that are being set up at Stanford and MIT.

"Don't expect a computer to completely take control of your Camry soon. Toyota will always assume a person will be at the wheel," said **Gill Pratt, Ph.D.,** *Massachusetts*



Beta '83, who oversaw the DARPA Robotics Challenge and has joined Toyota as an executive technical adviser. "Toyota will focus on creating 'human-centric systems' that are supplemented by technology," Pratt said at a press conference in Palo Alto, CA.

Stevens Institute of Technology has announced a \$10 million gift from **Greg R. Gianforte, D.Eng.,** *New Jersey Alpha '83*, to name the Gianforte Academic Center, a new state-of-the-art interdisciplinary educational and research facility dedicated to technological innovation. Combined with a previous gift from the Gianforte Family Foundation in 2012, this is the largest gift to a single project in university history.

The two-building facility is scheduled for completion in 2019 and will provide academic space and research laboratories to further advance research and education in areas of need, like healthcare and medicine, sustainable energy, financial systems defense and security, and STEM education.



Brain Ticklers

RESULTS FROM

FALL

Perfect

*Bohdan, Timothy E.	IN	Γ	'85
*Slegel, Timothy J.	PA	A	'80

Other

Alexander, Jay A.	IL	Γ	'86
Aron, Gert	IA	B	'58
*Couillard, J. Gregory	IL	A	'89
Doniger, Kenneth J.	CA	A	'77
*Ebersold, Dakota	Member's son		
*Gerken, Gary M.	CA	H	'11
*Gulian, Franklin J.	DE	A	'83
Gulian, William F.	Member's son		
Handley, Vernon K.	GA	A	'86
*Kimsey, David B.	AL	A	'71
Lalinsky, Mark A.	MI	Γ	'77
Lamb, James A.	NY	Γ	'66
*Mayer, Michael A.	IL	A	'89
*Norris, Thomas G.	OK	A	'56
*Prince, Lawrence R.	CT	B	'91
*Quan, Richard	CA	X	'01
Rentz, Peter E.	IN	A	'55
Rentz, Mark	Member's son		
*Richards, John R.	NJ	B	'76
*Schmidt, V. Hugo	WA	B	'51
*Shepperd, Stanley W.	MA	B	'70
Cantrell, Sage	Member's daughter		
Sigillito, Vincent G.	MD	B	'58
*Spong, Robert N.	UT	A	'58
Stadlin, Walter O.	NJ	Γ	'52
*Strong, Michael D.	PA	A	'84
*Voellinger, Edward J.	Non-member		

*Denotes correct bonus solution

FALL REVIEW

Problem 4 (books in a library) proved to be the most difficult, with fewer than 25% of submitters giving a correct answer, and Problem 2 (used car loan) was next hardest, with only 40% correct answers. Both were harder than the Bonus (security switches) for which 90% of the answers were correct.

WINTER ANSWERS

1 PUZZLE+PUZZLE+PUZZLE+PUZZLE=WINTER translates to **237716 + 237716 + 237716 + 237716 = 950864**. It is convenient to rewrite this Tickler as $4 \times \text{PUZZLE} = \text{WINTER}$. To start, observe that $P=1$ or 2 . Now, $E \neq 0$, since R would also have to be 0 , and $E \neq 1, 5$, or 7 since an even carry from the units column to the tens column requires E to be even, and $E \neq 4$ or 8 since an

odd carry from units to tens column requires E to be odd, so $E = 2, 3, 6$, or 9 . Try $E=2$, which implies that $R=8, L=3$, and $P=1$ (P can't be 2 , since $E=2$). Only $Z=7$ works, leading to $T=9$ and $N=0$. This result has no valid solution for U . Try $E=3$ which implies that $R=2$ and $L=8$, and again $P=1$. Only $Z=4$ works, leading to $T=9$ and $N=7$. One of W, U , and I must be 0 , but this is impossible. Try $E=9$ which implies that $R=6$ and $L=4$. Therefore, $Z=8$, leading to $T=3$ and $N=5$. One of W, U, I , and P must be 0 , but this is impossible. Therefore, $E=6$, and $R=4$. This leads to $L=1$, so $P=2$. Only $Z=7$ works, leading to $T=8$ and $N=0$. There is only one possible way to distribute the remaining digits: $U=3, I=5$, and $W=9$, to give the solution shown above.

2 The ranking from first to last is Art, Dan, Bob, Eli, and Cai. C hears A state that he is not 2^{nd} and B state that he is two places higher than D . C first intuitively that only one of these statements is true. Then, after a pause, claims that he can announce the correct order of finish for all of them. Let's analyze C 's reasoning. Being a Tau Bate, he realizes that, if A 's statement is true and B 's false, there are too many possibilities for the ranking (for example, $ABDEC$, $ADEBC$, and $DBAEC$) to be able to pick the correct one. Therefore, he decides to assume that it is B 's statement that is true and A 's that is false. This puts A 2^{nd} and, together with C 's knowing that he, himself, ranked last, leaves only $BADEC$, so he claims this is the ranking. Of course, he can't be sure, since it may be A 's statement that is true, but he gambles that he is correct. Unfortunately for C , it turns out that the first three places are all wrong. This means that the true ranking must be either $ADBEC$ or $DBAEC$, but we are told that A and B rank in order of truthfulness. Since $DBAEC$ has B , whose statement is false, ranked ahead of A , whose statement is true, the correct ranking is $ADBEC$.

3 The sides of the triangle are 3, 5, and 7. Let the sides of the scalene triangle be a, b , and c , with c opposite θ , the angle which is an integral number of degrees. The law of cosines states that $c^2 = a^2 + b^2 - 2ab \cos \theta$, or $\cos \theta = (a^2 + b^2 - c^2)/(2ab)$; since a, b , and c are all integers, $\cos \theta$ is a rational number. Using Niven's theorem (I had never heard of it either, until Judge Jeff Stribling brought it to my attention), the cosine function is only rational when θ is a member of $\{60^\circ, 90^\circ, 120^\circ\}$ for $0 < \theta < 180^\circ$. Since the triangle has no right angle, we need consider only $\theta = 60^\circ$ and $\theta = 120^\circ$, or $\cos \theta = 1/2$. This gives $c^2 = a^2 + b^2 \pm ab$. Trying some low values for a and b quickly shows $a = 3, b = 5$ and $c = 7$, giving a perimeter of 15 . You can also use a spreadsheet.

4 The faucet's opening is 23.3 cm above the drain. Applying the equation of motion for the velocity of an object under free fall to the falling water gives $v = \sqrt{(v_0^2 + 2gy)}$, where v_0 is the initial velocity, g is the gravitational constant, y is the distance of the drain from the faucet, and v is the velocity of the water at the drain. We are given $r_0 = 1$ cm and $r = 0.45$ cm at the drain. The volumetric flow rate, F (given as 8.328 L/min), must be the same at every point along the stream. Thus we have: $v_0 = F/(\pi r_0^2) = 138.8/\pi = 44.18$ cm/s; and at the drain, $F/\pi r^2 = 138.8/(0.45^2 \pi) = 218.2$ cm/s. Substituting for v and v_0 in the equation for v gives $y = (218.2^2 - 44.2^2)/(2g) = 22828.8/980.7 = 23.3$ cm, that is the faucet is 23.3 cm above the drain.

5 Allen received 101 votes and Bill got 99. Consider a square grid with a horizontal axis, and let a be the number of votes for A and b the votes for B . Any vote count is represented by a path starting at $(1, 1)$ or $(1, -1)$, depending on who got the first vote counted, to $(a+b, a-b)$. At any point in the count, an A -vote is indicated by an uptick from (p, q) to $(p+1, q+1)$, and a B -vote by a downtick from

(p, q) to $(p+1, q-1)$. Call a path “bad” or “good” depending on whether it touches or crosses the axis or not. Now, any path that starts with a B-vote is a bad path (because it eventually has to cross the axis); the number of such paths is $C(a+b-1, b-1) = (a+b-1)!/[a!(b-1)!]$, where $C(i, j)$ is the number of combinations of i objects taken j at a time. To find the number of bad A-paths, take any such path and consider the portion from $(1, 1)$ to the point where the path touches the axis. Now, reflect this portion of the path across the axis. This converts the bad A-path into a B-path, which shows that there is a one-to-one correspondence between bad A-paths and B-paths, so the number of bad A-paths equals the number of B-paths. The total number of possible vote count paths is $C(a+b, a)$, and the number of good paths is $C(a+b, a) - 2C(a+b-1, b-1) = (a+b)!/[a!b!] - 2(a+b-1)!/[a!(b-1)!] = (a+b-1)!(a+b-2b)/(a!b!) = (a+b)!(a-b)/[a!b!(a+b)]$. Dividing by the total number of paths gives the probability $P = (a-b)/(a+b)$ of A’s staying strictly ahead of B in the count. If $P = 1/100$, then $100(a-b) = a+b$, or $99a = 101b$. With the restriction of only 350 members, the only integer solution is Allen got 101 votes and Bill got 99.

Bonus The i^{th} triangular number which is simultaneously the sum of two cubes and the difference of two cubes is $T_i = [3^6(2i-1)^{12} - 1]/8$. We start with equations (1) and (2):

$$A^3 + B^3 = n(n+1)/2 \quad (1)$$

$$C^3 - D^3 = n(n+1)/2 \quad (2)$$

We need to determine n such that (1) and (2) are valid for some positive integers A, B, C, D . Multiplying (1) and (2) by 8 gives:

$$(2A)^3 + (2B)^3 = 4n(n+1) \quad (3)$$

$$(2C)^3 - (2D)^3 = 4n(n+1) \quad (4)$$

Let $2A = w-x$; $2B = y-z$;

$$2C = w+x; 2D = y+z \quad (5)$$

for some integers w, x, y , and z . To simplify the problem, it was given that $D=B+1$; so $(y+z)/2 = (y-z)/2+1$, which gives $z=1$. Expanding the cubic terms in (3) and (4) (with $z=1$) gives:

$$w^3 - 3w^2x + 3wx^2 - x^3 + y^3 - 3y^2 + 3y - 1 = 4n^2 + 4n \quad (6)$$

$$w^3 + 3w^2x + 3wx^2 + x^3 - y^3 - 3y^2 - 3y + 1 = 4n^2 + 4n \quad (7)$$

$$\text{Let } x^3 = 3y; 3wx^2 = 3y^2; 3w^2x = y^3 \quad (8)$$

Substituting these values into (6) and (7) and canceling like terms reduces both (6) and (7) to:

$$w^3 - 1 = 4n^2 + 4n \quad (9)$$

The three equations (8) are dependent equations, so we can select an arbitrary value of x to ensure w, x, y are all integers. One choice is:

$$x=3k \quad (10)$$

which makes:

$$w=9k^4; y=9k^3 \quad (11)$$

This gives:

$$2A=3^2k^4 - 3k; 2B=3^2k^3 - 1; \quad (12)$$

$$2C=3^2k^4 + 3k; 2D=3^2k^3 + 1$$

Substituting into (9) gives:

$$(3^2k^4)^3 - 1 = 3^6k^{12} - 1 = 4n^2 + 4n \quad (13)$$

Dividing by 8 gives:

$$T=A^3+B^3=C^3-D^3=n(n+1)/2 = (3^6k^{12} - 1)/8. \quad (14)$$

The relationships (14) confirm that there are triangular numbers which are both the sum and difference of cubes. Since $(3^6k^{12} - 1)$ must be even (it is divisible by 8), then k must be odd. The i^{th} such triangular number is,

$$T_i = n(n+1)/2 = [3^6(2i-1)^{12} - 1]/8 \quad (15)$$

$$A=(3^2k^4 - 3k)/2; B=(3^2k^3 - 1)/2;$$

$$C=(3^2k^4 + 3k)/2; D=(3^2k^3 + 1)/2 \quad (16)$$

We can determine n from:

$$n(n+1)/2 = (3^6k^{12} - 1)/8 \quad (17)$$

Rearranging gives:

$$4n^2 + 4n + 1 = (2n+1)^2 = (3^3k^6)^2 \quad (18)$$

solving for n , with $k=2i-1$, gives

$$n = [3^3(2i-1)^6 - 1]/2 \quad (19)$$

Letting $i=1$ confirms the given solution of 91 with $n=13$, and $A, B, C, D = 3; 4; 6; 5$, respectively; and $i=2$ gives a triangular number of 48,427,561 with $n=9841$ and $A, B, C, D = 360; 121; 369; 122$.

Computer Bonus The smallest x is **693,901,529**. For this value of x , the value of the prime counting function, $\pi(x) = 35,953,285$, and the value of the semi-prime counting function, $\pi_2(x) = 112,950,577$. The ratio of $\pi_2(x)/\pi(x) \approx 3.14159268\dots$, as close to π as you can come.

NEW SPRING PROBLEMS

1 At summer camp, John has just returned to his tent with two 10-liter

containers full of water, when two of his friends show up, each asking for 2 liters of water. Al has a 4-liter pail, and Fay has a 5-liter pail. No other containers are available. How can John give Al and Fay each exactly 2 liters of water in their pails without spilling any water? On each transfer, one of the containers must be completely filled or totally emptied. Present your answer as a table with four columns labeled 10a, 10b, 5, and 4. The first line in the table will be 10 10 0 0, the initial situation. The following rows will be the situation after a transfer has occurred. For example, if John’s first move was to fill the 4-liter pail from the first 10-liter container, the second line of the table would be 6 10 0 4. We want the shortest sequence.

—*Mathematical Puzzles of Sam Loyd*, Volume Two, edited by Martin Gardner

2 The first four triangular numbers are 1, 3, 6, and 10. Triangular numbers are numbers generated by the formula, $n(n+1)/2$, where n is a positive integer. If you take a triangular number of dots, they can be arranged in a triangle, similar to the ten pins in a bowling alley. ONE, THREE, SIX, and TEN are each a triangular number. What are their values? The usual rules for cryptics apply.

—Richard England in *New Scientist*

3 A manufacturer of paving blocks makes all sizes of rectangular blocks that have the following properties: the length, width, and thickness are each an integral number of cm, and the sum of the lengths of the 12 edges of the block is equal to two thirds the block’s volume. What sizes does the manufacturer produce? Present your answer as a series of three integers in parentheses, such as (L, W, T) with $L \geq W \geq T$.

—*Puzzle Corner* by Allan Gottlieb in *Technology Review*

4 A, B, C, and D represent four different digits that can be combined to

yield 24 different four-digit integers. These 24 integers have the following properties:

- 4 are primes
- 7 are the products of two different odd primes
- 1 is the square of a prime
- 8 are divisible by 2 but not by 4
- 2 are divisible by 4 but not by 8
- 1 is divisible by 8 but not by 16
- 1 is divisible by 16

What are the values of A, B, C, and D?

—*Classic Puzzles*
by Gyles Brandreth

- 5 A standard die is tossed repeatedly until the total of the numbers thrown exceeds 12. What is the most likely final total?

—*Book of Curious and Interesting Puzzles* by David Wells

Bonus In the Power Ball lottery, five balls are drawn from among 69

Matches	Winnings
5 W + PB	Jackpot
5 W	\$1,000,000
4 W + PB	\$50,000
4 W	\$100
3 W + PB	\$100
3 W	\$7
2 W + PB	\$7
1 W + PB	\$4
PB	\$4

white balls, numbered 1 to 69, and one Power Ball is drawn from among 26 red balls, numbered 1 to 26. If a player's ticket matches all

five white balls and the Power Ball, he wins the jackpot, but there are eight other ways to win, as shown in the table. Tickets cost \$2, but there is the power play option for an additional \$1. At the end of the regular drawing, a power play number is drawn (from 42 balls, 24 of which are 2's, 13 are 3's, 3 are 4's, and 2 are 5's); and, if the player has paid the extra dollar, his winnings (except the jackpot, which isn't affected, and the \$1,000,000 prize, which only goes to \$2,000,000, regardless of the power play number) are multiplied by the power play number. How big must the jackpot be for the game to be fair for a \$3 ticket, i.e., for the expected value of the player's winnings to equal \$3? Ignore taxes, the fact that the money is given as an annuity, and the possibility of multiple winners.

—*A Mathematician at the Ballpark*, by Ken Ross

Double Bonus Starting with a standard double-six set of dominos, arrange the 28 dominos into the perimeter of a square, such that the pip values on each of the four sides of the square sum to the same value. At each corner of the square, there is a 90° turn, so that each side is $7\frac{1}{2}$ dominos long. The usual rules apply; that is, where two dominos meet, the ends must match (have the same number of pips). Place the double value dominos lengthwise, not crosswise. Present your answer as four strings of $7\frac{1}{2}$ dominos each, starting at the upper left corner and proceeding clockwise around the square. For example, the top edge might be: 0-3|3-3|3-5|5-5|0-0-2|2-4|4 (sum = 44), and the right edge might be: 4-6|6-2|2-2|2-1|1-5|5-4|4-0|0 (sum = 44). There are multiple answers, and any valid solution will be accepted.

—Howard G. McIlvried III,
PA Γ '53

The method of solution is not necessary, and the Double Bonus is not graded. Postal mail your answers to any or all of the Spring Brain Ticklers to Curt Gomulinski, Tau Beta Pi, P. O. Box 2697, Knoxville, TN 37901-2697 or email to Brain-Ticklers@tbp.org as plain text only. The cutoff date for entries to the Spring column is the appearance of the Summer *Bent* in mid-June (the electronic version is distributed a few days earlier). We welcome any interesting problems that might be suitable for the column. Curt will forward your entries to the judges who are **F. J. Tydeman**, CA Δ '73; **J. C. Rasbold**, OH A '83; **J. R. Stribling**, CA A '92, and the columnist for this issue,

H. G. McIlvried, III, PA Γ '53

LETTERS TO THE EDITOR

(Continued from page 5)

order for the university to operate.

NCEES has stated “engineering education has fallen behind other professions in preparing students for practice.” There has been a persistent decrease in the content of education for years.

ASCE, ASME, IEEE, and other technical societies have expressed concern as well.

One solution to the problem of the strength of the engineering education program is to implement the NSPE Policy across the U.S. That policy states in part “NSPE recommends the establishment of professional schools of engineering which provides formal education beyond the bachelor degree—and operates under the direction of qualified practitioners.”

That policy would require significant changes in the laws governing the practice, which would primarily be the responsibility of the various states. To my knowledge, no state has made any effort to establish a professional school of engineering. If the “dual system,” as suggested in my full article were used, only one professional school would be required in each state. NSPE could be most helpful by providing “model laws” and guidelines as well as working with state legislators, as they have in the past.

If you are interested in reading the full article I have developed on this subject as well as submitting any comments or questions, please email me at chipincorp@aol.com.

Tom L. Underwood, P.E., OH Γ '52





CHAPTER ETERNAL

The condensed style of these notices of death is made necessary by Tau Beta Pi'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 Association members, 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 | '42 | Carstens, Robert Southard ; April 10, 2001. | | '73 | Turney, William Joseph ; July 12, 2015. |
| | '49 | Debardelaben, Sheldon LeGrand ; March 23, 2005. | | '78 | Graham Jr., Robert Lee ; October 1, 2015. |
| | '49 | Goodman, William Lewis ; January 13, 1999. | ID A | '80 | Erickson, Leif ; April 19, 2016. |
| | '55 | Carroll, James William ; January 19, 2004. | IL A | '41 | Johnson, Lloyd Howard ; April 23, 2012. |
| AL B | '57 | Mapes, Robert Glen ; March 25, 2016. | | '48 | Frank, Wilson James ; November 12, 2007. |
| AZ A | '51 | Howard, Rollins Stanley ; October 22, 2016. | | '50 | Love, James Gilpin ; August 6, 2009. |
| AZ B | '47 | Allen Jr., Theodore ; September 30, 1992. | | '51 | Smutney, Robert R. ; October 4, 2016. |
| | '68 | Hallowell, Richard Eugene ; February 12, 2016. | | '55 | Regul, Thomas Francis ; October 21, 2013. |
| | '86 | Lindquist, Jean F. ; May 9, 2016. | | '57 | Smith, William Calvert ; no details. |
| AR A | '50 | Shaddox, Robert Glen ; December 10, 2016. | | '59 | Hudson, John Lester ; August 6, 2016. |
| CA A | '41 | Crandall, Lionel LeRoy ; April 3, 2011. | | '60 | Love, James Oliver ; June 15, 2004. |
| | '50 | Krusi, George Stetson ; November 20, 2016. | | '82 | Niemi, Gerald A. ; no details. |
| | '51 | Allen Jr., Thomas Vincent ; December 15, 2012. | IL B | '42 | Pollack, Meyer ; April 12, 2015. |
| | '52 | Uebele, George Sidney ; December 5, 2016. | | '43 | Soderberg, John Walter ; November 7, 2010. |
| | '56 | Boyd, Lawrence Edward ; November 21, 2016. | | '46 | Camburn, Robert Dean ; February 19, 2007. |
| | '58 | Airolti, Alan J. ; No details. | | '50 | McNamara Jr., Lawrence Francis ; February 3, 1994. |
| CA B | '51 | Goodman, Franklin Ralph ; April 17, 2011. | | '55 | Dorman, Frank John ; March 22, 2016. |
| CA I | '51 | Blackmer, Richard Hardin ; November 17, 2016. | | '55 | Elsen, Michael John ; no details. |
| | '95 | Place, Christopher John ; February 21, 2008. | | '58 | Gallagher, Charles Augustine ; November 4, 2016. |
| CA A | '45 | Soderberg, Richard Reuben ; November 12, 1980. | | '62 | Meyer, Richard W. ; July 14, 2016. |
| | '46 | Jacobs, Gordon Andrew ; February 25, 2013. | IL I | '48 | Trueman, Richard Elias ; September 15, 2015. |
| | '47 | Morrill, Daniel F. ; January 28, 2006. | | '51 | Dundurs, John ; September 21, 2016. |
| | '48 | Fichter, John Latham Marsh ; November 8, 2016. | | '51 | Nugent, Daniel Eugene ; April 17, 2016. |
| | '48 | Vawter, Verne Evan ; December 6, 2016. | | '61 | Malling, Gerald Fredrick ; October 12, 2016. |
| | '49 | Hadley, Arthur H. ; September 22, 2015. | IL E | '98 | Hoy, Patrick Donald ; April 1, 2014. |
| | '50 | Seltzer, Sol ; December 11, 2016. | IL Z | '16 | Georges, Alexander Anthony ; October 24, 2016. |
| | '55 | Kelley Jr., Dole Jonathan ; January 23, 2016. | IN A | '41 | Golding, Brage ; August 24, 2016. |
| CA E | '58 | Caldwell, Roger Ralph ; October 10, 2016. | | '42 | Schumacher, Dale Calvin ; July 23, 2009. |
| CA I | '68 | Hix, James Hoover ; June 21, 2007. | | '44 | Wormser, Hans Herman ; November 16, 2016. |
| CA A | '94 | Carpenter, Ray Douglas ; no details. | | '45 | Kleppe, Carl Albert ; April 11, 2011. |
| CA S | '42 | Lawrance, Charles H. ; no details. | | '47 | Bardwick, Howard Allen ; November 6, 2006. |
| CO A | '43 | Campbell, Everett Lawyer ; May 4, 2007. | | '47 | Forney, Robert Clyde ; August 3, 2016. |
| | '51 | Love, James Benjamin ; October 6, 2016. | | '47 | Shore, Jerry ; May 19, 2014. |
| | '56 | Love, Chester L. ; September 28, 2011. | | '48 | Wainscott, William S. ; June 26, 2015. |
| | '15 | Fullerton, Daniel Allan ; October 15, 2016. | | '50 | Huss, James Ernest ; December 29, 2005. |
| CO B | '40 | Mayor, Harry Alfred ; November 30, 2014. | | '55 | Yee, Henry Lin Sau ; January 25, 2016. |
| | '48 | Adams, Robert Russel ; July 30, 2016. | | '56 | Cernan, Eugene Andrew ; January 16, 2017. |
| | '52 | Sharp, Richard Louis ; August 16, 2016. | | '56 | Lorenz, Arthur Ernest ; September 20, 2016. |
| | '66 | Noren, Stephen Charles ; May 17, 2010. | | '57 | Winter, Edward Monroe ; January 30, 2015. |
| CO I | '57 | Forster, Robert Lewis ; February 24, 2016. | | '59 | Peale, Stanton Jerrold ; May 14, 2015. |
| CT A | '49 | Allen, John Marshall ; February 27, 2013. | | '61 | Padden, Duane Edward ; no details. |
| | '50 | Bishop, Broughton Hayward ; August 7, 2016. | IN B | '50 | Corban, Frederick LeRoy ; September 28, 2016. |
| | '51 | Jones, Robert Sinclair ; March 11, 2008. | IN I | '47 | Kobayashi, Francis ; December 27, 2016. |
| | '52 | Hartman, Frank Buford ; January 27, 1999. | IA A | '42 | Wharton, Robert Howard ; January 11, 2013. |
| CT B | '49 | Carroll, Raymond Bruce ; August 14, 2001. | | '43 | Carstens, Robert Lowell ; August 1, 2016. |
| | '50 | Johnson, Arthur Roger ; no details. | | '44 | Watkins, Dean Allen ; May 17, 2014. |
| DE A | '51 | Rosenthal, William Richard ; October 3, 2000. | | '47 | Patterson, Russell Eugene ; October 7, 2016. |
| | '60 | Crockett, Richard J. ; 2012. | | '48 | Firkins Jr., Bruce Judson ; May 25, 2015. |
| DC B | '59 | Vijil-Ycaza, Miquel Ernesto ; 2013. | | '48 | Howarth, Harry Merton ; March 9, 2016. |
| FL A | '50 | Carroll, Edward Elmer ; May 16, 2006. | | '50 | Peterson, William D. ; July 5, 2015. |
| | '50 | Saarin Jr., Arthur W. ; May 18, 2016. | | '53 | Haines, Roger William ; no details. |
| | '65 | Estabrook Jr., Walter ; September 15, 2016. | | '53 | Hoak, H. Robert ; December 13, 2016. |
| FL I | '77 | Bowman, Harold Jackson ; August 12, 2016. | | '56 | Aukerman Jr., Frank Charles ; January 11, 2009. |
| FL E | '48 | Gika, Konstantin ; April 28, 1997. | | '58 | Wolf, Frederick Henry ; December 4, 2016. |
| GA A | '41 | Hagan, John Luther ; January 7, 2004. | | '80 | McNamara, Colleen Fitzgerald ; July 10, 2015. |
| | '43 | Allen, James Roy ; June 20, 2004. | IA B | '41 | Sacks, Newton Nathaniel ; November 4, 2016. |
| | '44 | Manning, John Vernon ; February 26, 2015. | | '47 | Whiteley, Robert Bennett ; December 22, 2012. |
| | '49 | Scott, Joseph M. ; November 29, 2016. | | '49 | Golden, Martin P. ; December 19, 2016. |
| | '49 | Thomas, Alan Eugene ; November 24, 2016. | | '50 | Greusel, Fred Barton ; November 18, 2016. |
| | '50 | Smith, Robert Lee ; 2015. | KS A | '49 | Sacks, John Richard ; May 24, 2016. |
| | '55 | Patterson, Wilbur Lafayette ; February 7, 1997. | | '60 | McCaig, James Claude ; August 1, 2007. |
| | '57 | Schultz, David Norman ; July 26, 2016. | KY A | '49 | Alsop Jr., Othniel ; May 2, 2016. |

KY B	'58	Campbell, Edward Beal; October 27, 1992.	MT A	'53	Schaubert, Richard William; December 9, 2016.
	'43	Horvay, Julius Benjamin; January 12, 2015.		'63	Howard, Clarence John; October 18, 2016.
	'53	Hagan, Ralph S.; January 15, 1997.		'51	Lyman, Richard Evans; no details.
LA A	'55	White, James Richard; December 31, 2014.	NE A	'15	Atkinson, Jeffrey Charles; October 2015.
	'43	Love, John Lawrence; October 29, 2015.		'49	Dorothy, Walter Warren; December 11, 2002.
	'46	McNeil, Edwin B.; November 26, 2016.		'69	Lynch, Darrel Dewitt; January 19, 2014.
LA B	'49	Prejean, Joseph Savan; May 18, 1989.	NH A	'42	Arnoldi, Robert Alfred; October 14, 2008.
	'50	Patterson, Truman Dale; April 5, 2013.		'42	Yevick, George J.; no details.
	'47	Isaacson Jr., Irwin; January 11, 2017.		'44	Birmingham, William Joseph; November 11, 2014.
LA Γ	'43	Evans, James Wilburn; February 1, 2015.	NJ B	'49	Errera, Samuel Joseph; December 29, 2016.
MD A	'50	Painter, Jack Timberlake; July 25, 2015.		'60	Easton, Robert William; April 26, 2003.
	'51	Heck, Joaquim Lewis; December 16, 2016.		'60	Gallo, Donald John; June 6, 2016.
	'73	Urie, Thomas Edward; November 13, 2016.	'80	Griffin, Peter DeWald; November 29, 2016.	
MD B	'42	Haywood, Stuart Troy; February 28, 2004.	NJ Γ	'39	Brugger, Norman; October 19, 2016.
	'50	Holdt, Donald Harvey; April 12, 2016.		'50	Albanes, John James; November 19, 2016.
	'56	Brown Jr., Bergen Thomas; May 20, 2016.		'59	Richardson, Robert Edward; March 7, 2007.
MA A	'56	Sussman, Jules P.; May 12, 2016.	'61	Riffel Jr., Frank; May 24, 2005.	
	'47	Gross Jr., Frank Albert; January 15, 2010.	'62	Shephard, Glenn Gordon; November 8, 2016.	
	'56	Horrigan Jr., Lawrence Bernard; March 28, 2015.	'49	Ford, C. Quentin; May 1, 2016.	
MA B	'35	Dauphine, Thonet; November 18, 2016. [Cent. III]	NM A	'77	Lee, Jon Dee; December 8, 2015.
	'46	Hoover, Lloyd Nims; July 2, 2016.		'42	Kellogg, Herbert Humphrey; January 17, 2016.
	'47	Goodman, Louis John; June 7, 2011.		'62	Myers, Michael Kenneth; October 29, 2016.
MA Δ	'47	Holland Jr., Norman Norwood; no details.	NY A	'66	Isaacs, Jonathan Lewis; April 30, 2003.
	'47	Willard, Hanford P.; July 17, 2001.		'45	Eisaman, Leo Coburn; September 20, 2016.
	'49	Ficarra, Virgil Frank; April 16, 2012.		'48	Kubick, Harry; October 17, 2016.
MA E	'49	Kerwin Jr., Edward Michael; December 31, 2004.	NY B	'47	Bordeman, Kenneth M.; May 9, 2009.
	'49	Stolz, Norman; March 20, 2010.		'50	Schumacher, Rodger Barrett; May 22, 2016.
	'51	Pflasterer Jr., George Russell; August 9, 2014.		'52	Allen, Edward Michael; May 16, 2016.
MA Γ	'51	Stein, Peter Koloman; June 8, 2016.	NY Γ	'53	Soden, Ralph Arthur; June 26, 2012.
	'53	Kalman, Rudolf Emil; July 2, 2016.		'58	Oscarson, Edward Ronald; March 17, 2012.
	'59	Boyd Jr., John Huntly; February 25, 2014.		'39	Chandler, William C.; January 9, 2017. [Cent. 126]
MA Δ	'68	Lee, Min-Li; September 13, 2011.	NY Δ	'44	Ludington Jr., Francis Henry; January 14, 2017.
	'44	Moss, Donald Frederick; September 11, 2016.		'49	Murphy Jr., Arthur Phillip; December 25, 2016.
	'53	Atallah, Sami; July 6, 2016.		'49	Zwart Jr., Bernardus Molder; December 7, 2016.
MA E	'42	Greenleaf, Francis Dodge; no details.	NY E	'53	Cheo, Bernard Ru-Shao; November 27, 2016.
	'51	Allen, Donald Frederick; December 17, 2001.		'56	Kravetz, Herman Terry; October 10, 1993.
	'51	Kenyon Jr., Herford Payson; November 21, 2015.		'44	Handman, Stanley Edward; November 11, 2013.
MI A	'53	Rosenthal, Milton Leonard; July 12, 2000.	NY Z	'50	Jacobs Jr., Charles Edward; October 24, 2009.
	'58	Callahan, Gerald James; November 23, 2015.		'50	McNamara, Robert Francis; November 19, 2003.
	'48	Montague, Richard William; August 28, 2015.		'56	Daley, Michael Charles; February 25, 2014.
MI Δ	'53	Mosher III, Clifford Coleman; no details.	NY H	'44	Handman, Seymour; December 3, 2005.
	'66	Caltrider, Robert Glen; December 6, 2015.		'47	Demitrack, George; December 31, 2016.
	'67	Burck, Larry Harold; March 29, 2015.		'49	Handelsman, Jerome G.; December 26, 2009.
MI Γ	'41	Britton, Harold Edgar; October 31, 2016.	NY Θ	'51	Rosenthal, Stanley Arthur; February 28, 2002.
	'48	Emunson, Bryce Malcom; November 9, 2011.		'48	Crandall, Boyd Leslie; January 2, 1998.
	'48	Howell III, John Stinson; November 16, 2002.		'50	Greenman, Arthur Beecher; January 19, 2011.
MI E	'50	Jaroff, Leon Morton; 2012.	NY I	'50	Wojcik, William John; March 31, 2007.
	'51	Dykstra, William; September 1, 2011.		'53	Goodman, Eugene Lewis; December 23, 2008.
	'51	Goodman, Ralph Raymond; March 10, 2008.		'55	Jones, Robert Artimus; December 6, 2016.
MI Δ	'51	Meisel, Al Milton; December 19, 2012.	NY K	'43	Rosenwach, Wallace; no details.
	'58	Blanchard, James Bernard; January 9, 2017.		'48	Schumacher, Robert; August 12, 2004.
	'43	Hand, Rowland Cartlidge; April 5, 2008.		'59	Goodman, Leon Judias; November 14, 1995.
MI E	'56	Schumacher, Paul Joseph; March 16, 1989.	NY L	'69	Kenny Sr., Eugene Franklin; November 22, 2016.
	'73	Trama, Louis Anthony; October 16, 2014.		'42	Lundgaard, Ivar Atkinson; December 18, 2016.
	'62	Genik, Richard Joyner; October 25, 2016.		'84	Mersereau, Keith Owen; January 10, 2017.
MI K	'06	Tomczak, Shelby Ann; June 28, 2015.	NY A	'47	Stephan, John Emil; June 18, 2014.
MN A	'41	Blodgett, Omer William; January 11, 2017.		'50	Schumacher, Harold Eugene; February 18, 2011.
	'47	Johnson, Archie Hyttsten; November 17, 2010.		'57	Brown, Robert William; May 11, 2015.
	MS A	'44	McKee Jr., J. Chester; June 7, 2016.	NY B	'47
'49		Sumrall, Joe Luther; November 30, 2016.	'57		Reynolds, Cassian Joseph; May 1, 2007.
'55		Graves, Meek Bernell; June 28, 2016.	'71		Del Bagno, Vincent Dominick; December 1, 2010.
MS B	'85	Case, Michael Alvin; February 25, 2003.	NY O	'62	Marburger III, John H.; July 28, 2011.
MO A	'49	Goode, William Preston; December 22, 2007.		'41	Call, James Walter; no details.
	'67	Spradling, Robert DeWitt; June 21, 2010.		'48	Handley Jr., Arthur; October 30, 2004.
	MO B	'67	Weaver, Samuel Ross; February 11, 2016.	'50	Kitchens, James Merrell; October 24, 2002.
'49		Carroll, John Thomas; June 1, 2007.	'51	Johnson Jr., Albert Sidney; June 4, 1994.	
'50		Hagan, Warren Edmon; September 1, 2001.	'52	Sakshaug, Eugene Clemons; November 26, 2016.	
MO Γ	'50	Kunz, Charles Oscar; December 10, 2016.	'59	Gwaltney, James Henry; March 29, 2001.	
	'59	Kennedy, Ralph Carl; May 3, 2015.	'41	Dorris, Robert Cozby; January 5, 2011.	
	'59	Munger, Paul Rudolph; April 19, 2014.	'48	Goodman, Sherman David; November 30, 2010.	
	'48	Senne Jr., Joseph Harold; December 20, 2016.	'51	Kerslake, William Roy; September 29, 2015.	

'55 **Alert, Jerry George**; June 28, 2016.
 '60 **Reichard Jr., George W.**; December 15, 2013.
 '64 **Heestand, Glenn Martin**; December 18, 2016.
 OH B '48 **Lyman, Robert**; July 17, 1989.
 '49 **Allen, Leland Cullen**; July 15, 2012.
 OH Γ '46 **McGriff Jr., Haskell Hawes**; November 27, 2012.
 '49 **Gibson, Virgil Dean**; August 23, 2006.
 '50 **Allen, Robert McMillin**; December 4, 2002.
 '55 **Campbell, Dale Edward**; December 8, 2013.
 '58 **Hanlon, Robert Fulton**; July 25, 2016.
 '59 **Roll, Ronald Elwood**; August 19, 2016.
 OH Δ '52 **Shelton III, Frank Winfred**; no details.
 '52 **Wismar Jr., Harry Robert**; September 13, 2016.
 '58 **Campbell, Clifford Wayne**; January 30, 2013.
 OH E '52 **Allen Jr., Harrison**; May 9, 2006.
 '59 **Allebach, Gene Edward**; July 29, 2016.
 '71 **Cwynar, David Stanley**; May 4, 2002.
 OH Z '57 **Gerwin, Howard John**; July 12, 2016.
 OH Θ '54 **Jacobs, James Wilbur**; January 26, 2000.
 OH K '53 **Renner, Jack Lewis**; June 25, 2006.
 OH M '74 **Lynch, George Arthur**; February 23, 2016.
 OK A '42 **Carroll Jr., R.M.**; March 31, 1998.
 '45 **Wright, John William**; November 17, 2016.
 '50 **Daniels, Raymond DeWitt**; May 8, 2016.
 '51 **Grimes, David Noel**; November 5, 1999.
 '53 **Gross, Angelo C.**; no details.
 '53 **Jones, Robert Fred**; October 26, 2010.
 '55 **Box, James Lee**; March 26, 2016.
 '56 **Harris, Floyd Wayne**; March 28, 2012.
 '56 **Spradlin, Billie Charles**; January 26, 2015.
 '64 **Lauderdale, Charles George**; July 20, 2016.
 OK B '58 **Schwartz, Robert Eugene**; May 28, 2016.
 OR A '42 **Lundeen, Robert W.**; April 13, 2016.
 '51 **Brooks, James Sprague**; June 29, 2015.
 PA A '49 **Kelley, David Philip**; October 1, 2008.
 '50 **Carroll, John Millar**; February 25, 2011.
 '51 **Stewart Jr., Donald Speir**; June 17, 2009.
 '52 **McNamara, Joseph Burk**; December 24, 2010.
 '57 **Burkhardt, Samuel Faust**; no details.
 '73 **Radcliffe, Robert C.**; February 8, 2016.
 PA B '41 **Jenks, John Ward**; February 7, 2012.
 '47 **Meckley III, Daniel Grant**; January 14, 2017.
 '48 **Kenyon, Charles Bradford**; September 7, 2007.
 '51 **Grimm, James Harry**; March 25, 2015.
 '54 **Jacobs, Daniel Andrew**; November 6, 2010.
 '55 **Coombes, Bernard Frederick**; November 18, 2016.
 '61 **King, Franklin George**; June 7, 2016.
 '63 **Coyne Jr., Harold Jerome**; October 28, 2016.
 PA Γ '42 **Handlos, Arthur Ernst**; October 5, 2004.
 '44 **Gross, Don H.**; November 13, 2008.
 '44 **Tennyson, Edson Leigh**; July 14, 2014.
 '52 **Schumacher, Donald Joseph**; June 1, 2015.
 '56 **Mann, August Colling**; November 30, 2004.
 PA Δ '91 **Roth, Daniel Leonard**; no details.
 PA E '49 **Allen, Theodore Elliott**; October 9, 2002.
 PA Z '51 **Matlack, George Lippincott**; November 14, 2014.
 '67 **Hodson, William Rickly**; September 7, 2016.
 PA H '62 **Windes, David Lockhart**; December 18, 2016.
 '72 **Carroll, Sharon Rose**; January 11, 2013.
 PA Θ '63 **Sotak, Roger William**; November 12, 2016.
 '72 **Behen III, John Edward**; September 26, 2014.
 PA Λ '79 **Petsche, Robert James**; February 28, 2007.
 RI B '49 **Hand, Eugene E.**; September 18, 1993.
 '50 **Goodman, Joseph Lawrence**; December 16, 1993.
 '96 **Douton, Christopher Michael**; January 12, 2013.
 SC A '42 **Rhodes, Laddie Thomas**; July 15, 2008.
 '61 **Leverette, David Sheffield**; September 12, 2014.
 '63 **Hall Sr., John Randall**; November 5, 2016.
 SC B '60 **Epps Jr., William Sutton**; January 16, 2013.
 SC Γ '57 **Edwards, Helen T.**; June 21, 2016.
 SD B '78 **Karnitis, John**; September 17, 2003.

TN A '49 **Smith, Peter McK**; July 18, 2012.
 '51 **Campbell, Willis Henry**; no details.
 '52 **Finney, Richard Cochran**; March 2, 2016.
 '54 **Allen, Edwin Lewis**; March 17, 2015.
 '54 **Goodman, Marvin K.**; July 24, 2013.
 '62 **Harris, Howard Gaylon**; November 29, 2016.
 '62 **Mullins, Bert Clifford**; November 4, 2016.
 '64 **Smith, Moffett Benton**; October 7, 1987.
 '65 **Ackermann Jr., Norbert Joseph**; no details.
 '65 **Cox, Ronald Baker**; January 12, 2017.
 TN B '50 **Rhodes, Thomas Hemphill**; May 3, 2001.
 TN Δ '58 **Chester, Johnny Ray**; June 23, 2015.
 TX A '43 **Spradlin, Joe Dewey**; September 11, 2011.
 '45 **Wilkinson, James Arthur**; no details.
 '49 **Miller, Leland Homer**; September 19, 2016.
 '50 **Allen, John Chiles**; May 29, 2000.
 '52 **Campbell, Harvey Anthony**; December 13, 2015.
 '53 **Campbell, Stewart Nelson**; August 4, 2010.
 '61 **Farley, Ramsey Wayne**; May 30, 2016.
 TX B '48 **Harrison, Marvin Eugene**; October 7, 2016.
 '50 **Wiebelt, John Albert**; December 2, 2015.
 '61 **John, Marion Alfred**; December 29, 2015.
 TX Γ '48 **Badger, Algernon Sidney**; April 22, 2016.
 '60 **Lesser, Herbert Arthur**; May 5, 2016.
 TX Δ '39 **Hagan, Edward Emmett**; November 26, 2016.
 '47 **Hutchin, Walter James**; January 11, 2014.
 '49 **Hoyler, Thomas Harrold**; December 7, 2016.
 '49 **Johnson Jr., Allen Forrest**; February 2, 2015.
 '49 **Purdy, Alton Burton**; February 18, 2003.
 '51 **Carroll, Floyd Jewel**; November 24, 2016.
 '52 **Green, Richard A.**; December 17, 2016.
 '54 **Rogers Jr., Luther Franklin**; November 24, 2016.
 '58 **Breazeale, Kenneth Jerald**; December 23, 2016.
 '58 **Lane, John R.**; no details.
 '58 **Williford, Allen Heny**; August 15, 2016.
 '63 **Poehl, Rudell**; March 20, 2015.
 TX Z '54 **Jansen, Joe Baker**; February 28, 2013.
 TX H '47 **Nichols, Robert L.**; May 8, 2015.
 '63 **Dawson, Ellis Crouse**; December 22, 2016.
 UT A '48 **Anderson, Edward Parley**; December 17, 2011.
 '48 **Ellsworth, Richard D.**; February 3, 2016.
 '55 **Lyman, Gary Bowen**; January 14, 2006.
 '78 **Eixenberger, Robert Craig**; January 17, 2017.
 VA A '59 **King Sr., Wilton Wayt**; November 21, 2016.
 VA B '42 **Groff, J. Franklin**; no details.
 '49 **Jacobs, Alfred**; August 2, 1996.
 '55 **Allen, John Houston**; September 1, 1999.
 '55 **Jones Jr., Robert Delbert**; August 15, 2007.
 VA Δ '58 **Pai, David Hsien-Chung**; July 23, 2016.
 WA A '42 **Somers, Howard Edward**; January 15, 2005.
 '43 **Petrich, Raymond Olmstead**; October 18, 2012.
 '43 **Sutter, Joseph Fred**; August 30, 2016.
 '49 **Handler, Harry Elias**; December 2, 2015.
 WV A '43 **Couch, James G.**; December 25, 2016.
 '50 **Patterson, William Albert**; August 15, 1993.
 WI A '41 **Hart, John Shelley**; March 5, 2010.
 '42 **Wulff, Carl Eugene**; March 5, 2015.
 '45 **Daub, Edward Eugene**; December 3, 2015.
 '48 **Goodman, Harrison David**; November 6, 2005.
 '49 **Troller, Robert John**; August 29, 2015.
 '55 **Fowler, Calvin D.**; June 21, 2013.
 '57 **Carlson, Gerald Joseph**; March 29, 2010.
 '58 **Henderson, Philip George**; November 18, 2016.
 '61 **Peercy, Paul Stuart**; October 20, 2016.
 '64 **Tharman, Paul Albert**; August 25, 2016.
 '68 **Schroeder, Kenneth Louis**; October 26, 2016.
 WI B '41 **Yank, Frank Andrew**; February 4, 2012.
 '44 **Reichl, Ray Peter**; November 6, 2004.
 '49 **Elsen, John Meyer**; December 1, 2003.
 '49 **Elsen, Richard**; November 1, 2008.



FAMILIES

Centenarians

We add the names of five members who have reached their second century and been recognized in *The Bent*. The full list is available at www.tbp.org under Distinguished Members.

John J. McKetta Jr., *TX A '36*
b. October 17, 1915

Thonet C. Dauphine, *MA B '35*
b. November 8, 1913
d. November 18, 2016

George F. Strollo, *NY E '36*
b. October 24, 1913
d. April 6, 2016

Wallace J. McRoy Sr., *MS A '39*
b. January 26, 1915
d. October 8, 2016

William C. Chandler, *NY Δ '39*
b. December 1, 1916
d. January 9, 2017

Bi-Spousal

We welcome more Tau Beta Pi couples to this most popular category.

Chad E. Alexander, *CA Θ '77*
Beverlee G. Steinberg, *CA Θ '77*

Jeffrey L. Bowman, *PA B '73*
Rebecca A. Bowman, *PA B '76*

Robert J. Dallman, *NE A '78*
Martha Perrins-Dallman, *NM B '03*

Christopher K. Doran, *CA Ψ '10*
Sarah E. Doran, *CA Ψ '10*

David R. Fischell, *NY Δ '75*
Sarah T. Fischell, *NY Δ '78*

Kari A. Helminen, *MI B '17*
Wayne A. Helminen, *MI B '16*

Mark J. Korinek, *WI B '84*
Sarah S. Korinek, *WI B '84*

Joseph G. Langevin, *WA B '11*
Kendra L. Langevin, *WA B '12*

Joseph C. Nadeau, *PA A '89*
Stacy L. Tantum, *MA Δ '94*

Angela K. Pannier, *NE A '01*
Tyler N. Pannier, *NE A '02*

Christopher B. Pastega, *IN Γ '91*
Kimberly S. Pastega, *IA A '91*

Jacqueline C. Plyler, *SC B '15*
Francesco G. Risalvato Jr., *SC B '14*

Lynn M. Russell, *CA Γ '91*
Jeremy D. Dunworth, *CA Ψ '96*

Ines C. Stuckert, *MI Γ '13*
Nicholas R. Stuckert, *WY A '08*

Lauren E. Tetzloff, *MI B '17*
Thomas N. Tetzloff, *MI B '17*

Brian C. Tyson, *NY Θ '15*
Kaitlyn E. Tyson, *NY Θ '15*

Cynthia A. Vinoski, *TN Δ '84*
Stephen B. Vinoski, *TN Δ '85*

Multi-Generation

Here are families with at least two generations.

The Abriola Family
†Joseph Leon, *PA Z '48*
Linda M., *PA Z '76*
Joseph L., Jr., *TN B '80*

The Ambrico Family
Robert J., *OH E '71*
Steven R., *CT B '93*
Joseph M., *CT B '95*

The Bayless Family
Jack H., *TX Z '56* (grandfather)
Katie S., *AL B '14*

The Blalock Family
Benjamin J., *TN A '91*
Quillen V., *TN A '18*

The Boroson Family
†Harold R., *MD B '44*
Michael L., *MI Γ '81*

The Bowman Family
Jeffrey L., *PA B '73*
Rebecca A., *PA B '76*
Joshua S., *PA B '16*

The Chemin Family
Louis O., Jr., *LA A '73*
Louis O., III, *LA A '00*

The Clark Family
†Albert F., *CO B '22*
Albert F., Jr., *CO B '52*

The Dallman Family
Robert J., *NE A '78*
Martha L. Perrins-Dallman, *NM B '03*
Ann R., *TX Δ '07*

The Davisson Family
Roger C., *CA B '65*
Ross A., *CA Γ '01*

The Draelos Family
Zoe K., *AZ A '79*
Mark T., *NC A '12*

The Ebner Family
Alan M., *PA Z '61* (grandfather)
Seth N., *MO Γ '17*

The Evans Family
Samuel G., *SC Γ '53*
Lovick C., *SC Γ '81*

The Fischell Family
Robert E., *NC Γ '51*
David R., *NY Δ '75*
Sarah T., *NY Δ '78* (daughter-in-law)

The Fore-Khalek Family
Sharon G., *OK A '77*
David N. Khalek, *VA Δ '01*

The Fosberg-Majeau Family
Theodore M., *WA A '59* (grandfather)
Fiona M. Majeau, *CA Γ '15*

The Freedman Family
Curt M., *NY K '81*
Benjamin R., *NY K '11*

The Gabriel Family
Michael J., *MI Γ '90*
Zachary T., *AL B '18*

The Gaudreault Family
Michele L., *MA B '83*
Pierre J., *LA Δ '83*
Marie C., *CO Z '11*

The Gendreau Family
Cal J., *ND B '76*
Jeffrey L., *ND B '17*

The Genik Family
†Richard J., *MI E '62*
Laura J., *MI A '91*

The Goel Family
Atul K., *NY* Θ '82
Leela D., *NC* *Z* '16

The Golkaramnay Family
Mohammad R., *VT* *B* '80
Artniz, *VT* *B* '17

The Gordier Family
Matthew S., *CA* *E* '81
John S., *CA* *E* '17

The Graff Family
Richard S., *IA* *A* '48
Richard L., *TX* *B* '74
Richard M., *TX* Δ '05
Allison A., *LA* *A* '08

The Hayden Family
Dann L. *MA* *A* '85
Haley H. Smestad, *MA* *A* '15

The Holzer Family
Nelson J., *UT* *A* '90
Tayson J., *UT* *A* '16

The Hoyer Family
Timothy J., *NY* *N* '84
Timothy M., *PA* *A* '13

The Jabusch-Ackerson Family
Donald A. Jabusch, *WA* *A* '60 (grandfather)
Margaret Ackerson *CA* *Z* '17

The Jizba Family
†Jaroslav Z., *WA* *B* '47
Gregory M., *NE* *A* '82
Eric M., *IL* Γ '14

The Kirschenmann Family
†Kendrick C., *IN* Δ '71
Korey J., *SD* *A* '05

The Korinek Family
Mark J., *WI* *B* '84
Sarah S. Korinek, *WI* *B* '84
Paul D., *WI* *A* '86
Kelley, *WI* *A* '16

The Kouroupis Family
James B., *MD* *B* '79
Sara, *AL* *A* '15

The Krusi Family
†Leroy F., *CA* *A* 1917
†George S., *CA* *A* '50

The Kukucka Family
James P., *NJ* Γ '16
James M., *NY* Γ '12

The LaBerge Family
E.F. Charles, *MD* *A* '74
Kelsen E., *OH* *I* '04

The Lanzi Family
Daniel C., *NY* *N* '84
Alison M., *NY* Γ '15

The Leonard Family
Keith R., Jr., *CA* *E* '84
Keith R., III, *CA* Δ '17

The Mavroides Family
John G., *MA* Δ '44
Joanne M., *MA* Θ '82

The Minshew Family
Stephen V., *TX* *I* '73
William T., *NJ* Δ '13

The Muller-Girard Family
Otto T., *NY* *K* '52
Otto, Jr., *NY* *K* '89

The Ness Family
Joel K., *IA* *A* '92
Stephanie K., *ND* *B* '18

The Ogino Family
Douglas T., *NY* *A* '78
Christine H., *MA* *H* '08

The Owen Family
M. Kathleen, *NC* *A* '84
Joseph D., *NC* Δ '11

The Pape Family
Marina M. Blanco-Pape, *FL* *B* '81
Marilyn A., *FL* *B* '15
Marie J., *FL* *B* '18

The Parker Family
†Wendell R., *CA* *A* '50
Lisa J.P. Chrisman, *CA* *A* '77

The Pastorino Family
Frank A., *WI* *B* '71
Sarah A. Alwardt, *KY* *B* '97

The Paul Family
Howard C., Jr., *LA* *B* '80
Bryan H., *LA* *A* '17

The Perpich Family
William M., *MI* Γ '59
Suzanne M., *WI* *A* '90

The Poe Family
David R., *KY* *B* '86
Edward A., *KY* *B* '17

The Porter Family
†James W., *TX* Δ '22
James W., Jr., *TX* Δ '51

The Redelsheimer Family
Sigmund M., *AL* *A* '51
Sigmund M. *TN* *B* '77

The Reynolds Family
Allan E., *IN* *A* '43 (grandfather)
Haley T. Davis, *NY* *K* '91

The Roberts Family
Wallace M., *MT* *A* '60
Lauren M., *NM* Γ '88
Austin T., *CO* *A* '16

The Roche Family
†Edward C., Jr., *NJ* *A* '54
Timothy E., *NJ* Γ '84

The Rogenski Family
Mark T., *OH* Λ '94
Elizabeth A., *OH* Λ '17

The Rowan Family
†William H., *TN* *B* '26
†William H., Jr., *TN* *B* '55

The Scalzetti Family
Matthew R., *PA* *Z* '56
Stephen D., *NY* *B* '84
Elizabeth R., *NY* *B* '16
Philip C., *NY* *B* '88

The Schauble Family
Robert C., *WA* *B* '86
Kirstin E., *WA* Γ '17

The Schnepfer Family
†Leon P., *IL* *A* '52
Cory S., *IL* *B* '16

The Schunk Family
Peter R., *CO* *B* '84
Sofie W., *WI* *B* '14
Hattie C., *TX* *B* '17

The Schwartz Family
Joshua A., *DC* Γ '85
Lauren R., *VA* *B* '18

The Seasholtz Family
Elwood F., *PA* *A* '46
Richard, *PA* *B* '63

The Sedgwick Family
Scott L., *NY* *O* '82
Sarina, *AZ* *A* '16
Alyssa L., *CO* *Z* '17

The Sonnenfeld Family
Stephen L., *KY A '68*
Alan M., *MO Γ '99*

The Shutler Family
†Norman D., *KS A '60*
Brian D., *VA A '90*

The Voltz Family
Christopher D., *AZ B '89*
Julia L., *TX Γ '17*

The Warner Family
Richard H., *CA Γ '82*
Michelle H., *CA Γ '13*

The Wilkowski Family
Stephen J., *NY I '80*
Paul S., *NY B '17*

The Weimann Family
Cynthia D., *PA A '89*
Christopher S., *PA B '16*

The Zayan Family
Nicholas M., *MI H '86*
Julia, *MI B '17*

Siblings

This section includes brother and sister members, plus twins as indicated.

The Adams Sisters
Anna C., *AL Δ '14*
Alyse R., *AL Δ '17*

The Alhathal Twins
Bader, *CA N '16*
Mohammed, *CA N '16*

The Amaratunga Brothers
Givan M., *PA A '16*
Akila B., *PA A '18*

The Aung Siblings
Lily K., *CA Δ '09*
Lawrence H., *CA Δ '11*

The Bagwell Siblings
Amy Bagwell Martin, *SC A '89*
Roger B., *FL A '91*

The Baldwin Siblings
Andrew B., *NC A '17*
Madison E., *NC A '18*

The Ballard Twins
Mark E., *AL A '16*
Martha E., *AL A '16*

The Barta Twins
John J., *FL A '17*
Kevin J., *FL A '18*

The Blanning Brothers
Robert W., *PA B '58*
Bruce J., *PA B '62*

The Bliss Twins
Addison L., *PA H '17*
Prescott H., *PA H '17*

The Bodnaruk Brothers
Nicholas A., *CA Ω '01*
Ethan W., *CA Ω '04*

The Carbajal Twins
Christopher J., *CA I '16*
Michael A., *CA I '16*

The Cepulo Brothers
†Andrew J., *OH E '81*
Raymond G., *OH E '01*

The Clemmens Siblings
Matthew K., *SC A '04*
Meredith A., *SC A '16*

The Dalton Twins
Brittany B., *CO Δ '18*
Emily E., *CO Δ '18*

The DeMass Siblings
S. Nikki, *SC A '16*
Ian G., *SC A '16*

The Denoon Twins
Jonathan E., *SD B '18*
Matthew A., *SD B '18*

The Dickerman Siblings
Eric, *MT B '13*
Grace E., *MT A '16*

The Doan Twins
Dong V., *NC E '16*
Yen T., *NC E '16*

The Eckert Sisters
Aubrey C. Eckert-Gallup, *NM B '15*
Regina F., *NM B '15*

The Epperson Twins
Cody L., *KY A '16*
Justin B., *KY A '16*

The Farrow Sisters
Felicia T., *VA Γ '09*
Kayla M.G., *VA Γ '15*

The Fischi Brothers
Michael C., *NY B '92*
Jonathan C., *NY B '95*

The Gammeter Brothers
†Erwin, *MO B '26*
†Elmer, *MO B '26*

The Jaglal Siblings
Ravindranath, *DC A '11*
Rishi, *DC A '12*
Priya D., *DC A '17*

The Jajistar Brothers
Ricky G., *MD E '15*
Ravin K., *MD E '17*

The Jander Brothers
Georg, *MO Γ '87*
Albrecht, *MO Γ '91*

The Judish Brothers
David A., *TN A '83*
Greg W., *GA A '86*
Nathan P., *MO Γ '89*

The Kaufer Brothers
Larry J., *WA Γ '83*
Steve A., *WA Γ '84*

The Kaunelis Brothers
Pranciskus S., *MI Δ '69*
Vytautas P., *MI Γ '76*

The Keltie Brothers
Robert J., *DC Γ '69*
Richard F., *NC A '73*

The Labrie Siblings
Marie-Christine V., *TN Z '09*
Marc-Olivier, *TN Z '12*

The Lindamood Brothers
†Lapsley S., *MS A '70*
Willilam E., Jr., *TN A '78*

The LoCurto Siblings
Anthony C., *IA A '17*
Josephine J.M., *WI Δ '18*

The Loeb Twins
Jeffrey S., *OH Γ '82*
Jonathon T., *OH Γ '82*

The Loesing Brothers
Norman R., *MO B '42*
Vernon T., *MO B '42*

The Mattavi Twins
James N., *PA B '59*
Joseph L., *PA B '59*

The Maughan Brothers
Scott W., *UT B '17*
Craig W., *UT B '18*

The Maund Brothers
Ehren R., *PA B '91*
†Brion R., *PA B '95*

The Morse Twins
Avery J., *MN B '18*
Gavin D., *MN B '17*

The Ogletree Twins
Zachary T., *MS A '18*
Zane M., *MS A '18*

The Pankow Siblings
Carolyn, *MI Z '16*
Bradley, *MI Z '18*

The Perham Brothers
Roscoe E., *ME A '57*
Douglas A., *ME A '62*

The Piper Siblings
Jessica M., *AZ B '14*
Tyler I., *AZ B '17*

The Ponicki Triplets
Frances A., *IL A '19*
Mary R., *IL A '19*
Theresa C., *IL A '19*

The Pons-Siepermann Siblings
Ines C. Stuckert, *MI Γ '13*
Carlos Pons-Siepermann, *MI Γ '13*

The Rheinhardt Brothers
Brian J., *CA N '83*
Mark E., *CA N '84*

The Smick Twins
Cameron D., *IN Γ '18*
Ryan J., *IN Γ '18*

The Smith Twins
Julia K., *SC B '17*
Peggy A., *SC B '17*

The Swords Twins
Jacob A., *AL A '17*
Samantha C., *AL A '18*

The Tenny Brothers
Steven O., *KS A '07*
Kevin M., *KS A '17*

The Testarmata Sisters
Ann M., *MA Z '77*
Mary A., *MA Z '81*

The Thomas Brothers
Ryan J., *MI Γ '16*
Erik M., *MI Γ '17*

The Traum Brothers
Matthew J., *CA T '01*
Jonathan A., *CA A '03*

The Trlica Brothers
Frank E., Jr., *TX Δ '67*
Cary A., *TX Δ '69*

The Vinoski Brothers
Stephen B., *TN Δ '85*
James M., *TN Δ '87*

The Wagner Twins
Aaron M., *CA Z '17*
Alexander R., *CA Z '17*

The Wiznitzer Twins
Michael, *WI Δ '17*
Solomon, *WI Δ '17*

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

SEND US your best captions for this snapshot from Tau Beta Pi's photo archives, and if it is judged one of the best, you win a TBPI t-shirt of your choice!

The picture shows Kurt M. Duclos, *ID A '92*, on his back on an unidentified football field in 1990 or 1991. That's all we know! We are hoping that one of our readers can provide more details, but in the meantime, we'll leave it to your imagination! Submit your entries to pat@tbp.org, or mail them to HQ by Monday, May 1, 2017.

The photo for the Winter Contest, below, was taken on April 19, 1980, at Michigan Gamma's dedication of its new Bent monument in honor of Professor A.D. Moore, *PA Γ 1915*, shown seated on the right. Chapter officers attending to the new Bent are, left to right, Michael T. Koinis, *MI Γ '80*, and Howard K. Fertel, *MI Γ '79*, with Bradley G. Titus, *MI Γ '80*, chapter president, presiding.

After reviewing 28 captions offered by 13 Tau Bates, the judges declared Richard L. Stanley, *CA Λ '79*, the winner, submitting both the first and second favorite captions:

#1) "Michigan engineering students should have known that it might still be cold enough in April that their tongues could stick to the Bent."

#2) "Ever since they were kids, Mike Koinis and Howie Fertel never were very good at hiding."

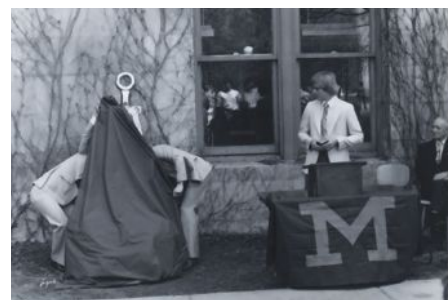
The third place entry was provided by Dante A. Masnada, *CA Z '75*.

#3) "Just act natural and no one will notice."

Congratulations to both of you and enjoy your TBPI t-shirts!

There was once again a three-way tie for Honorable Mention. From William R. Hasek, *PA Γ '49*, we have "C'mon guys, you're engineers! If you can't untie the knot, just use a pocket knife!" Richard L. Stanley had two more gems up his sleeve: "Guys—never mind about trying to make it a surprise—I am pretty sure that Professor Moore has already spotted you." and "No, the Bent monument is not usually painted scarlet and gray, why do you ask?"

Thanks again for making us laugh!





ALUMNI NOTES

Arizona Beta

J. Matthew Barnett, '90, has become the chair of the Accredited Standards Committee (ASC) N13, Radiation Protection. This maintains American National Standards Institute (ANSI) accreditation and the Health Physics Society (HPS) serves as the ASC N13 Secretariat. ANSI/HPS supports the N13 radiation protection standards for instrumentation, internal and external dosimetry, and environmental, medical, and operational health physics. Barnett is radioactive air task lead at the Pacific Northwest National Laboratory in Richland, WA.



Florida Gamma

James L. Hall, P.E., '02, has joined Pennoni's Winter Haven, FL, office as a senior engineer specializing in water/wastewater. He will be responsible for the design of water/wastewater treatment, pumping, and collection systems along with electrical and control systems for Florida projects. Hall has over 21 years of extensive experience in this field. Before engineering, Hall was a trombonist with gigs including a tour of South America with Natalie Cole.



Illinois Alpha

James R. Van Epps, '75, senior vice president, WSP | Parsons Brinckerhoff, has been elected as a member of the 2016 class of the National Academy of Construction.



Van Epps retired from the U.S. Army Corps of Engineers after 30 years of military service. He has led WSP | Parsons Brinckerhoff's work on several prominent transportation programs, including the California High-Speed Rail Program and the \$6 billion Honolulu Rail Transit Project.

Kentucky Alpha

John E. Broadbent III, M.D., '86, has joined the medical staff at



Murray-Calloway County Hospital in Kentucky as a cardiologist. He is board certified in cardiovascular diseases, a member of the American College of Cardiology, the American Medical Association and AIChE, and has contributed six published articles relating to cardiology topics.

Robert A. Yeager, '74, has been named chief district engineer for the Kentucky Transportation Cabinet District 6 office in Covington. Most recently, he has been serving in the acting CDE capacity. Yeager began his career with the Kentucky Transportation Cabinet as a maintenance engineer in 1975.

Louisiana Epsilon

Brandon M. Taravella, Ph.D., P.E., '03, is developing a "robotic eel" to improve the U.S. Navy's shallow water surveillance and reconnaissance with technology



that is safer for personnel. Taravella, associate professor in University of New Orleans' school of naval architecture and marine engineering, and colleague Kazim Akyuzlu have received a three-year, \$418,000

Office of Naval Research grant to continue and expand Taravella's previous research on the device.

Maryland Alpha

Mark Monmonier, Ph.D., '64, has been inducted into the GIS Hall of Fame at the Urban and Regional Information Systems Association (URISA) annual meeting. Monmonier is a geography professor at Syracuse University. He is one of the world's leading cartographers, has authored 19 books, and developed an algorithm "to detect boundaries among vertices of a valuated graph." Monmonier was also cited for his dedication to the GIS community as a mentor to younger scholars.



Maryland Beta

Roger W. Antony, P.E., '71, went on to obtain an MBA and then spent the next 37 years in general contracting. Early in his career, he obtained a civil engineering P.E. license. Roger's projects included locks and dams, power plants, hospitals, airports, high rise structures, and casinos. Now retired from general contracting, he has launched a new career as a novelist and has recently self-published books in both digital and softcover format.



New Hampshire Beta

Stefan D. Cleveland, '16, has been selected fourth in the second round (#26 overall) of the 2017 Major League Soccer SuperDraft. He was chosen by the Chicago Fire out of the University of Louisville where

he played goalkeeper for the varsity men's soccer team, and is completing his MBA. He previously earned his bachelor's in engineering from Dartmouth while playing varsity soccer. Cleveland

was named Ivy Defensive Player of the Year in 2015 and named to CoSIDA Academic All-America Second team in 2016.

Nevada Alpha

Albert H. Wigchert, '74, is a member of the liberFactory team at ATOS, working on the COBOL compiler. They offer compiling COBOL code, which is often complex and difficult to maintain, into C++, improving the ease of maintenance and performance. The team recently achieved a migration at CNAF, an agency of the French central government, similar to Health and Human Services in the USA. It was the largest migration from one vendor to another in computer industry history.

New York Iota

Stephen J. Wilkowski, '80, has retired from Nokia (formerly Alcatel-Lucent, Lucent Technologies, AT&T, and the Bell System) with over 35 years of service. He is now working temporarily with Verizon Wireless at Warren, NJ, testing the inter-operability of new equipment with existing radio access networks.

Ohio Iota

Clark A. Carty, '92, has been promoted to principal engineer at Cisco Systems, Inc. He is a 16 year Cisco



veteran who has been an architect of the 802.11 access points and started wireless LAN controller development in 2003. He was one of the principal creators of multirate ethernet (2.5 and 5Gbps) that is enjoying wide industry adoption and deployment.

Carty regularly works across Cisco business units developing hardware with others and contributes to IEEE 802.3 standards development.

Ohio Gamma

James E. Houseman, Ph.D., '68, has been selected as a distinguished life member of the American Ceramic Society, which he joined as a student member in 1966. He was ACerS president for 2001-02, Houseman is currently CEO



and chairman of Harrop Industries, Inc., a kiln manufacturer in Columbus, OH, where he started work as a design draftsman while at college.

Pennsylvania Lambda

Craig T. Burda, '85, received the 2017 ECHO (Environment, Community, Humanity, Ownership) Award



“for his sustained efforts to effectively implement the law.” Burda is a mining engineer with the Pennsylvania Department of Environmental Protection. He was cited for “protecting people and the environment against the ongoing threat of acid mine drainage coming from permitted coal waste facilities.” The award is given by the Office of Surface Mining Reclamation and Enforcement.

Texas Eta

E. Boyd Daniels, '96, is a principal engineer at the Department of Energy's waste isolation pilot plant, 35 miles east of Carlsbad, NM. He serves as the primary cognizant engineer for the most advanced nuclear waste processing system at the site. It uses automatic guided vehicles and robotic equipment to safely process



and emplace transuranic waste a half mile underground. Boyd was recently elected president of the WIPP Leadership Association, the first National Management Association chapter in New Mexico.

Texas Kappa

Verniss S. Dillon, '05, is founder and CEO of Houston, TX, based consultants MicAyla Global. He plans to give clients intelligent tools and solutions to help effectively manage their projects from start to finish, on time, and within



budget. Dillon has led and assisted with the planning and scheduling of over \$31 billion worth of construction projects in multiple sectors—accounting for over \$642 million in project savings.

West Virginia Alpha

David W. Baker, Ph.D., '76, has been elected treasurer of Sigma Xi, the scientific research honor society. He recently retired as senior vice president of field services at AT&T/DIRECTV. He started his professional career with Weyerhaeuser Company. Other appointments included Getty Oil Company and the Hughes Space and Communications Group.



Write Your Own Note!

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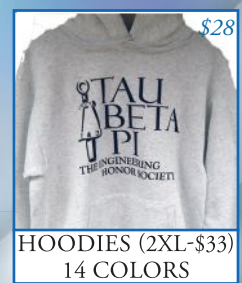
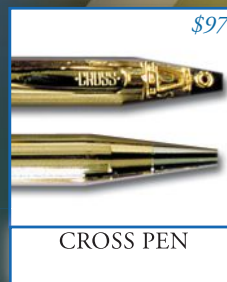
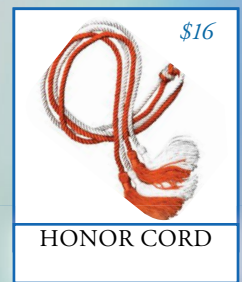
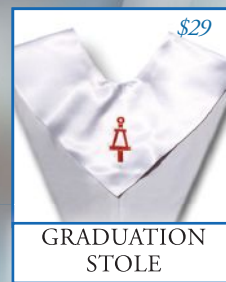
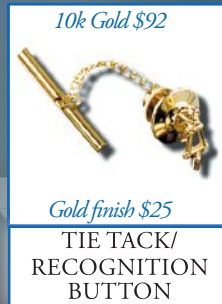
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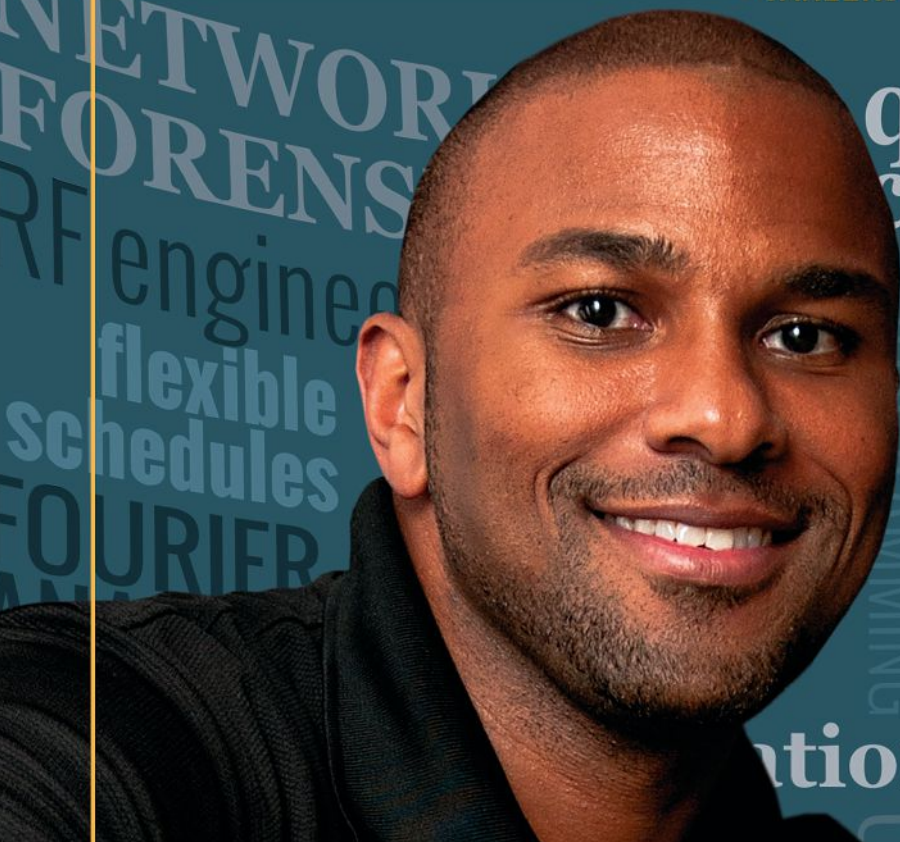
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