

THE BENT



OF TAU BETA PI

The Engineering Honor Society

Summer 2016

**EMF
Fears**

**Fellows
Named**

CHAPTERS

ALUMNI CHAPTERS (72)

District 1 • denotes active chapter

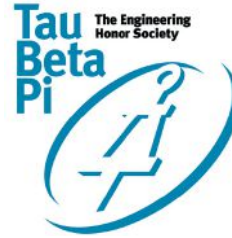
- Greater Boston Area, MA
- Central Connecticut, Hartford
- District 2**
- Buffalo, NY
- Central Jersey, NJ
- Long Island Suburban, NY
- Newark, NJ
- New York City, NY
- New York Capital District, NY
- Rochester, NY
- Southern Tier, Binghamton, NY
- District 3**
- Lehigh Valley, Bethlehem, PA
- Philadelphia, 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
- Dayton, OH
- Southeastern Michigan, Detroit
- Flint, MI
- Ohio's North Coast, Cleveland
- Columbus, OH
- West Michigan, Grand Rapids
- District 8**
- Chicago Area, IL
- Central Illinois, Urbana-Champaign
- Milwaukee, WI
- District 9**
- Rolla, MO
- St. Louis, MO
- District 10**
- Greater New Orleans, LA
- Central Texas (Austin/San Antonio)
- 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 A	15	Univ. of California, Davis	NJ A	2	Princeton Univ.
CA M	15	Calif. Poly. St. Univ., San Luis Obispo	NJ E	2	Rowan Univ.
CA N	16	California State Poly. Univ., Pomona	NJ Z	2	The College of New Jersey
CA E	16	San Diego State Univ.	NM A	13	New Mexico State Univ.
CA O	16	Loyola Marymount Univ.	NM B	13	Univ. of New Mexico
CA P	15	Northrop Univ. (inactive)	NM F	13	New Mexico Inst. of Mining & Tech.
CA P	16	California State Univ., Fresno	NY A	2	Columbia Univ.
CA S	16	Univ. of California, Santa Barbara	NY B	2	Syracuse Univ.
CA T	16	Univ. of California, Irvine	NY G	2	Rensselaer Polytechnic Inst.
CA Y	15	California State Univ., Sacramento	NY I	2	Cornell Univ.
CA F	15	Univ. of the Pacific	NY E	2	New York Univ. (inactive)
CA X	16	California State Univ., Fullerton	NY Z	2	Polytechnic Inst. of Brooklyn (inactive)
CA P	16	Univ. of California, San Diego	NY H	2	City College of CUNY
CA T	16	Harvey Mudd College	NY O	2	Clarkson Univ.
CA A	15	California State Univ., Chico	NY I	2	Cooper Union School of Engineering
CA AB	16	Univ. of California, Riverside	NY K	2	Univ. of Rochester
CA AF	15	San Francisco State Univ.	NY A	2	Pratt Inst. (inactive)
CA AA	15	Univ. of California, Santa Cruz	NY M	2	Union College
CA AE	16	Univ. of San Diego	NY N	2	SUNY at Buffalo
CO A	12	Colorado School of Mines	NY E	2	Manhattan College
CO B	12	Univ. of Colorado at Boulder	NY O	2	SUNY at Stony Brook
CO G	12	Univ. of Denver (inactive)	NY P	2	Rochester Inst. of Technology
CO D	12	Colorado State Univ.	NY P	2	Polytechnic Institute of New York Univ.
CO E	12	Univ. of Colorado at Denver	NY S	2	Alfred Univ.
CO Z	12	United States Air Force Academy	NY T	2	Binghamton University
CT A	1	Yale Univ.	NY Y	2	United States Military Academy
CT B	1	Univ. of Connecticut	NC A	4	North Carolina State Univ.
CT G	1	Univ. of Hartford	NC B	4	Univ. of N.C. at Chapel Hill (inactive)
DE A	3	Univ. of Delaware	NC G	4	Duke Univ.
DC A	4	Howard Univ.	NC D	4	Univ. of North Carolina at Charlotte
DC B	4	Catholic Univ. of America	NC E	4	North Carolina A&T State Univ.
DC G	4	George Washington Univ.	NC Z	4	East Carolina University
FL A	5	Univ. of Florida	ND A	11	North Dakota State Univ.
FL B	5	Univ. of Miami	ND B	11	Univ. of North Dakota
FL G	5	Univ. of South Florida	OH A	7	Case Western Reserve Univ.
FL A	5	Univ. of Central Florida	OH B	7	Univ. of Cincinnati
FL E	5	Florida Atlantic Univ.	OH G	7	Ohio State Univ.
FL Z	5	Florida Inst. of Technology	OH H	7	Ohio Univ.
FL H	5	Florida A&M Univ.-Florida State Univ.	OH E	7	Cleveland State Univ.
FL O	5	Florida International Univ.	OH Z	7	Univ. of Toledo
FL I	5	Embry-Riddle Aeronautical Univ.	OH H	7	Air Force Inst. of Technology
GA A	5	Georgia Inst. of Technology	OH O	7	Univ. of Dayton
GAB	5	Mercer Univ.	OH I	7	Ohio Northern Univ.
ID A	14	Univ. of Idaho	OH K	7	Univ. of Akron
ID B	12	Idaho State Univ.	OH A	7	Youngstown State Univ.
ID G	12	Boise State Univ.	OH M	7	Wright State Univ.
IL A	8	Univ. of Illinois at Urbana-Champaign	OH N	7	Cedarville Univ.
IL B	8	Illinois Inst. of Technology	OH E	7	Miami Univ.
IL G	8	Northwestern Univ.	OK A	9	Univ. of Oklahoma
IL A	8	Bradley Univ.	OK B	9	Univ. of Tulsa
IL E	8	Southern Illinois Univ. at Carbondale	OK F	9	Oklahoma State Univ.
IL Z	8	Univ. of Illinois at Chicago	OR A	14	Oregon State Univ.
IN A	8	Purdue Univ.	OR B	14	Portland State Univ.
IN B	8	Rose-Hulman Inst. of Technology	OR F	14	Univ. of Portland
IN G	8	Univ. of Notre Dame	PA A	3	Lehigh Univ.
IN A	8	Valparaiso Univ.	PA B	3	Pennsylvania State Univ.
IN E	8	Trine Univ.	PA G	3	Carnegie Mellon Univ.
IN Z	8	Indiana Univ.-Purdue Univ. Indianapolis	PA A	3	Univ. of Pennsylvania
IA A	11	Iowa State Univ.	PA E	3	Lafayette College
IA B	11	Univ. of Iowa	PA Z	3	Drexel Univ.
KS A	9	Univ. of Kansas	PA H	3	Bucknell Univ.
KS B	9	Wichita State Univ.	PA O	3	Villanova Univ.
KS G	9	Kansas State Univ.	PA I	3	Widener Univ.
KY A	6	Univ. of Kentucky	PA K	3	Swarthmore College
KY B	6	Univ. of Louisville	PA A	3	Univ. of Pittsburgh
KY G	6	Western Kentucky Univ.	PA M	3	Penn State Erie, The Behrend College
LA A	10	Louisiana State Univ.	PR A	5	Univ. of Puerto Rico
LA B	10	Tulane Univ.	RI A	1	Brown Univ.
LA G	10	Louisiana Tech Univ.	RI B	1	Univ. of Rhode Island
LA A	10	Univ. of Louisiana at Lafayette	SC A	5	Clemson Univ.
LA E	10	Univ. of New Orleans	SC B	5	Univ. of South Carolina
ME A	1	Univ. of Maine	SC G	5	The Citadel
MD A	4	Johns Hopkins Univ.	SD A	12	South Dakota School of Mines & Tech.
MD B	4	Univ. of Maryland	SD B	11	South Dakota State Univ.
MD G	4	United States Naval Academy	TN A	6	Univ. of Tennessee
MD A	4	Univ. of Maryland Baltimore County	TN B	6	Vanderbilt Univ.
MD E	4	Morgan State Univ.	TN G	6	Tennessee Tech Univ.
MA A	1	Worcester Polytechnic Inst.	TN A	6	Christian Brothers Univ.
MA B	1	Massachusetts Inst. of Technology	TN E	6	Univ. of Memphis
MA G	1	Harvard Univ. (inactive)	TN Z	6	Univ. of Tennessee at Chattanooga
MA A	1	Tufts Univ.	TX A	10	Univ. of Texas at Austin
MA E	1	Northeastern Univ.	TX B	13	Texas Tech Univ.
MA Z	1	Univ. of Massachusetts at Amherst	TX G	10	Rice Univ.
MA H	1	Boston Univ.	TX A	10	Texas A & M Univ.
MA O	1	Univ. of Massachusetts Lowell	TX E	10	Univ. of Houston
MA I	1	Western New England Univ.	TX Z	10	Lamar Univ.
MI A	11	Michigan State Univ.	TX H	10	Univ. of Texas at Arlington
MI B	11	Michigan Tech. Univ.	TX O	13	Univ. of Texas at El Paso
MI G	7	Univ. of Michigan	TX I	10	Southern Methodist Univ.
MI A	7	Univ. of Detroit Mercy	TX K	10	Prairie View A & M Univ.
MI E	7	Wayne State Univ.	TX A	10	Texas A & M Univ.-Kingsville
MI Z	7	Kettering Univ.	TX M	10	Univ. of Texas at San Antonio
MI H	7	Lawrence Technological Univ.	TX N	10	Univ. of Texas-Rio Grande Valley
MI O	7	Oakland Univ.	UT A	12	Univ. of Utah
MI I	7	Univ. of Michigan-Dearborn	UT B	12	Brigham Young Univ.
MI K	7	Western Michigan Univ.	UT G	12	Utah State Univ.
MI A	7	Grand Valley State Univ.	VT A	1	Univ. of Vermont
MN A	11	Univ. of Minnesota-Twin Cities	VT B	1	Norwich Univ.
MN B	11	Univ. of Minnesota, Duluth	VA A	4	Univ. of Virginia
MS A	6	Mississippi State Univ.	VA B	4	Virginia Polytechnic Inst. & State Univ.
MS B	6	Univ. of Mississippi	VA G	4	Old Dominion Univ.
MO A	9	Univ. of Missouri-Columbia	VA A	4	Virginia Military Inst.
MO B	9	Missouri Univ. of Science & Technology	VA E	4	Virginia Commonwealth Univ.
MO G	9	Washington Univ.	WA A	14	Univ. of Washington
MO A	9	Univ. of Missouri-Kansas City	WA B	14	Washington State Univ.
MO E	9	Saint Louis University	WA G	14	Seattle Univ.
MT A	12	Montana State Univ.	WA A	14	Gonzaga Univ.
MT B	12	Montana Tech of the Univ. of Montana	WV A	4	West Virginia Univ.
NE A	9	Univ. of Nebraska-Lincoln	WV B	4	West Virginia Univ. Inst. of Technology
NV A	15	Univ. of Nevada, Reno	WI A	8	Univ. of Wisconsin-Madison
NV B	16	Univ. of Nevada, Las Vegas	WI B	8	Marquette Univ.
NH A	1	Univ. of New Hampshire	WI G	8	Univ. of Wisconsin-Milwaukee
NH B	1	Dartmouth College	WI A	8	Milwaukee School of Engineering
NJ A	2	Stevens Inst. of Technology	WI E	8	Univ. of Wisconsin-Platteville
NJ B	2	Rutgers Univ.	WY A	12	Univ. of Wyoming
NJ G	2	New Jersey Inst. of Technology			

COLLEGIATE CHAPTERS (252)

Chap. Dist.	Institution
AL A	6 Auburn Univ.
AL B	6 Univ. of Alabama
AL G	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 G	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 G	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
CA K	16 California State Univ., Northridge

the Bent^{of}



Summer 2016
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*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.

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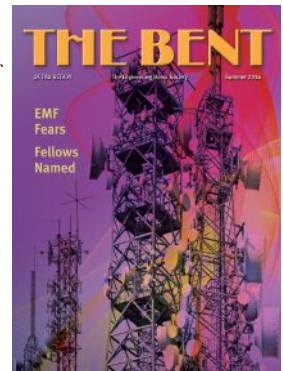
by Jeromy C. Johnson, SD A '98

Elementary STEM Nights.....20

by Lisa S. Kim, MI Γ '90, and

David T. Preissig, P.E., IA A '96

ON THE COVER:
Jeromy C. Johnson looks
at the rise in the use of
wireless technology and
fears of electromagnetic
force.



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

Closer Look at Executive Council Changes

aS YOU READ in the Winter 2016 *Bent*, the proposal to restructure Tau Beta Pi's Executive Council (EC) was presented to and adopted by the 2015 annual Convention in Providence, RI.

I am pleased to report the proposal has now been ratified by the required three-fourths affirmative vote by the 245 collegiate and 39 alumni chapters eligible to vote, and the changes to the Constitution are now in effect.

Let's recap the key elements of the EC restructuring:

- The Council is now enlarged from 5 to 9-12 members.
- Their terms will be staggered with up to 4 new members being added and rolling off each year.
- Elections will now be held every year at the annual Convention, starting this year in San Diego.
- Councillors will now serve for 3 years.

The current Executive Council is excited by these changes and we hope you are equally as excited. Let me review each change and explain how the Council, along with the Executive Director, believe each will benefit TBPi.

Increased Size

The larger Council will allow for better coverage of our existing programs. With the restructuring, each Councillor can concentrate on a specific area rather than being thinly spread across multiple programs as they are now. The change also opens the possibility for adding new programs as having more members will allow us to carry out more initiatives. Finally, the increased Executive Council size gives more members a chance to serve at the highest levels of our leadership.

Staggered Terms

The move to staggered terms will provide more continuity both in leadership and the direction of the organization. By staggering the addition of new Councillors to work alongside existing members, progress on longer term strategic initiatives can proceed smoothly without the interruption of a whole new Council every four years. Another benefit of staggered terms is the opportunity to shorten the learning curves for new Councillors as they will immediately be working with experienced members.

Annual Elections

By holding EC elections each year instead of every 4, we enhance the opportunity for delegates at each annual Convention to have more influence on the direction of the Association. The Council will also encourage members with skills needed to carry out the Association's strate-

gic plan to consider serving on the EC. Ultimately, we believe that holding elections every year will make us more nimble and responsive to changing needs.

Shorter Terms

In restructuring the Executive Council, we wanted to recognize that "being in the right time in your life" is a key part of a member's deliberation prior to volunteer to serve on the EC. One of the major benefits we see in the restructuring is increasing the number of members able to serve by shortening the time commitment of an Executive Councillor from 5 years (1 year in training as the EC-elect and 4 years after as the installed EC) to 3 years.

Next Steps

Now that the restructuring has been approved and ratified, a key next step is to elect 3 additional Council-



lors at the 2016 Convention. In the meantime, the current Council will continue to work with Brad Gray, our consultant on non-profit management, to develop a strategic direction for the organization. This is based on input from student members and alumni volunteers, a SWOT analysis by the Executive Director and EC, and an analysis of the current state of the Association. It will help us determine the skill sets

and expertise we need to add to the Council. The strategic direction will also help us in identifying metrics by which we can continuously monitor the effectiveness of changes that we implement on the programs and activities of TBPi, and make any needed corrections.

How Can You Help?

Serving on the Executive Council is a great way to give back by using your talents and experience. We anticipate the restructuring will give this opportunity to more alumni. If you are interested in serving on the Council, now or in the future, please contact Executive Director Curt Gomulinski at curt@tbp.org, and he will have the proper information sent to you.

As always, we wish the very best for all of our members, who every day are helping to create a better world.

—Norman Pih, Tennessee Alpha '82, Vice President

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



Send us your witty captions for this photo from *The Bent* archives, and if it is judged one of the best, you will win a TBPI t-shirt.

The picture above, which appeared in the winter 1977 issue, was taken during the 71st Convention in College Station, TX, on October 28-30, 1976. The camera captured Secretary-Treasurer Nagel and Assistant Secretary-Treasurer Soukup clarifying some points for Larke E. Reeber, *CA A '77*. Email entries to pat@tbp.org, or mail them to HQ by Monday, August 8, 2016.

The photo for the spring contest, below, was taken during the 1975 Convention hosted by Ohio Beta at the University of Cincinnati. Here, M.E. Forsman, Ph.D., *TX A '40*, the Gainesville Alumnus Chapter delegate, compliments Mrs. Shapton on the table displays she had made for the Initiation and Awards Banquet. Mrs. Shapton, wife of Convention Treasurer W.R. Shapton, Ph.D., *MI A '62*, served as head of the "Wives Program" that year.

The judges carefully considered 38 captions submitted by 25 readers. In a near tie for the top spot, Solange C. Dao, P.E., *FL A '95*, emerged as the first place winner for her caption:

Mr. Forsman: "Did you know 8% of males are color blind, and only 0.5% of women?"

Mrs. Shapton: "Those lucky 0.5%...."

A close second place goes to Daniel A. Naber, *NY O '66*, for his entry:

"Thank you, but I'll wait for the cheese and crackers."

Congratulations to both of you. Your TBPI t-shirts are in the mail.

David D. Walden, *IN A '83*, deserved an honorable mention with this take on the photo: "No young lady, the assignment was to calculate square roots, not grow them."

Thanks again to all of our participants for confirming that engineers do indeed have a sense of humor!



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EDITORIAL

Secretary-Treasurer No More

As I sat down to write this editorial, I experienced a sense of nostalgia mixed with hope and excitement. I felt nostalgic at the realization that with the recently ratified changes to the Constitution and Bylaws, I am the fourth and last member to carry the title of Secretary-Treasurer of Tau Beta Pi. On the flip side, it is deeply satisfying to see a recommendation initiated nearly three years ago come to fruition. With this important change now in place, I wanted to share a little about the evolution of the position of Secretary-Treasurer and its role with the Executive Council.

In the early years of the Association, we had no elected national officers as we weren't large enough to need them. After the establishment of Indiana Alpha at Purdue, representatives from the three chapters in existence gathered in Cleveland, Ohio, in May 1895 and elected the first Executive Council to terms of one year including a President, Secretary, and Treasurer. Conventions were held on a regular basis through 1924, although the Association chose to meet on a biennial basis in the early years and did not meet during World War I. Executive Council elections occurred at each Convention, but the positions changed several times along the way. A Vice President was added to the Council by the 1905 Convention which also elected Robert C. "Red" Matthews as Secretary. A change to the Constitution retained the Secretary as an ex-officio member of the Council but made his election a Council decision. At the same time, the term of office for Councillors was changed to three years with one new member elected each year.

The 1912 Convention combined the offices of Secretary and Treasurer. When Red indicated his position as Secretary and his full-time teaching responsibilities were consuming his time, the Convention agreed to hire a clerk and provide Red with a generous increase in salary from \$300 to \$400 per year. The Convention instructed the Executive Council to "make it \$500 if the financial condition of the society warrants."

The Convention adopted in 1923 and implemented in 1924 changes to the Executive Council structure which created the "package" Council. This new arrangement changed the election period to once every three years, introduced the slate concept, and required Councillors to live in the same geographical area to facilitate meetings and collaboration. These changes also relieved the Secretary-Treasurer from serving as a member of the Executive Council to focus on the daily work of running the Association. While the previous 20 years had been

filled with change, the next twenty were relatively quiet.

The next changes to the governance of Tau Beta Pi began with our incorporation in June 1947 followed by Robert H. "Bob" Nagel assuming the role of Secretary-Treasurer on August 1 after seven months of serving as Assistant Secretary-Treasurer and five years as Editor of *The Bent*. The position of Secretary-Treasurer became full-time with the inclusion of the responsibilities of Editor of *The Bent*. The 1947 Convention saw the Executive Council expand to five members to meet the requirements of a corporation in Tennessee. A final change of this period occurred in 1949 when the term of office of Executive Councillors increased to four years from three years. Tau Beta Pi then entered another period of limited governance change until the end of the 20th century.

James D. "Jim" Froula assumed the office of Secretary-Treasurer with Bob's retirement in 1982. Jim's



term as Secretary-Treasurer saw two changes to the Association's governance including permitting members of the Executive Council to reside anywhere as travel and collaboration were much easier than in the 1920s. The title of Executive Director was added to that of Secretary-Treasurer by the 1998 Convention. Organizations doing business with Tau Beta Pi wanted to work with the person in charge and the title

of Secretary-Treasurer did not convey the importance of the position. My predecessors always served in the capacity of Executive Director; the title just wasn't in common use until recently. After 17 years with both titles in place, making the change in 2015 was much easier than in 1998.

August 1 will mark my fifth anniversary of reporting to Headquarters as the Executive Director-designate. My job responsibilities will remain the same although Councillor Morales now has the title of Secretary and Councillor Passman has the title of Treasurer. I look forward to continuing to serve as the Executive Director of this outstanding organization!

Until later,



DISTRICT DOINGS

DISTRICT 2

The **New York City Alumni Chapter** celebrated Pi Day at Angelo's Coal Oven Pizzeria and met with board candidates in April during happy hours at 5th and Mad. To join, email tbpnycalumni@gmail.com.

DISTRICT 4

The 38th annual **District 4 Conference** was held at the University of Virginia over the weekend of April 1, with 22 chapters and a total of 92 Tau Bates attending. President J.P. Blackford and District 4 Director Ed Gorzkowski told delegates about TBI programs including scholarship and grant opportunities, awards, and initiation procedures. Engineering Futures Facilitator Cathy Gorzkowski and President Blackford provided an overview of the different Engineering Futures modules that are offered. In the afternoon, three distinguished Tau Bates gave 'Tau' Talks about topics of their choosing. Delegates were then invited to Virginia Alpha's spring initiation. Afterward, conference attendees and newly initiated members took advantage of the beautiful weather and had refreshments on The Lawn. The conference came to a close with ICE sessions and the selection of West Virginia Alpha as the 39th annual District 4 hosts.

DISTRICT 5

The **District 5 Conference** was held in Tampa, FL, March 19-20. It was hosted by the Florida Gamma Chapter at the University of South Florida. Several TBI alumni were in attendance including members of the Tampa Bay Alumni Chapter, right.

(District Doings continued on page 45)

DISTRICT 6



The **District 6 Conference** was hosted by Tennessee Beta at Vanderbilt University, with all 16 chapters represented, above. Friday night the students participated in DICE and Game Night. Saturday activities included learning how to use the online system, and Alabama Delta presented their steps to be-

coming the Most Improved Chapter. Before lunch, six alumni sat on a panel and students asked questions about work-life vs. academia. After lunch, the District Directors discussed TBI programs and chapter officer responsibilities. Alabama Epsilon explained what it takes to be the Most Outstanding Chapter.





LETTERS

Band Leader or Lieder?

• Thank you for the *Profiles in Leadership* article #8 about Tom Scholz in your Spring 2016 issue.

In the late 70s, when I was in high school, I had many friends who convinced me to go to my first rock concert at the Knoxville, TN, Coliseum: Boston.

At the time, my concert experiences had been attending and listening to my father's rehearsals and concerts with the volunteer-driven Oak Ridge Symphony Orchestra. Imagine my surprise when I discovered that I was in the minority of the crowd who actually went to hear the music.

I do remember one of my friends telling me, as well: "One of them is an engineer!" Now, some four decades later, I learned more about the engineer who created (and is still creating) this wonderful music.

I shared your article with my son (a teenager) who responded after reading it, as well: "Great article." Please let Tom know that!

Bruce K. Vaughen, Ph.D., P.E.
TN B '88

Innovation Insights

The Winter 2016 issue is so interesting that I feel compelled to comment.

Thank you again to Trudy Bell for the article on the drought (*Peak Water? Choices Are Tough in California's Epic Drought*). Although a California resident and well-informed on this issue, I found it quite worthwhile reading. (I did, however, find some glaring editing errors—proofreaders take note.)

The article by Joel Cuello (*Building the Next Silicon Valley: Insight from 11,600 Years Ago*), however, contains a few major errors that may be difficult for your readers to identify. First, identifying the Natufians as an "innovation ecosystem" is quite mistaken. These people were not able to change their lifestyle overnight, and their crops required many generations of selective breed-

ing to become viable staples. The transition from full nomadism to full sedentism most likely took place gradually over a thousand years or more, so that any individual generation may not have been aware of the change that was taking place.

Second, a sedentary farming lifestyle did not bring abundant food and prosperity. Fossil remains show that lifespan and stature decreased with the advent of farming, and in Europe did not recover to hunter-gatherer levels until the early modern period. Early farmers had a nutritionally impoverished diet compared to nomads, and were more prone to disease and parasites due to crowding and poor sanitation.

Finally, the map on page 20, appearing to show a single wave of migrations from Africa producing modern ethnicities, is very misleading. It does not account for historically attested migrations such as those of the Germans, Slavs, and Tatar-Mongols. Neither does it account for any migrations that may have taken place during the tens of thousands of years between the first human settlement and the advent of historical records. Furthermore, we have no knowledge of whether Stone Age people possessed the characteristics that we would recognize as ethnicity (language, beliefs, and appearance shared over a wide area), or whether they thought of their identity in this way.

A few specific errors with regard to the origin of particular ethnicities:

- Russians entered Russia not from central Asia but from the Balkans, and are quite unrelated to the Tatars shown on the same branch.
- The British are not one ethnicity but several, formed from successive waves of migration.
- The Romanians did not become Romanian until conquered and assimilated by the Romans (Trajan), coming from the south and west, rather than from the steppes as shown.

Ilya V. Gurin, CA A '07

[Joel Cuello responds: Thanks to Ilya Gurin for his comments on my article. His claim, however, that my article contains "a few major errors" is itself erroneous. First, his suggestion that a technology ecosystem qualifies only as a veritable innovation ecosystem if somehow it materializes almost overnight is a fallacy. Every human innovation is produced through an aggregation and accumulation of human knowledge and skills with long temporal, even spatial, origins. Every innovation ecosystem is constituted in the same way. Indeed, it could be argued that Silicon Valley exists today because of technology advances whose origins date as far back as over 2,000 years ago. My article explicitly acknowledges that it had taken several centuries for the earliest agriculture community to coalesce and materialize in the Jordan River Valley.

That it was an ecosystem for innovation is beyond refute, producing a host of new technologies including the sickle, and helping pave the way for the spread of agriculture and settlement in the Fertile Crescent and beyond—the Neolithic Revolution—during a period when the majority of modern humans in other parts of the world remained nomadic hunter-gatherers as they had always been for over 190,000 years.

Second, the article never claims that the beginning of agriculture resulted in a more balanced and healthy nutrition for those who adopted a sedentary village lifestyle relative to those who continued in their nomadic hunter-gatherer lifestyle. This was beside the point of the article.

Finally, the map in question charts the migratory history of modern humans based on genetic recombinatorial analysis conducted by the Genographic Project by National Geographic and IBM. The project is to date the most comprehensive global survey of human genetic variation in order to map how the earth was populated. The map shows the

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Who knows better how talented our students are but Tau Bates themselves? Through contacts by our member-employees, TBPI has formed long-term relationships with companies like Sandia, Pratt & Whitney, and Next Era Energy who saw the value in hiring fellow members.

Contact Pat McDaniel at pat@tbp.org for more information.

Constitutional Amendments Ratified

The 2015 Convention approved a single package of amendments to the Constitution and Bylaws of Tau Beta Pi and sent it to the chapters for ratification. In accord with the Association's amending procedure, with 284 chapters (245 collegiate and 39 alumni) eligible to vote, 213 or more affirmative chapter votes are required to ratify an amendment, and 72 or more negative votes would defeat it.

Headquarters received 270 valid ballots by the voting deadline of April 1, 2016 (plus 5 invalid for lack of a chapter quorum). The proposed amendment was therefore ratified, and is in effect.

Amendment

I. Change the structure of the Executive Council to establish a 9-12 member Council with members elected annually to staggered 3-year terms, create Executive Council offices of Secretary and Treasurer, adjust employment provisions for the Executive Director, and remove the title of Assistant Secretary-Treasurer. (Constitution Article III, Secs. 2 (a) and 2 (i), Secs. 3 (a) to 3 (h), Secs. 4 (a) and 4 (b); Article IV, Sec. 1, Secs. 2 (a) to 2 (e); Bylaw I, Secs. 1.01. and 1.03; Bylaw II, Sec. 2.01; and Bylaw III, Sec. 3.02)

Outcome

I. Ratified by chapter vote; 229 affirmative, 41 negative.

“net” movements of modern humans over the past 100,000 years based on chromosomal DNA recombinations. This net directional migration perfectly accounts for any back migrations, re-migrations, and mixing up of different peoples that transpired at various periods in the past. The net migratory paths over millennia of the recent groups of peoples that

Ilya mentioned—however much they wandered about in the past—are nicely captured in the said map.

The building of innovation ecosystems, intentional or not, is what has continually and significantly advanced the human condition throughout the past 14 millennia. Understanding the values that undergirded those innovation

ecosystems should inform how the new innovation ecosystems getting built around the world today are designed. They should not only churn out technological advances and create wealth, but also help build global societies that are more informed, just, and more environmentally sustainable.]



WHO'S WHO

ASEE Leadership

Bevlee A. Watford, Ph.D., Virginia Beta '81, has become president-elect



of the American Society for Engineering Education (ASEE). She is associate dean for academic affairs and professor of engineering education at Virginia

Tech. Watford recently served as first VP and chaired the diversity task force that resulted in the creation of the ASEE diversity strategic plan. **Col. Bobby Grant Crawford, Ret., Ph.D., New York Upsilon '85**, mechanical engineering professor at Quinnipiac University, was elected vice president for member affairs. He is



former director of the mechanical engineering program at the United States Military Academy. **Shane**

W. Rogers, Ph.D., Iowa Alpha '04, became chair for zone 1. He is an associate professor in the department of civil and environmental engineering at



Clarkson University. Before that, Rogers spent eight years with the Environmental Protection Agency.

John J. Tracy, Ph.D., California Tau '86, Boeing's chief technology



officer, will retire in July after 35 years with the company. Boeing said he had begun transitioning his role as senior vice president of engi-

neering, operations, and technology to "a team of corporate leaders."

Boeing announced that **Gregory L. Hyslop, D.Sc., Nebraska Alpha '80**,



will become senior vice president for engineering, test and technology. Hyslop's previous leadership roles included serving as vice president and general manager for Boeing's strategic missile and defense systems.

Charles W. Bachman III, Michigan Alpha '48, has received an honorary



doctorate of engineering from Michigan State University, his alma mater. Bachman was a pioneer of computer science and information systems. He

developed the first generic database management system and rode the introduction of large disk storage technology to modern business systems.

William J. Dally, Ph.D., Virginia Beta '80, has been honored by



Japan's largest IT society, the Information Processing Society of Japan, the nation's largest IT body, with the Funai Achievement Award for

his achievements in the field of computer science and education. He is NVIDIA chief scientist and senior vice president of research. Before joining NVIDIA in 2009, Dally served from 2005-09 as chairman of Stanford University's computer science department, where he had

taught since 1997. Previously, he led the group at MIT that built the J-Machine and M-Machine, parallel machines that pioneered the separation of mechanism from programming models.

Jill S. Tietjen, P.E., Virginia Alpha '76, is being honored by Women's



eNews as one of the 21 Leaders for the 21st Century. Tietjen has spent decades nominating women for awards to promote them and their groundbreaking

work to ensure there are female STEM models everywhere. She is president and CEO of Technically Speaking, Inc., and former CEO of the National Women's Hall of Fame.

Thomas F. Wolff, Ph.D., P.E., Missouri Beta '70, has become president



of Chi Epsilon, the civil engineering honor society. He was previously vice president. Wolff is associate dean for undergraduate studies and associate

professor of civil and environmental engineering at the Michigan State University college of engineering. He is an advisor to Michigan Alpha Chapter. The new vice president

is **Michael D.**

Symans, Ph.D., New York Nu, '90, an associate professor of civil and environmental engineering at Rensselaer Polytechnic Institute.



His field of research is structural earthquake engineering.

Tau Beta Pi Fellows for 2016-17

RECIPIENT	CHAPTER	FIELD OF ADVANCED STUDY	FELLOWSHIP
Shannon E. Anderson	MA H '16	Biomedical Engineering	Tau Beta Pi No. 810
Christopher A. Argento	MD A '16	Chemical & Biomolecular Engineering	Zimmerman No. 5
Paige Balcom	NH A '16	Mechanical Engineering	Anderson No. 10
Sean M. Bittner	AL A '16	Bioengineering	Fife No. 209
Savannah R. Brown	MI Z '15	Biomedical Engineering	Arm No. 8
Felipe Lenz Carvalho	FL E '14	Electrical & Computer Engineering	Williams No. 37
Matthew A. Clarke	DC A '16	Aeronautics & Astronautics	King No. 55
Sarah A. Dean	PA Δ '16	Electrical Engineering	Swalin No. 1
Andrew P. Eagan	NY Γ '16	Tech. Commercialization & Entrep.	Best No. 6
Ryan A. Gellner	WV A '16	Biomedical Engineering	GEICO No. 1
Christie R. Hasbrouck	IN E '16	Metallurgical & Materials Engineering	Tau Beta Pi No. 811
Nathan C. Kemper	OH B '16	Biomedical Engineering	Tau Beta Pi No. 812
Cassidy A. Laird	SC A '16	Biosystems Engineering	Centennial No. 31
Ryan S. Longchamps	AL Δ '15	Mechanical Engineering	Spencer No. 61
Morgan M. Miller	OH M '16	Biomedical Engineering	Fife No. 210
Robert C. Mines	AL E '16	Biomedical Engineering	Tau Beta Pi No. 813
Arman Mohsen Nia	MD A '16	Bioengineering	Tau Beta Pi No. 814
Ryan P. O'Hara	NY N '16	Biomedical Engineering	Nagel No. 19
Katherine E. Riojas	OK B '16	Mechanical Engineering	Hanley No. 10
Felipe Augusto Sozinho	WV B '16	Electrical Engineering	Tau Beta Pi No. 815
Ever O. Velasquez	FL H '16	Chemical Engineering	Dodson No. 3
Lisa Wang	CA Γ '16	Computer Science	Forge No. 5
Shuwen Yue	AL B '16	Chemical Engineering	Tau Beta Pi No. 816
Kasra Zarei	IA B '16	Ophthalmology & Engineering	Matthews No. 19

THE FELLOWSHIP BOARD selected 24 Tau Beta Pi Fellows for 2016-17, 19 of whom will receive \$10,000 cash stipends for one year of graduate study and 5 who have other extensive financial aid for their year of advanced work. Implemented by President A.D. Moore in 1929, the Fellowship Program has provided over \$6,434,000 to 1,065 stipend recipients.

Now in its 83rd year, the Fellowship Program remains a principal philanthropic activity of the Association and continues to receive strong support from alumni. The program was initiated with funds from the operating budget of the Society, including the eventual transfer of fees from deceased life subscribers of *The Bent*. It was first enlarged in 1938 by a gift from the Southern California Alumnus Chapter, and in 1948 the first Alumnus Fellowship was awarded. Since that time, gifts from alumni, industry, corporate matches, friends, and the earnings of the invested Fellowship Fund have all contributed to these awards.

This year's program leveraged a new web-based system that allowed members to submit their applica-

tions and transcripts online. Letters of recommendation were submitted by applicants' references electronically through this new system. A record number of members took advantage of this new process.

With the large number of applicants, the Fellowship Board engaged the services of 18 additional TBPI members to read and rank applicants. The Fellowship Board used this information to make the final Fellow selections in March. The Association is grateful to these members for their role in the selection process. Participants are listed at www.tbp.org/fellowships.cfm.

In addition to its own awards, TBPI selects recipients for named fellowships, which are administered just as other Society fellowships. Since 1956, 31 fellowships have been named for TBPI members; 12 are so named this year.

The **Anderson Fellowship** is named for Mabel E. and Marshall Anderson, *MI Γ '32*, TBPI Fellow No. 9, who left a bequest to the Society in 2005.

The **Arm Fellowship** is named for Rena M. and David L. Arm, *PA E '30*, who left a bequest in 2007.

The sixth **Best Fellowship** commemorates Ina C. and Raymond A. Best, *NY Γ '33*, and is to be used by a mem-

ber for the purpose of acquiring an M.B.A. at Rensselaer Polytechnic University.

The **Centennial Fellowship**, given to that fellow who the board determines is most outstanding, commemorates TBPI's 100th anniversary.

The **Dodson Fellowship** is named for Charles R. Dodson, *MD B '30*, who made generous gifts to TBPI in 1998 and 1999. A total of 60 scholarships and 3 fellowships have been awarded to date.

Two named awards are sponsored by the late William Fife, *CA A '21*, who bequeathed the earnings of an irrevocable trust for TBPI fellowships. The **Fife Fellowships** are named in honor of his father, James.

The fifth **Forge Fellowship** is awarded this year and is named for Charles O. Forge, *CA Γ '56*, who left a bequest in 2010.

GEICO sponsors the inaugural **GEICO Fellowship** this year.

The tenth **Hanley Fellowship** is awarded in honor of Mary A. and Edward P. Hanley, *IL B '42*, TBPI Fellow No. 84, who left a bequest to TBPI in 2007.

Harold M. King, *MA A 1910*, was TBPI President from 1954-58 and took a special interest in the student branches of the national technical societies. The **King Fellowship** is awarded for the fifty-fifth time to recognize outstanding participation in volunteer technical societies.

Two fellowships recognize former Secretary-Treasurers.

The **Matthews Fellowship** is awarded for the nineteenth time and honors R.C. "Red" Matthews, *IL A 1902*, who served as Secretary during 1905-12 and as Secretary-Treasurer in 1912-47. Red died in 1978 at the age of 99.

The nineteenth **Nagel Fellowship** is awarded in honor of Robert H. Nagel, P.E., *NY Δ '39*, who served as Secretary-Treasurer in 1947-82 and Editor of *The Bent* during 1942-82. Bob died in 1997.

The second fellowship honoring a former TBPI President is named for Charles H. Spencer, *MI Γ 1896*, who served during 1936-47. The **Spencer Fellowship** is awarded for the sixty-first time and is presented to the member who has made significant contributions to his or her collegiate chapter.

The first **Swalin Fellowship** is awarded this year. Helen M. & Richard A. Swalin, Ph.D., *MN A '52*, left a bequest to the Association in 2015 to provide engineering fellowships and scholarships.

The **Williams Fellowship**, established to honor the Association's Founder, Edward H. Williams Jr., Ph.D., *PA A 1875*, is awarded for the thirty-seventh time to a candidate who plans to work toward a doctoral degree and enter the engineering teaching profession.

The fifth **Zimmerman Fellowship** is named for Marlin U. Zimmerman Jr., *MD A '44*, who left a gift of \$200,000 to TBPI in 2010.

Tau Beta Pi received 476 fellowship applications, the highest number in the history of the program. Board members Charles W. Caldwell, Solange C. Dao, Margaret M. Darrow, Robert E. Efimba, and Director of Fellowships Sally J. Steadman made final selections on March 28.

Tau Beta Pi Fellow No. 810

Shannon E. Anderson



Shannon graduated summa cum laude with a B.S. in biomedical engineering from Boston University, where she was President of her TBPI Chapter, and treasurer and captain of the women's club soccer

team. She spent most of her undergraduate career taking part in collaborative research with Professors Joyce Wong and Michael Smith in biomaterials and tissue engineering. She was selected as a Beckman Scholar in 2014 to research in bioactive silk biomaterials for use in neural applications. This gave her the opportunity to present a poster at the Beckman Symposium and an oral presentation at the Tissue Engineering and Regenerative Medicine World Congress, both in 2015. She was awarded a TBPI Scholarship for 2015-16. This fall, she will be pursuing her doctorate in biomedical engineering in a joint program at the Georgia Institute of Technology and Emory University. Ultimately, she plans to continue research in tissue engineering and regenerative medicine.

Zimmerman Fellow No. 5

Christopher A. Argento



Christopher graduated summa cum laude from Johns Hopkins University with a B.S. in chemical and biomolecular engineering, as well as a concentration in interfaces and nanotechnology. At JHU, he conducted

research and published with Professor Joëlle Frechette, modeling the interaction of electrostatic double layers of micropatterned, charged surfaces. He was president of the Johns Hopkins badminton club and is an active member of Maryland Alpha and AIChE. In the summer of 2015, Christopher interned at Genentech in South San Francisco, developing protein purification processes for antibody therapeutics. This summer, he will intern at IMEC, a microelectronics and nanotechnology center in Leuven, Belgium. In the fall, Christopher will begin a master's degree at Johns Hopkins in chemical and biomolecular engineering, with a concentration in nanobioengineering. After that, he hopes to help patients in pioneering ways at the interface of biotechnology and nanotechnology.

Anderson Fellow No. 10

Paige Balcom



Paige graduated with a B.S. in mechanical engineering and applied math minor from the University of New Hampshire, earning a 4.0 GPA and recognition as University Woman of the Year.

As president and project leader for Engineers Without Borders, she helped implement a potable water project in Uganda. Paige co-founded Project OASIS to design an aquaponic system in Costa Rica. While interning with ASME in Washington, D.C., she published a paper on agricultural technologies for developing nations. She researched at UNH and Leibniz Universität in Germany through the DAAD RISE program. Paige took part in the 2014 Fulbright Wales Summer Institute, studied abroad in Madrid, and represented her university at the 2015 Global Grand Challenges Summit in Beijing. Paige will return to Uganda on a nine-month Fulbright Research Grant and then join the M.S./Ph.D. program at the University of California, Berkeley, as a Chancellor's Fellow and NSF Graduate Research Fellow.

Sean M. Bittner



Sean graduated summa cum laude from Auburn University with a B.S. in chemical engineering, including a specialization in biomedical engineering, as well as a minor in Spanish. At Auburn, he served as an officer in the American Institute of Chemical Engineers and the Biomedical Engineering Society. In the Alabama Alpha Chapter, Sean served as Webmaster and Recording Secretary. He is also a five-year participant in the Alabama Alliance for Students with Disabilities in STEM, where he helps mentor high school and undergraduate students who are living with disabilities. Next fall, Sean will attend Rice University to pursue a Ph.D. in bioengineering. There, he will study drug delivery and polymeric composite development to ultimately design new biomedical products. After graduate school, Sean hopes to work in industrial research in the medical field, building on experiences at the Texas Medical Center and Bioscience Research Collaborative.

Savannah R. Brown



Savannah graduated summa cum laude from Kettering University with a B.S. in mechanical engineering including a bioengineering applications specialty and minors in biochemistry and biology. As a part

of Kettering's curriculum, she worked as a product development engineering co-op focusing on vehicle crash safety systems at Ford Motor Company. She completed an undergraduate thesis addressing variability in airbag deployment. Savannah was an integral member on the executive boards of TBPi, Pi Tau Sigma, Pre-Med Club, Society of Women Engineers, Alpha Sigma Alpha sorority, and Kettering Student Government Academic Council. She was also a first year experience class peer mentor and academic tutor for a variety of classes. Savannah will attend Case Western Reserve University this fall to pursue an M.S. in biomedical engineering with a concentration in translational health technology. Savannah then plans to be the principal facilitator in the development of innovative medical devices.

Felipe Lenz Carvalho



Felipe received a B.S. in electrical engineering summa cum laude in 2014 from Florida Atlantic University, where he was a research assistant in the biomedical signal processing lab. On completion of his honors project involving the acquisition and processing of biosignals, he went to the University of Florida and earned his master's in electrical and computer engineering with a 4.0 GPA in 2015. Currently, Felipe is working on his Ph.D. in electrical and computer engineering at UF. He is a research assistant in the lightning laboratory, and part of a group of scientists who artificially initiate lightning from ground-wired rockets to investigate the interactions of high-energy electromagnetic phenomena with the ionosphere—the atmospheric layer influencing distant radio waves. Since 2013, Felipe has held several officer positions in the Florida Epsilon and Alpha Chapters. He intends to work at a national laboratory and eventually become a faculty member at a major university.

Matthew A. Clarke



Matthew graduated summa cum laude and top of his program with a B.S. in mechanical engineering from Howard University. He has served as Vice President of DC Alpha and was actively involved

in ASME and NSBE. He was also president of the Engineers Without Borders chapter which saw him work with rural communities in Haiti, Kenya, and El Salvador. He has conducted research at MIT and Howard on mist cooling technology and aircraft topology optimization, respectively. In his senior year, Matthew formed a research group to introduce both undergraduate and graduate students to concepts frequently under investigation in aerospace engineering. He will attend Stanford University for graduate school in the department of aeronautics and astronautics. He plans to pursue a career in industry focused on the research and development of revolutionary air and spacecraft technology. With a belief in the investment of education, he later intends to re-enter academia.

Sarah A. Dean



Sarah is graduating with a B.S.E. in electrical engineering and mathematics from the University of Pennsylvania, where she was President of the TBPi Chapter. She developed a love of teaching and civic

engagement as the director of communications and technology for West Philadelphia Tutoring Project, a volunteer organization made up of approximately 300 Penn students who help students in underfunded West Philly schools. Sarah's enjoyment of teaching is also reflected in her work as a TA since her sophomore year, both for freshman level engineering courses and for integral and multivariate calculus. Throughout her undergraduate career, she worked on research projects in topics ranging from sensor characterization to bipedal locomotion, to networked neuroscience. Sarah will pursue a Ph.D. in EECS at UC Berkeley, where she intends to do work in machine learning and signal processing. After her graduate studies, she plans to continue her love of teaching as a professor.

Andrew P. Eagan



Andrew completed his B.S. in chemical engineering at Rensselaer Polytechnic Institute in May 2016. This fall, he will return to RPI to pursue his M.S. in technology commercialization and entrepreneurship from the Lally School of Management. During his undergraduate studies, Andrew worked under Dr. Koffas in a metabolic research lab optimizing the energy and material pathways in E. coli so as to maximize the efficient production of a common pharmaceutical precursor. In addition to his academic interests, Andrew enjoys playing both the piano and pipe organ as well as singing with two choirs. In the future, Andrew's goal is to leverage his engineering background in combination with his graduate work to develop and commercialize innovative environmental solutions and to contribute to the growing movement to mitigate global climate change.

Ryan A. Gellner



Ryan graduated from West Virginia University with a B.S. in mechanical engineering and honors distinction. He was an active member of the WV Alpha Chapter for two years and was Vice President dur-

ing his senior year. As an officer, Ryan helped to organize charitable and social events, including a Bubble Soccer tournament in honor of the late Charles M. Vest, WV A '63, alumnus of WVU, which benefitted the local Pancreatic Cancer Action Network. Ryan has also served alongside other college students as a leader of middle school ministry in the local chapter of Young Life, a Christian outreach organization. In addition, he has participated in two years of undergraduate research in biomechanics for stroke rehabilitation at the WVU health sciences center. Ryan plans to attend Virginia Tech to pursue a master's in biomedical engineering, studying the effects of concussions in the youth population. Ultimately, his desire is to help ensure the safety of young athletes as they play the sports they love.

Christie R. Hasbrouck



Christie graduated from Trine University with a B.S. in mechanical engineering and a minor in metallurgical engineering. She was INE Chapter President in 2014, Vice President in 2015, and joined TBIT's

national Student Advisory Board in 2015, serving as Secretary. Christie also held leadership positions in other organizations such as AIAA, ASME, SWE, and Alpha Chi. She completed internships at GE Aviation and Sandia National Laboratories, a co-op at Regal Beloit America, Inc., and an REU at Lehigh University. She volunteered in STEM outreach events such as SWE's "Introduce a Girl to Engineering Day," Trine University Math Club's "Math Kids' Night," and judging the Northeastern Indiana Tri-State Regional Science Fair. Christie will attend Colorado School of Mines to pursue an M.S. and Ph.D. in metallurgical and materials engineering, with an emphasis in welding and joining metallurgy. Her ambition is to contribute to materials joining in the aerospace industry.

Nathan C. Kemper



Nathan graduated with a B.S. in biomedical engineering from the University of Cincinnati, where he served as Ohio Beta President. Through his studies and co-op experiences at medical device companies,

he has discovered a passion for medicine and developing new technologies to improve patient care. The main inspiration came from co-ops where he observed multiple procedures and conducted tissue tests to optimize device parameters for their indicated use. He plans on pursuing this passion by obtaining an M.D. from the University of Cincinnati College of Medicine. By merging clinical experience with an engineering education, he plans to identify areas for improvement in medicine and develop novel approaches to give patients the best possible outcomes. He also wishes to further the knowledge of biomechanics by conducting additional research on tissues that currently have poor surgical outcomes. Long term, he aspires to accomplish these goals as either a cardiothoracic or orthopedic surgeon.

Cassidy A. Laird



Cassidy is majoring in biosystems engineering at Clemson University, where she ranks first in her class, and is actively involved on campus as a member of the marching band. She also does research and is involved in ac-

tivities such as vice president and service chair in the Biosystems Engineering Club, undergraduate teaching assistant, co-chair of last year's Engineers Week activities, and student mentor, to name a few. She enjoys traveling and has completed a semester studying engineering in Spain. This year, Cassidy was awarded the Samuel B. Earle Award for most outstanding senior in engineering at Clemson, and was recognized as the 2016 ASABE Yoerger preprofessional engineer of the year. She graduated summa cum laude, with a bachelor's degree in biosystems and a minor in international engineering and science. She is returning to Clemson to earn her master's in biosystems and to work on developing sustainable energy solutions. Her research will focus on algal growth with regards to pretreatment for biofuel.

Ryan S. Longchamps



Ryan, a 2015-16 TBPI Scholar and a current Advisor to the Alabama Delta Chapter, graduated summa cum laude from the University of Alabama in Huntsville (UAH) with a B.S. in mechanical engineering.

He also served as Chapter President for two years. Through a large increase in the activity and impact of the AL Δ Chapter during this time, it received the R.H. Nagel Most Improved Chapter Award at the 2015 Convention. Ryan's other primary undergraduate extracurricular pursuits included a tutoring position with the university, a cooperative education position with the Parker Hannifin Corporation, and an undergraduate research position exploring electrochemical energy conversion devices. He is currently pursuing his M.S. in mechanical engineering at UAH, continuing to make advancements in his undergraduate research. He plans to complete this degree in May 2017 after which he will pursue doctoral studies. Ultimately, he hopes his research will help to harness alternative energy more effectively.

Morgan M. Miller



Morgan earned her B.S. in electrical engineering from Wright State University. She served as Recording Secretary and then as President of OH M. She also helped to charter a chapter of Phi Sigma Rho—the

engineering sorority. She graduated with a 4.0 GPA, her department's outstanding student award, and a university honors degree. Morgan has worked to instill a passion for engineering among first-year undergraduates by working as an engineering teaching assistant. She is now working towards two master's degrees at Wright State University: one in electrical engineering and one in biomedical engineering with a focus in neuroengineering. She has a strong passion for spinal cord injury research inspired by her brother who overcame a broken neck. She plans to finish her master's and then enter a Ph.D. program where she can research applications of electrical stimulation in treating spinal cord injuries. She also plans to continue spreading her passion for engineering through teaching.

Tau Beta Pi Fellow No. 813

Robert C. Mines



Robert graduated summa cum laude from the University of South Alabama with a B.S. in chemical engineering, and minors in math and chemistry. He served as the Alabama Epsilon Chapter's Corresponding

Secretary and Sophomore Scholarship Chair, president of Omega Chi Epsilon, a student government association senator, and was an active member of the university honors program. Robert took part in two NSF REU programs: engineered bioactive interfaces and devices at the University of Kentucky, where he worked on gene therapy applications; and cellular bioengineering at Rutgers, where he tissue engineered a hepatocyte assay to screen potential weight-loss agents and optimized a "defatting cocktail" for metabolically reconditioning livers prior to transplant. Robert is a recipient of a Goldwater Scholarship and an NSF Graduate Fellow. He looks forward to beginning his Ph.D. in biomedical engineering at Duke University's center for genomic and computational biology in the fall.

Tau Beta Pi Fellow No. 814

Arman Mohsen Nia



Arman graduated at the top of his class from Johns Hopkins University with a B.S. in materials science and engineering. He started his higher education at Pasadena City College, where he was also a visiting

student at the California Institute of Technology (Caltech). Following two research fellowships at Caltech, he transferred to Johns Hopkins in 2013, and his curriculum was heavily concentrated on biomaterials and public health. He was awarded the senior design engineering award and the provost's undergraduate research award for his work on more effective therapeutic delivery platforms. Outside class, Arman served in a number of leadership positions including being a senior leadership consultant, Vice President of the MD A Chapter, and president of the JHU society for biomaterials. He was also captain of Hopkins Taekwondo team for a year. Next year, he is pursuing an M.S.E. in bioengineering innovation and design (biomedical engineering) at Hopkins where he will be developing medical devices.

Nagel Fellow No. 19

Ryan P. O'Hara



Ryan graduated as an honors college scholar from the University at Buffalo with a B.S. in biomedical engineering. He has served as the secretary of his TBI and BMES chapters, volunteered for STEM

educational outreach programs in the city of Buffalo, and found a passion for biomedical research. During his three years as a research assistant at Gates Vascular Institute in Buffalo, Ryan developed new methods for surgical planning in endovascular procedures by applying 3D printing technology. His progress is emerging in the medical industry while simultaneously giving clinicians the capability to perform procedures on accurate models of patient vascular anatomy prior to patient operations. Ryan is an Eagle Scout, an avid downhill skier and snowboarder, and a dedicated Buffalo Bills fan. He would like to develop a career in academia or industry with a strong focus in precision medicine. As an NSF graduate research fellow, he will pursue his Ph.D. in biomedical engineering at Johns Hopkins University.

Hanley Fellow No. 10

Katherine E. Riojas



Katy graduated summa cum laude from the University of Tulsa with a bachelor of science in mechanical engineering. In the fall, she will be attending Vanderbilt University to pursue a Ph.D. in

mechanical engineering. She looks forward to focusing on medical device design and fabrication in graduate school. While at the University of Tulsa, she enjoyed performing undergraduate research creating assistive devices for persons with disabilities. Katy was also the President of the OK B Chapter and was captain of the University of Tulsa women's soccer team. During the summers, Katy performed undergraduate research at both the University of Tulsa and the University of Pittsburgh. She also worked as a combustion engineer in industry and at a startup company developing assistive devices. Long term, she aspires to develop innovative medical device solutions for surgical applications.

Tau Beta Pi Fellow No. 815

Felipe Augusto Sozinho



Felipe graduated from West Virginia University Institute of Technology with an emphasis in electrical engineering systems and a minor in math. He played soccer there for four years, worked as a resident assist-

tant and peer tutor, and served as WV B Chapter President. Felipe had two papers presented in this year's IEEE southeast conference, "Comparison of IGBT Modules—Focus on High Power Systems" and "Analysis of Large Scale Photovoltaic Power System Integration into the Existing Utility Grid Using PSAT." He has also worked on another research paper, on implementation of an improved controller for microgrid voltage stabilization, as his senior project and plans to work a little further on it this summer. He is still working to secure funding for graduate school and hopes to pursue an M.S. in electrical engineering at one of the four universities where he has been accepted (West Virginia University, St. Louis University, University of Kentucky, or University of Michigan).

Dodson Fellow No. 3

Ever O. Velasquez



Ever graduated summa cum laude from the Florida State University with a B.S. in chemical engineering. He served as President of Florida Eta, was active in the university AIChE chapter, and participated

in intramural soccer and football. For research, he defended his honors thesis on liquid-liquid extraction of dysprosium with an electrochemical potential and has done various REUs at Florida State University, University of California-Irvine, and the University of Strasbourg in France. This led him to work in interdisciplinary projects ranging from 3D photovoltaic cells to geochemical structures of gallium iron oxides for computer memory applications. He has also been the recipient of the FAMU-FSU college of engineering academic leadership award, outstanding senior scholar, and NRC nuclear energy scholarship. He plans to pursue a Ph.D. in chemical engineering at the University of Texas at Austin. He hopes to pursue a career in the advancement of cleaner, more efficient energy.

Lisa Wang



Lisa graduated from Stanford University with a B.S. in computer science. She was President of CA Γ and focused on growing chapter membership, involving alumni, and expanding the service commitment. As a

teaching assistant for introductory CS courses, she designed section materials to motivate students and highlight interdisciplinary applications. Topics included localization in autonomous cars and genetic algorithms. In her senior year, she and two other students created and taught a course on artificial intelligence. It was open to students from all backgrounds and addressed technical, philosophical, and ethical aspects of AI by discussing recent research. Next year, she will pursue an M.S. in computer science with a specialization in AI at Stanford. She plans to continue research in machine learning with applications in education, e.g. by improving automated feedback in online learning. Her goal is to develop technologies that allow anyone in the world to experience good and affordable education.

Shuwen Yue



Shuwen graduated from the University of Alabama with a B.S. in chemical engineering and chemistry with minors in mathematics and computer-based honors. She served as Director of Community Involvement

for the AL B Chapter and also president of the university's ACS student chapter. In her undergraduate research, Shuwen applied computational methods to study thermodynamic properties of biomass derivatives in biomass conversion, designed ionic liquid membranes for carbon capture, and synthesized heterogeneous catalysts used in chemical manufacturing. She hopes to continue research in the field of energy as she pursues a Ph.D. in chemical engineering at Princeton University. Ultimately, Shuwen plans to enter a career in academia. She engaged local high school students when she taught basic science and engineering concepts to inspire careers in STEM fields. Shuwen also co-founded and serves as director the Greener Tide Project, an initiative to increase recycling on UA's campus.

Kasra Zarei



Kasra graduated with highest honors in a dual degree program in biomedical engineering and biochemistry from the University of Iowa. He served as president of the IA B Chapter and has been involved

in teaching assistantships, academic programs, business-related endeavors, and other activities on campus. Through his independent research projects, Kasra has published several papers and conference abstracts, most notably his first-author work on a novel method he developed to accelerate glaucoma animal studies. He also worked on another first-author publication on his basic science research work combining engineering and biology for the NASA Base Grant. Kasra has been recognized as a Goldwater Scholar and received other local/national awards. He has a deep commitment to science communication, outreach, and education. During his doctoral studies, he plans to continue his research in ophthalmology/engineering, focusing on screening measures and image-aided detection of eye diseases.

JOIN THE EXECUTIVE COUNCIL—CANDIDATES SOUGHT

As Vice President Norman Pih noted in his Council's Corner [page 2], the proposed changes to the structure of the Executive Council have been ratified and are in effect. With these changes in place, the Association is looking for members interested in serving on the Executive Council. The 2016 Convention will elect three members to join the existing five members and serve for the 2017-20 term.

Tau Beta Pi's Constitution and Bylaws, particularly Const. Article III, Secs. 3, 4, and 5, delineate the nominating and electing procedures and the Council's responsibilities. Due to the timing of the ratification, the Convention's desire to move forward with the expansion, and the transition period to the new structure, nominations for the Executive Council will remain open through Convention. However, members are encouraged to contact Headquarters by August 1, 2016, so nomination packets can be processed and biographies can be printed in the fall issue of *The Bent*.

Members should send a current resume or curriculum vitae along with a signed letter of interest indicating the members' qualifications to serve on the Executive Council to the Executive Director at tbp@tbp.org. The Executive Director will work with candidates needing a formal

nomination from an alumni or collegiate chapter.

The Executive Council is looking for members with experience in a variety of functions—management, finance, teaching, business, research, etc. Members with knowledge in the areas of image enhancement, branding, and fundraising are strongly encouraged to consider running for Executive Council.



Executive Councillors should be able to attend three to five in-person meetings each year, plus an additional teleconference each month. They should plan to attend the annual Convention, usually requiring five days including travel.

Executive Councillors are asked to also make several trips per year for new-chapter inspections, installations, and District

Conferences. Councillors typically attend two District Conferences each year.

Candidates are encouraged to attend this year's Convention in San Diego. Although candidates must cover a portion of their own expenses, the Association will provide on-site expenses plus prorated travel expenses up to \$5,000 total for all candidates combined.

Additional nomination details are available from Headquarters.

Wireless Wake-Up Call: A New Paradigm in EMF Science

By **Jeremy C. Johnson**, South Dakota Alpha '98

I BEGAN TO QUESTION the trajectory of our culture five years ago when a bank of wireless smart meters was installed below my bedroom in San Francisco. Within a week, my wife and I were experiencing headaches, insomnia, tinnitus, heart palpitations, and fatigue.

We had never experienced these symptoms before and when we left our house, they diminished. After some research, I found the same thing was happening to thousands of people throughout California and other states and countries where wireless smart meters were installed.¹

This set me on a journey to learn as much as possible about how electromagnetic fields (EMF) affect biology. I now have a website on this subject and recently gave a TED talk at TEDxBerkeley on the University of California, Berkeley, campus. This is called *Wireless Wake-Up Call* and can easily be found through an internet search.

I encourage you to watch the TED talk before reading further as the talk is a good introduction to this subject. In this article, I provide more technical analysis than a fifteen-minute talk for a general audience can allow. I will cover the basic problem with the recent exponential rise in EMF pollution, the evolution of EMF science, and possible solutions. I also describe steps you can take today to create a much healthier home from this perspective.

An Acknowledgment

Before we move on, I want to acknowledge that I realize this subject may be controversial for you. It was for me five years ago. The predominant view in our society is that electromagnetic fields are completely safe if they do not heat or shock you. Much of our economy is based upon this assumption, so one would conclude that it must be true.

My intention is not to be confrontational. It is to begin a discussion and to encourage some of the brightest minds in the United States to realize

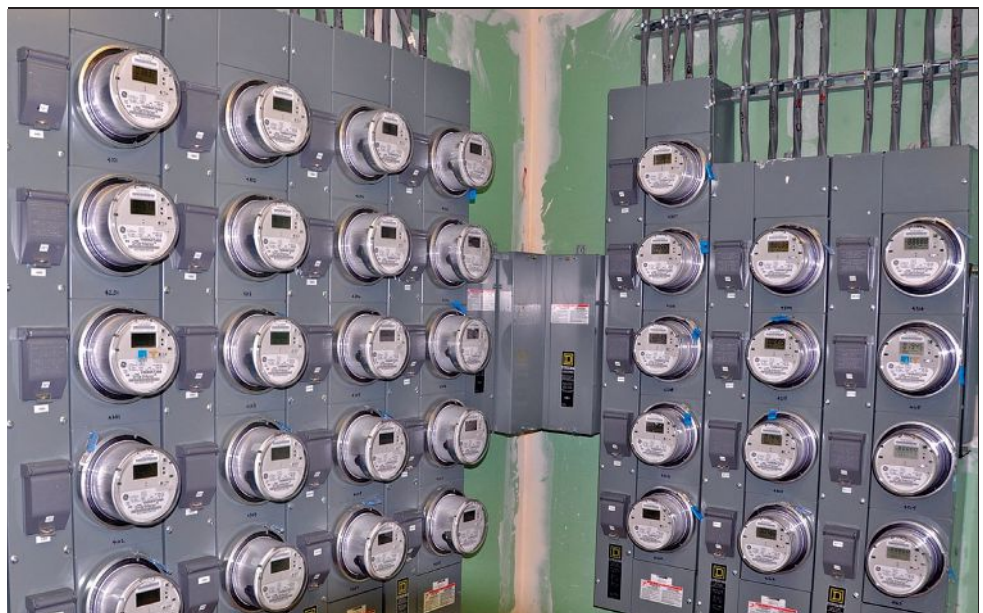
that we are not seeing the whole picture on the safety of wireless technology.

As you will see in this article and in your own research, there is now enough evidence that weak electromagnetic fields affect biology. This could have serious consequences for the future of our civilization; it is an issue we must begin to acknowledge so solutions can be created. I welcome your feedback and to furthering this discussion.

The Exponential Growth of Wireless

Our electromagnetic environment has changed immensely over the past ten years, and wireless technology is set to expand even faster in the next five. Before the invention of the iPhone eight years ago, the electromagnetic exposure for most people was quite low unless they were early adopters of wireless technology or lived next to a cell phone tower.

However, today we have nearly ubiquitous WiFi, even in schools, and additional cell towers to provide the data to everyone's smart phone. We also have smart watches, smart utility meters, smart thermostats, smart homes, and new vehicles with Bluetooth and WiFi. This increase in microwave radiation is unprecedented, but it is only the beginning.



Multi-family buildings often have a bank of smart meters like this next to units. Each wireless smart meter pulses on average 10,000 times per day, creating a dangerous situation for residents. Photo: Karen Nevis



The “Smart” Home and the “Internet of Things” may be highly profitable for technology companies, but include health, privacy, and internet security risks for families. *Image Credit: Josh del Sol.*

HOW TO MAKE YOUR HOME A LOW-EMF SPACE:

When it comes to your own home, there are four different types of electromagnetic fields that can be easily remedied. They include:

- **Microwave Radiation:** Created by our wireless technology, this has crept into our homes in the past decade.
- **Magnetic Fields:** Home wiring errors, stray current and major powerlines can create high magnetic fields in a home. Most homes have two to three wiring errors that can be easily corrected.
- **Electric Fields:** Standard Romex wiring can create high electric fields in a home. This can be remedied by turning off circuit breakers to the bedrooms at night. If you are remodeling or building a new home, use MC Cable or EMT conduit with compression fittings, which will greatly reduce electric fields.
- **Dirty Electricity:** Electromagnetic interference (EMI) will be put in your home wiring by dimmer switches, CFL and LED lighting, certain electronics, and solar inverters. By reducing and eliminating these sources of EMI (you can purchase incandescent bulbs online), the power quality in your home will be much healthier.

You can measure each of these four types of electromagnetic fields or hire an EMF consultant in your area. I explain how to do this for yourself on my website. Once you locate and remedy each of these types of electromagnetic pollution, your home will be much healthier for decades to come.

The next phase is the “Internet of Things,” which will connect everything we purchase to the internet with its own IP address and wireless transmitter. The “connected home” of the future may have up to one million bursts of microwave radiation pulsing through it each day.

To make all of this work and to circumvent the community review process for cell tower siting, wireless companies are now joining with local governments to put powerful cell antennas on utility poles, often just 10 to 20 feet from homes. This is called the Distributed Antenna System (DAS) and is currently being rolled out in cities such as San Francisco, where new antennas are being

placed on most city blocks.² Many cities in the United States will have this system in coming years.

To add to this, Google and Facebook are competing to provide their own internet service. Through projects such as Google’s “Project Loon,” which will put up balloons with WiFi antennas at 60,000 feet³ and Facebook’s proposed 60 GHz

Terragraph WiFi system,⁴ we have entered a new era of electromagnetic exposures. However, this is all being done on the assumption from a previous era that pulsed microwave radiation is completely safe.

The Primary Controversy with EMF

Our society’s EMF safety guidelines are based on thermal standards. The idea is that if non-ionizing electromagnetic fields do not heat you, then they cannot possibly hurt you. Even though there is plenty of evidence that non-thermal EMF exposures cause biological damage, this evidence is repeatedly dismissed by the private bodies and government agencies that set safety standards.

The reason for this is quite practical. In the 1950s, after the development of radar in WWII, the military and industrial applications of microwave technology were seen as a higher priority than any potential ill effects on health. They reasoned the Cold War and economic growth were more important than the possibility of illness or cancer for a segment of the population 20 to 30 years in the future.

However, the people making those decisions in the 1950s and 1960s could have never imagined that 60 years later, our society would be experiencing the tremendous boom in consumer wireless technology that has occurred. Nor could they have imagined the predicament that future political and industrial leaders would find themselves in. Today we have a situation where the growth in consumer wireless technology has created some of the biggest and most profitable companies in the world. This technology has quickly become an integral part of our economy and, lately, one of the few reliable growth sectors.

Wireless is also an incredibly popular technology that much of the population loves and is addicted to.⁵ This is primarily because of the convenience and the fact that people simply enjoy communicating.

Plus, it provides immense tax revenue and surveillance capabilities to the government through data collection. For all of these reasons, there is no politician or industry leader who will be able to admit the safety standards do not protect the public because they are not designed for the exposures we experience today.

The Evolution of EMF Science

The study of the biological effects of electromagnetic fields is a very complicated arena. It takes researchers who understand complex biological processes as well as the physics and engineering of electromagnetic fields. When studies find biological effects, they must then be replicated, but if just one parameter is changed slightly, the biological effect can be lost. Parameters include frequency, pulsation patterns,⁶ power, polarization⁷, and whether windows exist

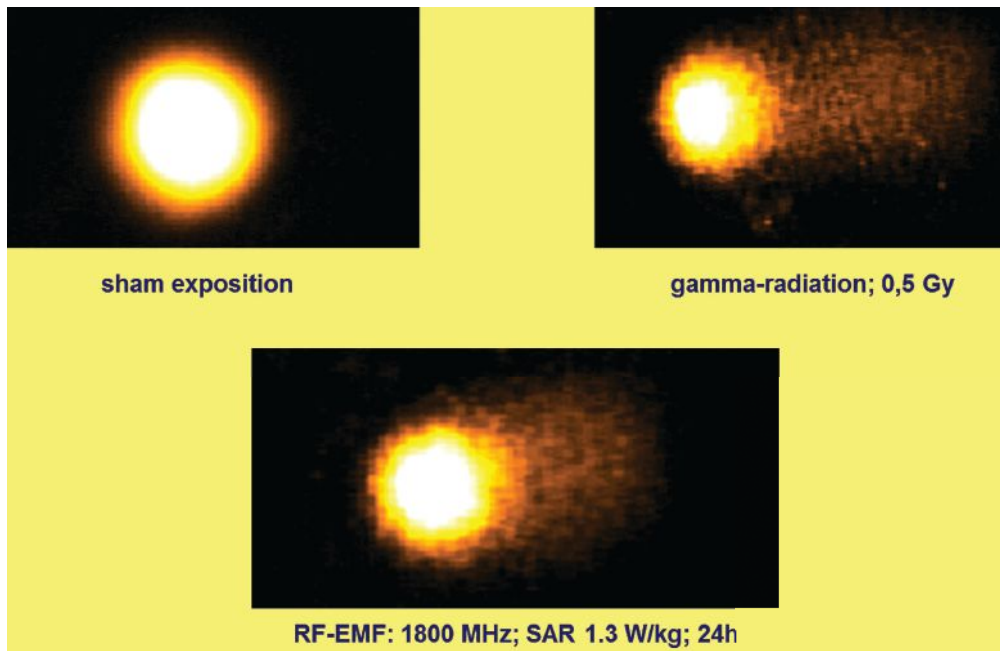
where effects can be more significant at lower power levels. Additionally, the funding to repeat studies is often not available, especially when almost all funding for this type of research comes from industry sources that may not want results that could hurt their profits.⁸

One of the first persons to discover the biological effects of non-thermal microwave radiation was Dr. Allan Frey. In 1975, he found that microwave radiation opened the blood brain barrier of rats, which is very similar to that of humans.⁹ This experimental result has been repeated in subsequent studies^{10,11} and is of great concern because the blood brain barrier plays a vitally important role in the protection of the brain from pathogens, toxins, and heavy metals.

Many other biological effects of non-thermal EMFs have been found over time.¹² They include sperm damage, nervous system disruption, cardiac/ECG changes, endocrine system malfunction, increased brain glucose levels, behavioral changes, and acute symptoms such as headaches, insomnia, tinnitus, difficulty concentrating, and fatigue. In all, over 100 non-thermal biological effects have been documented in thousands of studies on this subject.¹³ As might be expected, there are also many thousands of studies that show no biological effects from electromagnetic fields.¹⁴

One of the most disconcerting effects of non-thermal microwave radiation is DNA damage. The reason is obvious: DNA damage can lead to cancer and this critical outcome would require authorities to take action. The European Union funded REFLEX-Study looked at this exact issue. The 2004 study was coordinated by Dr. Franz Adlkofer in Vienna and the published results were very concerning for the cell phone industry and the public.¹⁵ The data showed that cell phone radiation caused DNA damage.¹⁶ This was obviously quite a surprise as it had been previously thought that non-ionizing radiation could not cause DNA damage because it was not strong enough to knock an electron off a molecule.

Not surprisingly, the study was quickly attacked and a leading industry-friendly scientist, Dr. Alexander Lerchl,



REFLEX-Study comet assays show similar micronuclei results (DNA strand breaks, genotoxic effects) for both gamma and microwave radiation from cell phone exposure.¹⁶ Image Credit: Clinical Chemistry, Free University of Berlin

10 Steps to Cut Down Your Wireless Exposures

1. Use your cell phone wisely. Never put it to the head. Use speaker phone or an "air-tube" headset. Avoid putting an operating cell phone in a front pocket of a shirt or pants.
2. Turn off all antennas in your settings (Cellular Data, WiFi, Bluetooth, etc.). You can still send/receive calls and texts, but the phone will not ping the network every few seconds.
3. Use your smart phone as an alarm clock by putting the phone in "Airplane" mode while you sleep.
4. If you have WiFi in your home, plug the router into a simple Christmas light timer so it is off while you sleep. When we sleep is the most important time to have a low-EMF environment.
5. Move toward a wired home. You can turn off the WiFi functions of your router and use Ethernet cables to access data for your computers and devices.
6. Know that distance is your friend when it comes to EMFs. Being 50 or 100 feet from a neighbor's WiFi router is much safer than having a router next to your desk.
7. If you have a home phone, use a wired version rather than a cordless DECT phone that radiates 24/7.
8. Advise new parents to ditch their wireless baby monitor. They are incredibly strong emitters and are often within a few feet of a sleeping infant. Google "Safe Baby Monitor" for better versions.
9. Join parents around the country in demanding that schools be wired. There is no reason to bathe children in strong WiFi for years when safer Ethernet and fiber optic solutions exist.
10. Avoid the "smart" home and wireless "smart" meters. These are part of a new push for the "Internet of Things." This technology will exponentially increase microwave radiation exposures in your home.

stated that the data must have been faked. The resulting media storm and pressure on the researchers and their universities diminished the impact of Dr. Adlkofer's study and prevented the use of European Union funds to further the research. However, after a full review and investigation, the research results stand and in 2015 the Hamburg District Court in Germany forced Dr. Lerchl to recant his allegations and convicted him of defamation and libel.¹⁷

EMF Activation of VGCCs Increases Free Radical Production

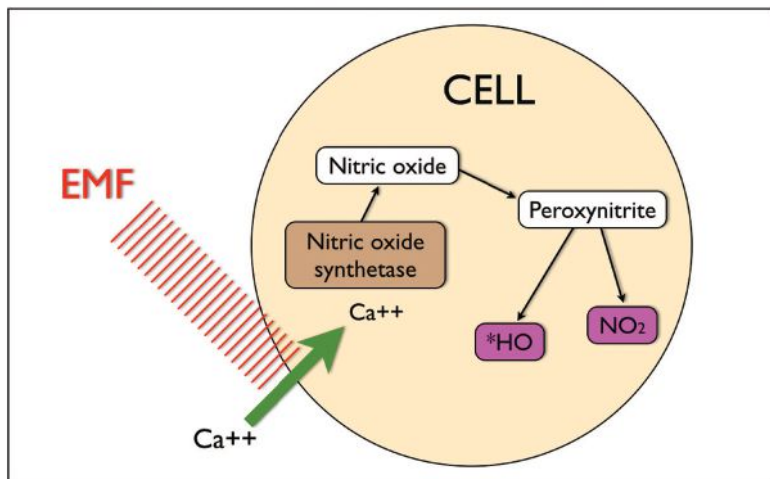
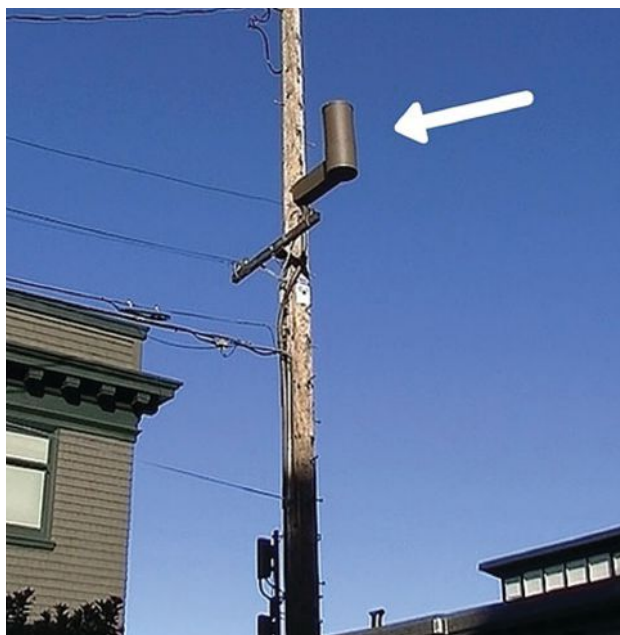


Image Credit: Dr. Paul Dart and Dr. Martin Pall



A DAS cell antenna in San Francisco. Thousands of these small but powerful antennas have recently been installed throughout the city, often directly adjacent to residences. Image Credit: Jeremy Johnson

Lerchl made the news earlier in 2015 for another reason. He was the head of a study that was a replica of a 2010 research project¹⁸ that found weak 3G cell phone signals promoted tumor growth in mice.¹⁹ The positive results of his study were another blow to the cell phone industry. They confirmed that when mice are exposed to a known cancer agent, ENU, in the womb, and then also exposed to 3G cell phone radiation, there was a significant increase in tumor production over the mice that had been exposed only to ENU.²⁰ In a press release from Jacobs University in Bremen, Germany, Dr. Lerchl stated: "Our results show that electromagnetic fields obviously enhance the growth of tumors."²¹

This is a significant change for a leading scientist who has spent the past couple of decades publicly stating there is no good science showing non-thermal biological effects from electromagnetic fields. However, if research increasingly shows DNA damage and cancer promotion from non-ionizing microwave radiation, what is the biological

mechanism? For, without a mechanism, it will be difficult for scientists to fully accept this new paradigm.

A Mechanism for DNA Damage

In 2013, Dr. Martin Pall, professor emeritus from Washington State University, made a key discovery that helps us to understand this paradigm.²² Through a review of the scientific literature and his own meta-study, he found that one of the primary non-thermal effects of electromagnetic fields is the activation of voltage-gated calcium channels (VGCCs) in the plasma membrane of cells. When electromagnetic fields activate these channels, large amounts of intracellular calcium (Ca^{2+}) are produced. This excess calcium in the cells produces a chain of chemical reactions leading to the production of free radicals and oxidative stress. The free radicals then culminate in DNA damage.²³

The diagram, above, shows the basic outline of this mechanism. In short, the excess calcium directly increases nitric oxide (NO) within cells. The increase of nitric oxide can result in therapeutic effects, which is one reason why non-thermal electromagnetic fields are increasingly used in medical therapies. However, nitric oxide can also interact with superoxide (OO^-) to create peroxynitrite ($ONOO^-$). It has been found that when peroxynitrite breaks down, it creates reactive free radicals and oxidative stress within cells.²⁴ It is these free radicals and oxidative stress from peroxynitrite that are thought to be the main culprits in causing disease and DNA damage.

I encourage you to read Dr. Pall's research papers showing how this knowledge could be used to create technologies that reduce the activation of VGCCs²⁵ and also to watch his presentation at the University of Oslo in Norway.²⁶ In addition, the *IEEE Power Electronics Magazine* recently published an article on a similar mechanism for biological effects from weak electromagnetic fields.²⁷

Protection of the Public

We are now at the point where it is no longer tenable for regulatory bodies to claim that non-thermal electromagnetic fields are safe. This is happening simultaneously with the expansion of wireless technology at an unprecedented rate. Unless something is done, within five years much of our civilization will be filled with levels of microwave radiation that are known to cause disease.

In the United States, the one regulatory body that could change the course we are on is the Federal Communications Commission (FCC). This body sets the legal exposure limits. However, its primary objective is actually to increase and monitor the advancement of wireless technology. The health of the public is not its primary concern, nor even its job. This is likely why the FCC only protects the public from thermal exposures.

To further complicate this matter, the FCC is believed to be heavily influenced by the wireless industry. In 2015, the Harvard School of Ethics and journalist Norm Alster published a report on this called "Captured Agency."²⁸ Mr.

Alster details how the revolving door between the agency and the industry it supposedly regulates is endangering the public. You have to look no further than the head of the FCC, Thomas Wheeler, who was once the top wireless lobbyist in the country. Former FCC commissioners also lead prominent wireless lobbying organizations.

It should be noted that Norm Alster wrote about the Dot Com crash and the 2008 Financial Crisis before they occurred. That he would now turn his considerable journalistic abilities toward this issue is very telling.

One of the most striking aspects about the FCC is that the agency does not have the expertise to determine the safety of electromagnetic fields. It is legally tasked with one of the most important public safety issues, but essentially takes no responsibility. Instead, it counts on private and semi-private scientific organizations to inform it. These include IEEE, The American National Standards Institute (ANSI), the National Council on Radiation Protection and Measurements (NCRP), and a German chartered NGO called the International Commission on Non-Ionizing Radiation Protection (ICNIRP).²⁹

Private Organizations Set Safety Standards

One of the primary organizations that western governments, including the United States, use to set microwave radiation safety guidelines is ICNIRP.³⁰ However, there is a problem with using private bodies for something as important as public safety. Small, private clubs can be easily manipulated by lobbying and by pressure from industry and military interests.

Private organizations can also self-select members who have a certain bias toward EMF science without comment or input from the public. This is a highly undemocratic way to choose the people who are responsible for determining if the technology our children and grandchildren use on a daily basis is actually safe.

Prof. Dariusz Leszczynski of Finland is an accomplished RF scientist who has written about the dangers of this situation. He was on the thirty-one member WHO International Agency for Research on Cancer committee that in 2011 determined non-thermal microwave radiation is possibly carcinogenic (Class 2b Carcinogen).³¹ In a recent article, he noted that the current ICNIRP members and new members coming in for the 2016-20 term are known to have identical opinions on EMF safety:³²

- RF-EMF does not cause any health effects.
- Human sensitivity to RF-EMF does not exist.
- The only biological mechanism for RF-EMF is thermal.
- Non-thermal biological effects do not exist.

If our safety standards are set by an unaccountable private body made up of members who already have a bias against the considerable science showing detrimental non-thermal EMF biological effects, then it is likely we are setting up for a major health crisis.

A Path Forward for Society

What I have shared thus far could be considered the bad news. The good news is that solutions do exist. On a personal level, there are many things you can do to

make your home, office, and children's schools safe from an electromagnetic perspective. In the two sidebars accompanying this article, the basic steps you can follow are clearly laid out. By taking these steps, you can begin to minimize exposure levels for you and your family until political will arises to create solutions on a broad scale.

Solutions also exist on a societal level and this is where engineers can be of immense value. One of the primary solutions is to wire our society with optical fiber. Using light to transmit data creates no electromagnetic fields, except at the switches. Fiber optics is also "future proof" because it provides nearly unlimited bandwidth. This will allow technology industries to prosper as bandwidth is no longer a limiting factor. Finding inexpensive ways to bring fiber optics to and within every home will be a boon. Companies are already doing this^{33,34,35} and one in Germany and Austria has developed a technology that turns existing copper wiring into fiber optics by extracting the copper and blowing in optical fiber.

We can also create safer products. This includes lowering the radiated power of consumer wireless devices so that the emissions are not just within the FCC guidelines, but at levels that are determined to be safer for users. Research will be needed for this, but based on the work of Dr. Pall, it may be possible that there are certain wireless frequency, polarization, pulsation, and power combinations that have minimal biological effects. It will take very complicated research to determine these windows, but once we admit we have a problem, this work can begin in earnest and will help society tremendously.

For now, one of the most important things we can do is to limit the rollout of wireless technology to only necessary applications and in ways that do not directly overexpose humans, especially children. Our carefree expansion of wireless technology must come to an end. A more intelligent way forward is needed if we are to have a technological society that is also safe for humans.

I believe that acknowledging the importance of this issue will move our society forward. It will also birth entire industries devoted to creating safer technology. Billion dollar companies can be created in this new frontier. You may already have an idea that will serve the parents who are now demanding safer technology for their children. As engineers, creating a healthy society with incredible technology would be a true paradigm shift and one of our greatest achievements. I hope you will join me in this grand endeavor.

• For links to references, visit: www.emfanalysis.com/tbp



Jeremy Johnson has a B.S. and M.S. in civil engineering from the South Dakota School of Mines & Technology. He was President of the SDSM&T Tau Beta Pi Chapter from 1998-99. Jeremy has spent his career in Silicon Valley with his focus for the past five years being the health effects of electromagnetic fields and solutions for safer technology. You can learn more and contact him at www.emfanalysis.com.

STEM Nights in Move to Inspire Elementary Students

Alumni Help to Organize Community Event for Kids and Parents

By **Lisa S. Kim**, Michigan Gamma '90, and **David T. Preissig**, P.E., Iowa Alpha '96

A NATIONWIDE PUSH to encourage students into disciplines of science, technology, engineering and math (STEM) hopes to provide qualified people for technical and teaching roles in our nation's research and industry facilities. Engaging students with exposure to these fields in elementary school could motivate them to be proficient in math and sciences, encourage college-readiness, and inspire them to practice such expertise in our modern economy with a fulfilling STEM career.

Naperville, IL, School District 203 recognized the national effort and assigned Meadow Glens Elementary School to conduct a STEM-focused event. The School-Family-Community Partnership (SFCP), a parent-teacher organization, was tasked to achieve this in the fall of 2014.

The group's first idea was to model it on the school's successful International Night, an event that relies on the school parents to demonstrate aspects of their cultural heritage. Another idea for STEM Night was based on larger STEM expositions nearby, notably one held each February at the Illinois Institute of Technology (IIT) Wheaton campus and another at Northern Illinois University (NIU) in DeKalb. Each of these remarkable events for children provide a day-long showcase of numerous disciplines, mainly relying on professional organizations and student groups to demonstrate STEM topics. Our group decided to style our event as an open-house exposition, and several parents within SFCP quickly volunteered their companies—the best of both worlds!

An important step for planning this type of STEM

Night was to assemble exhibitors. An invitation along with a response form were prepared that SFCP parents could use to recruit any company, friend, or colleague. Next, our organization contacted those parents who offered their professional affiliation along with any parents readily known to have careers in engineering or science to identify contacts. Then, the IIT STEM event coordinator generously provided contacts from nearby organizations that exhibit at their event to add to our growing list. This was further expanded by writing to nearby technological or scientific organizations and businesses including city and county departments, the public library's technology lab, a high school robotics team, and an environmental outreach organization. A GoogleSheet helped track correspondence, and we quickly realized an abundance of local STEM businesses and organizations.

Core Planning Team

A core planning team of parents assembled to imagine how our school could accommodate this event and understand what tasks would be needed to arrange it. The team had to determine many details including table layout, formatting program booklets, and coordinating a large number of volunteers. The planning team also determined various forms of publicity would be important at different junctures of the school year to promote the event among school families, including an art contest for the program logo that was organized by the art, music, and gym teachers. The team also planned a "hospitality room" with donated items solicited from local restaurants and parents, to show appreciation for the volunteers and exhibitors who offered their time to make this event possible.

Our event was constrained to two hours on a weekday evening so that existing custodial staff could support the event logistics. But emulating the exciting celebration at IIT, a marquee presentation was planned as a highlight of our first event.

As the first-ever STEM event took shape, excitement grew among staff with each announcement of plans. Many teachers volunteered to work the sign-in tables, monitor hallways, and host the hospitality room. Custodians helped obtain additional tables from other district schools. Excitement among teachers spread to excitement among students.

Our 2015 STEM Discovery Night was a tremendous success, thanks to the 28 companies

PHOTOS: LEFT: Robert Humphreys introduces flight concepts to young minds. TOP RIGHT: Local astronomers brought lessons indoors since cloudy weather persisted.



and several of our teachers that all provided such enlivening exhibits. We were also honored to obtain the enthusiastic support of our U.S. Representative Bill Foster (11th District of Illinois), who is the only physicist in Congress and has personal experience with vital research projects and studies at nearby Fermilab.

The evening kicked off with an introduction by the school's principal, followed by a raffle of items contributed by generous companies, an inspiring address by Congressman Foster, and a captivating display of cryogenics by Fermilab's "Mr. Freeze."

A total of 450 people attended our first STEM Discovery Night, of which 240 were children and 210 were adults. The event was advertised only within our school's communication channels, because our space was limited and might only accommodate the families that attend Meadow Glens Elementary. Nonetheless, word of our event had spread and families from nearby schools and neighboring communities were gladly welcomed.

Valuable Lessons Learned

After the event, an exit survey found resounding support and few complaints. The most frequent complaint from parents was not having enough time to see all the exhibits. The planning team concluded that a future event should eliminate the raffle and presentations to maximize viewing of the exhibits during the allotted time. The late spring date was problematic for some children already committed to outdoor activities. The team also felt it should be held earlier in the spring, but not so early that snow might cancel the event. A mid-March date, Pi Day 3.14.16, was a perfect date both chronologically and allegorically for the second STEM Discovery Night!

A core team assembled again in the fall of 2015 to prepare for the Pi Day STEM night. Planning was understandably smoother. The date was determined at the start of the school year, and this additional time allowed us to expand the list of organizations and companies invited. Parents and teachers would be asked early for their assistance, since over 40 volunteer slots were identified—from baking goods, to arranging tables, assisting exhibitors, greeting at sign-in tables, and cleaning up.

For this year's event, TBPI was a significant factor in expanding our contact list. We emailed Tau Beta Pi Headquarters for ideas to help grow our event, and Director of Alumni Affairs Tricia Gomulinski graciously offered assistance by emailing many individuals with Chicago-area connections. This quickly supplied a terrific array of unique and committed companies that no one in our parent-teacher organization could have imagined.

A new aspect of STEM night was adding time at the beginning for children with special social, emotional, physical, or learning needs. The school administration



added this time so a quieter environment would be available for these children and their families. This turned out to be special moments for those children as well as for us.

After many hours of planning, our 2016 STEM Discovery Night at Meadow Glens Elementary was also a great success. For two-and-a-half hours in the hallways and gymnasiums, the 40 exhibits amazed and motivated both children and adults. These hands-on and engaging demonstrations were provided by over 30 of the regions' premier science and technology companies and organizations as well as many inspired teachers and parents from our school community. Our parent-teacher organization is extremely grateful to these professionals and to the 50 parents and teachers who helped. This year, 200 families attended of which 250 were adults and 270 were children, representing more than half of our school's enrollment.

Our STEM nights were successful not only because they inspired the children, but also because they engaged school parents and created partnerships in the community. The event was a way for parents to give their time uniquely to the school and to express to their children the importance of a STEM education. By engaging more parents in school activities, the school community grows to further benefit our children. Both the school and district recognize that the exhibitors' participation that night was but one example of partnerships from within the surrounding community that gives our students unique learning experiences at their school.

Tau Beta Pi provided a valuable school-community partnership for our event, and we are grateful for the support of Headquarters and local active members. Tricia's emails to area Tau Bates linked us to the Boeing Corporation (Leo L. Engstrom, Jr, *Iowa Alpha '87*), Experimental Aircraft Association 461 (Robert L. Humphreys, P.E., *Pennsylvania Iota '68*), and Morey Corporation (Alan J. Mindlin, *Missouri Gamma '80*). We are also grateful to the Chicago Alumni Chapter, with assistance from Jeffrey G. Heng and President Josh Larson. We look forward to continuing relationships with TBPI and these organizations to make next year's event even more fulfilling for our students and continue to raise the awareness and interest in STEM.

North Carolina Zeta Installed



PHOTOS: COURTESY OF WILLIAM E. HOWARD

Charter Presentation

Curtis D. Gomulinski; Joseph P. Blackford; Andrew R. Cutrell; Ricky T. Castles (left to right)

NORTH CAROLINA ZETA was installed as a Chapter of Tau Beta Pi at East Carolina University on March 19, 2016. President Joseph P. Blackford was the official installing deputy of the Society's 252nd collegiate chapter, assisted by Executive Director Curtis D. Gomulinski, Director of Alumni Affairs Tricia E. Gomulinski, and District 4 Director Russell L. Werneth.

The 2015 Convention granted a chapter to the East Carolina University Engineering Honor Society, represented in Providence, RI, by Andrew R. Cutrell, president; Amanda K. Grandy, vice president, and Ricky T. Castles, Ph.D., VA B '03, chief advisor.

The Science and Technology Building on the campus was the site of the formal ceremonies of initiation and chapter installation, witnessed by Donald B. Boldt, IA B '57; Evelyn C. Brown, Ph.D., VA A '96; Ricky T. Castles, Ph.D., VA B '03; Atul K. Goel, NY O '82; Brent W. Reed, P.E., OH O '68; Stephanie T. Sullivan, Ph.D., IN Γ '90; and Joseph H. Wilck IV, Ph.D., P.E., VA B '04.

The initiation team included: Morris G. Armstrong II, NC E '16; Andrew R. Cutrell, NC Z '16; Amanda K. Grandy, NC Z '16; O. Hayden Griffin Jr., Ph.D., TX B '70; Suzette Morales, NC A '09; Michelle Nanney, TX Δ '96; John C. Reis, Ph.D., OR A '77; Cameron B. Solomon, NC E '16; and President Blackford and Director Werneth. Twenty-four undergraduates and sixteen alumni (identified on the facing page) comprise the charter members.

Immediately after the formal initiation, the new mem-

bers were constituted a new chapter in the ceremony of installation conducted by President Blackford. The ceremony included the formal election and installation of the chapter's charter officers and advisors (identified below).

A banquet followed the installation ceremony where President Blackford, Executive Director Gomulinski, and District 4 Director Werneth welcomed the members of the newest chapter and encouraged them to actively participate in their local collegiate chapter and as alumni.



First Officers

Advisor O. Hayden Griffin Jr.; Treasurer Christina M. Mitchell; President Andrew R. Cutrell; Chief Advisor Ricky T. Castles; Corresponding Secretary Leela D. Goel; Advisor John C. Reis; Recording Secretary Christopher P. D'Agostino; Vice President Amanda K. Grandy (not pictured: Advisor Evelyn C. Brown).



Student Initiates

Front row (L-R): Sara E. Abshire, Travis S. Albrecht; Samuel J. Axtman; Nicholas C. Garcia; Grace A. Baran; Andrew R. Cutrell; Christopher P. D'Agostino; Matthew C. Edwards.



Student Initiates

Front row (L-R): Vincent E. Holley; Tyler S. Martin; Leela D. Goel; Brian C. Garrett; Stephanie M. Humphrey; Amanda K. Grandy; Jalen M. McLean (not pictured Mikaela L. Howell).



Student Initiates

Front row (L-R): Jacob W. Swink; Christina M. Mitchell; Austin T. McPherson; Evan L. White; Collin W. Stancill; Dana J. Taylor; James A. Parker; Michael J. Jaeger.



Alumni

Left to right: Victoria L. Miller; Thomas O. Bridgers; Cameron C. Cook; Alexandra M. Morsch; Emily D. Moody; Chad Merewether; Lisa M. Eckert; William E. James.



Alumni

Left to right: Joseph R. Wooten; Daniel J. Woods; Brandon N. Watson; Patricia L. Pigg; Stuart K. Perry; Travis W. Norris; Barbara E. Sage; Christopher R. Randall.



Initiation Team

Left to right: Cameron B. Solomon; O. Hayden Griffin Jr.; Morris G. Armstrong II; Andrew R. Cutrell; Suzette Morales; John C. Reis; Michelle Nanney; Joseph P. Blackford; Amanda K. Grandy; Russell L. Werneth.

2016 Alumni Giving Program February-April Contributors

The names of 4,058 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 \$360,479 arrived between February 1, 2016, and April 30, 2016. Gifts received after April 30th do not appear here but will be published in the Fall 2016 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 last 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 Network for Good and are also deeply appreciated.

Donor Recognition Clubs

The names of 3,231 Tau Bates appear in this first section. They made donations to the 2016 Alumni Giving Program between February 1 and April 30, 2016, 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		

WILLIAMS CLUB

NY † Wright, Peter A. '75
OH † Rockow, Ralph Arthur '58

HEIKES CLUB

CT A Soderberg, Peter Holton '68
IA A Anonymous '69
MI † Brems, John Henry '46
OR A Smith, Richard Nelmes '57
TX H Taylor, Lee Deatherage '68

ALPHA CLUB

IN A Forney, Robert Clyde '47
Newcomb, Robert Wayne '55
MI † Clark, Walter Blue '69
PA B Bossert Jr., Warren Harris '45
RI B Brennan Jr., John Francis '81
Keddie, William Joseph '59
WVA Clutter Jr., James H. '70

BETA CLUB

AR A Brotherton, Robert H. '67
CA A Masatani, Peter James '04
CO B Hasund, Svein Harald '67
FL B Robert, Raymond W. '66
IL B Miyasaki, John K. '54
IL † Rasmussen, Warren Willis '53
IN A Clements, David '80
IN † Rice Jr., Donald Blessing '61
LA † Kitchens, Philip Hudgins '67
MO B McHenry, Steven Dale '81
NY † Denning, Peter James '64
OH A Herke Jr., Frederick Pardee '54
PA B Klingensmith, Rick Lee '82
SD A Gomulinski, Tricia Elizabeth '98
TN A Holmes, William S. '78
TN † Hall, Kristofer Brian '98
TX † Fox, Craig Alan '77
WVA Baker, David Wesley '76
WYA Schoenborn, Renee Margal '85

DELTA CLUB

AL B Drummond, Garry N. '61
AL A Fogle, Frank Risher '80
AL E Pierre Jr., Donald Stephen '90
AK A Gaddis, Bobby Langton '73
AZ B Jarvi, Theodore C. '66
CA A Ikeda, Kenneth Akira '62
Kepler II, David Edwin '75
CA † Davis Jr., Joseph S. '59
Johnson Jr., Franklin P. '50
CA E Case, Daniel Keyte '87
Chow, Chi-Hui Robert '85

Chow, Hilda Chung-Ching '85

CA † McClay, Michael Dennis '73
CA † Hickey, Robert William '88
Hickey, Jessica Ruth '88

CA T Fable, Scott Edward '96

CA Y Mukhar, Marwan John '93

CO B Kidd, T. Wayland '44

DE A Sharp III, Hugh Rodney '60

FL A Anonymous '78

Uhler, Robert Bruce '74

FL E Faske, David Gene '85

IL B Gendron, Roger Joseph '55

IL † Gross, Richard Charles '80

IN A Davidson, Charles Dean '72

IN E Dausman, Alan Vernon '77

LA A Burmeister, Jon Barth '68

Peterson, Michael L. '89

KS A Mitchell, James Edward '85

KS B Mueller, Robert Lynn '67

LA † Mohr, James Donald '55

MD B Burgio, Robert Blake '87

MA B Godrej, Adi B. '63

MA A Peterson, John William '53

MA Z Lewis, Nelson David '73

MA H Sin, Chi-Kai '88

Wotiz, Robert P. '78

MI A Colby, Kathleen Luchini '99

Colby, Dirk Joel '06

MI B Meyers, James P. '52

MI † Hopping, William D. '71

Tielking, John Thomas '62

MI E Gomulinski, Curtis Dennis '01

Lahti, Gerald Paul '59

Strebenadt, Richard Ernest '65

MI Z Quaid, Richard C. '65

MN A Stanley, Steven Francis '84

MO A Edgington, Bobbie George '69

MO † Phillip, Patrick William '98

MT A Carlson, Gene S. '64

NE A Walcott, Gwen Sharyn '82

NMB Modral, David Righter '91

Slominski, Paul '78

NY A Elwell, William Edward '78

NY B Fleisher, Richard Steven '72

NY † De Groot III, Ward Walton '54

DeGhetto, Kenneth Anselm '50

NY H Buttermann, Heidi Carol '79

NY † Bauer, Richard Carlton '66

OH A Salamon Jr., Peter Francis '71

OH B Forchione, Dennis Angelo '72

OH A Robe, Thurlow Richard '55

OH E Pasady, Ronald Chester '70

OH † Abdo, Richard Anthony '65

OK A Edwards, Paul Arnaud '87

PA A Brunner, Thomas Morris '63

PA A de Leon Jr., Manuel '51

PA Z Feldbaumer, William C. '51

Walter, Donald Kenneth '53

PA † Caramanico, Thomas A. '71

PA A Schuler, Joseph J. '80

Anonymous '90

RI B Spink, Sydney Arnold '58

SC A Roat, Suzanne D. '85

TN A Dodge, Franklin T. '60

Hopkins, John A. '88

Rossen, Howard Ward '70

Wilson, Wayne '77

TX A Adamo, Paul Magness '85

TX A Sinsye, Steven Lynn '83

TX E Sitton, Randal Warren '85

UT A Saduskas, Leonard '66

VA B Berk, Benjamin Charles '72

WAA Asplin, Lyle Irving '59

Pierce, Russell Wallace '70

Swanson, Hilmer Sigfrid '76

WVA Landes II, Junior Hamilton '64

WI A Grainger, David William '50

WI B Smith, John Gerard '87

Teague, Stephen Michael '71

Weigand Jr., Karl Russell '66

Weiss, Arthur Frank '55

IN B Conn, Richard Lee '76

IN † Jackewicz Jr., Joseph I. '75

Jones, Walter T. '64

Kelly, Robert A. '65

Zupic, Anthony M. '70

IN † Brandt, Daniel Melvin '74

Epperly, Michael P. '65

IA A Berkholtz, Nicholas E. '56

Harms, Richard P. '65

Manning, Thomas W. '64

Pride, Richard A. '47

Snyder, Merrill H. '68

IA B Schmidt, Charles C. '73

KS A Becker, Frank J. '58

Conrad, Kenneth F. '74

Meyer, Leslie D. '65

Powell, Ricky Steven '80

Reid, Jack Powell '57

KS B Patton, Robert Eugene '70

Wilson, Bryan Keith '85

KS † Hefty, Keith William '87

KY A Gould, William Howard '61

Upshaw, Wayne S. '65

KY B Dahlem, Bernard A. '51

Lambert, Linda Moore '88

Lambert, Michael Todd '88

LA A Walker, Carolyn Bell '80

ME A Blaisdell, John Robert '66

Bragdon, Reginald G. '93

Hamilton, Wayne Andrew '58

Jefts, Alan R. '73

MD A Gutsomuth, Henry R. '56

MD B Beard, James L. '67

Booth, Andrew William '64

Bryner, Nelson Prentice '83

De Oms, James Howard '68

MA A Descoteaux, Kenneth G. '89

Hamel, Peter J. '81

MA B Hirsch, Alan Robert '66

Mandell, Gordon Keith '69

McInnes, Harold A. B. '49

Petrofsky, Alfred M. '50

MA A Sullivan, Gerard F. '68

MA E Mahoney, John J. '56

MA Z Boraski, Nicholas '50

Lastella, Michael J. '72

Strzegowski Jr., Joseph C. '67

Urban, Mark '78

Penafiel, Jay Buhay '90

MI A Chiti, James D. '71

LaFrey, Raymond Richard '61

MI B Ojala, William Keith '54

Smith, Richard E. '48

Vojtech, Larry Joseph '69

MI † Burchfield, Jack Edward '56

Gromer, John David '74

Halverson, Mark W. '72

Seidel, David Allen '81

Smithies, Henry '49

Vlasic, Robert Joseph '49

Wackenhut, Thomas C. '69

MI † Dietrich, Robert William '57

Eberl, Edward G. '74

Korsich, Albert T. '52

Klimaszewski, Richard A. '65

Kogut, Kenneth Joseph '71

Wall, Raymond J. '50

MI E Boileau, James Maurice '87

Husak, Philip William '72

Morin Jr., Dornis Clinton '48

Schmuhl, John C. '71

MI Z Szafranski, Joseph Paul '66

Dymale, Raymond C. '70

Taylor, James A. '83

MI † Pivitt, Barry Robert '88

MN A Ziemer, Rodger E. '61

MS A Coley, James William '61

Owens, John Kent '65

Sims, Joseph H. '63

MO A De Young, Lance G. '65

Meyer, Roland P. '64

Sandfort, Robert Lorenz '64

MO † Gillespie, Charles K. '57

Taber, Norma J. '80

NH A Dycey, Vickie Sue '96

NJ B Boyesen, Robert Lorenz '63

Dougherty, Steven P. '64

Rice, Darren Christopher '91

Schelke, Joseph Anton '51

NJ † Dehn, Rudolph Albert '41

Riede, Bruce E. '67

Weisbrecht, Edwin H. '68

NJ A Lim, Yung Bong '87

NMA Bacastow, Jack L. '73

NY B Newman, Michael '84

NY † Anderlik, Jeffrey David '89

Geschwindner Jr., Louis F. '67

Hartung, Edward Clinton '63

Luckett, Larry W. '83

NY A Hart, Marjorie Leigh '51

Nelson, Arnold S. '50

NY E Freier, Otto Albert '70

Marsocci, Vello A. '53

Martin, Kent Richard '66

Arminski, Leslie M. '75

Urban, Mark '78

NY † Villiere, Paul Martin '50

NY K Hoffman, Thomas Edgar '50

Mastro, Noreen Louise '79

NY A Kuras, John Edward '69

NY N Rataj, Paul S. '83

Sherman, Lawrence J. '74

ZETA CLUB, CONTINUED

- Sisson, Albert E. '66
 NY E Mancuso, Richard G. '92
 Runowich, Carl Joseph '84
 NY O Ribuffo, Michael Rocco '75
 NY II Cole, David Michael '88
 NC F Vadnais, Paul A. '73
 OH A Ikeda, George T. '54
 Matkunas, Donald Miner '80
 Ockunzzi, Kelly Anne '94
 Rasbold, James Charles '83
 Soeder, James F. '72
 Stock, Daniel Lee '80
 OH B Pollock, Flavil Martin '77
 OH F Schauwecker, Harry Erich '52
 Wolff, Mark Frederick '88
 OH E Kubala, Andrew Otis '63
 OH Z Libbe, John F. '58
 Rose, John D. '82
 OH I Starr, Brian Frazier '87
 OH M Kelly, Gregory Joseph '88
 OK A Anderson, James K. '49
 Backing, Fred C. '58
 Johnson, James '59
 OK B Bobo, James Edward '77
 OR A Carlson, Burton Carter '53
 Milton, Stuart W. '84
 Thresher, Robert Wallace '62
 PA B Beecher, Gregory A. '78
 Reese, J. Mark '80
 Sterner, George R. '62
 PA G McIlvried III, Howard G. '53
 Shaffer, David Bruce '68
 Spector, Scott Jay '74
 PA A Fogel, Joel D. '62
 PA E Scott, Walter Alfred '59
 PA Z Forbes, Blair Carleton '58
 PA H Reiner, Robert E. '64
 PA O Castellani, Susan M. '84
 PA I Salyers, John Marshall '01
 PA K De Burlo Jr., Comegys R. '47
 PR A Garcia, Carlos E. '77
 RI A Healy, Henry Stephen '71
 RI B Wylie Jr., Thomas F. '51
 SC A Davis, Joseph Howard '91
 Doss, Thomas Glenn '71
 SC G Attanasio, Roger Alfred '57
 Hanes, Richard Michael '67
 TN A Baker, Jon P. '74
 Bounds, John Alan '80
 Penteost II, James Miller '69
 Whitten, James R. '59
 TN B Thomas, James Louis '77
 TN A Stewart, John Dale '78
 TX A Wells, Roger Murray '71
 TX B Bourdon III, Lynn L. '84
 Ellisen, Arthur Raymond '62
 TX G Jordan, Paul Joseph '90
 TX A Cloud, Eugene H. '67
 Johnson, Dennis Ray '74
 Kaminski, Bryan Joseph '84
 Porter, Larry Gene '64
 TX H Falk, Nathan M. '75
 UT A Endo, Thomas R. '82
 Lyman, George Randall '79
 Ong Jr., John N. '52
 VT A Scribner, Charles Franklin '70
 VA A Agosti, Steven J. '81
 VA B Anderson, Mark Evan '76
 Creslein III, William E. '52
 Friar, Billy Wade '58
 Hatfield, Bennett K. '79
 Tolson, Robert Heath '58
 WAA MacDougall, Donald Gerrard '61
 Ross, Robert Bruce '61
 Speece, Raymond Roy '54
 Williams, Donald Sidney '66
 WAB Schmidt, V. Joseph '51
 WVA Costanza, Russell Vincent '62
 Fournay, Michael E. '88
 Miller, Betty L. '47
 WV B Ashman, Michael D. '84
 Hughes II, Paul K. '71
 WI A Crooker, Thomas W. '60
 Larson, Nils Irving '58
 WI A Whalen, David Alan '91
 WYA Davidson, Steven Lee '80

CHI CLUB

- AL A Finfrock, M. Frank '51
 Goodwin, James Joseph '58
 Hill, Gregory J. '74
 Reynolds, Edgar L. '70
 Whitley III, Howard G. '63
 AL B Gray, David A. '80
 Helms, Robert Knight '61
 Hopper, Jeffrey C. '78
 Nicholson, William R. '73
 AL G Boam, Ashley Boulware '93
 Haggard, Warren O. '94
 Langner Jr., Eugene E. '52
 AL A Appleton, Robert Scott '90
 Hitt, Matthew Arnold '10
 Selby, Michael W. '88
 Hamer, Brandon T. '83
 AK A Keeney, Joseph Harry '78
 AZ A Bell, Edward A. '72
 Berg, Jeffrey Roy '93
 Davis, Robert Allen '79
 Johnson, Donald Earl '60
 Kennedy Jr., Thomas W. '59
 Soukup, David Joseph '76
 AZ B Hauptmann, Robert C. '80
 Jackson, Stephen R. '90
 Leach, David Robert '76
 Marchand, Jean M. '68
 Millson Jr., Chris '63
 CA A Ball, John William '50
 Bassett, James Harold '50
 Bragg, Robert H. '49
 Butner, David N. '61
 Dietsche, Laura R. '81
 Figueira, Michael Robert '73
 Fong, Kirby W. '67

- Gilbert, Paul Hammond '59
 Girouard, Forrest Richard '88
 Hoe, Albert '92
 Lammers, Thomas R. '50
 Reynolds, Barry D. '84
 Robson, Clayton William '58
 Van Dyke, Korbin S. '80
 Wing, Jimmie '52
 CA B Bowman, Thomas Eugene '60
 CA F Hillier, Frederick Stanton '58
 Parker, Henry Whipple '45
 Root, Steven D. '75
 Taniguchi, Brian Yoshito '77
 Conlin, Carter Barry '45
 Fernandez, Ferdinand F. '58
 Moulton, James R. '54
 Nakatani, David Takeshi '63
 Roof Sr., Dwight Ellis '57
 CA E Dobbs, Michael W. '66
 Gaunt, Arnold J. '86
 Holzman, Eric Louis '84
 McDowell, John D. '60
 Ohg, Frank '69
 Rifkin, Allyn D. '72
 Schurr, Hermann Dieter '82
 Schurr, Juliet Sagara '82
 Simsarian, Gregory G. '82
 Suyematsu, Herbert T. '58
 CA Z Welstand, Joseph Stephen '64
 Hensley, Henry P. '63
 Lampe, Fred P. '79
 Mathews, Steven Matt '69
 Mooney, Frank Carleton '58
 Nulk, Robert A. '58
 Plam, Alexander H.N. '88
 Vlahutin, Paul A. '65
 CA H Akers, Lee Lee '69
 Burrows, Stanford '63
 Rawson, Rollin F. '61
 Van Zwol, Jason '77
 Zanini, David Victor '90
 Zimmermann, Norman Bach '57
 CA O Berg, Jeffrey A. '84
 Hinker, Fred L. '68
 Lawson, Wayne A. '69
 Slater, Eric K. '67
 Weisz, Dorothy M. '72
 CA I Haan Sr., George T. '69
 Kuspa, Joseph Anthony '93
 Oei, Paul C. '87
 Schluer, David W. '82
 CA A Lieu, Tom '94
 West, Timothy Dewayne '78
 CA M Freeman, Karl Allen '89
 Lafontaine Jr., William R. '85
 Lee, Steven Yang-Sien '86
 Tucker, Naftalia F. '89
 CA N Harmeyer, Michael Allen '90
 Mayer, Robert James '85
 Shimokawa, Reyn Yukio '95
 Campbell, William James '65
 Mulvihill, Michael Edmund '60
 CA P Mullen, Merritt D. '70
 Anderson, Eric Kenneth '79
 Kraft, Lyle David '87
 Owens, Lawrence Paul '82
 CA S Radasky, William A. '81
 CA T Lee, Chin C. '70
 CA Y Davis, Sean Thearon '94
 Dawson, Carole Jeanne '85
 CA O Jenkins Jr., Lester Alfred '01
 Oatman, Brian Andrew '91
 Shelly, Ronald W. '62
 CO A Maurer, Mike Allen '87
 Trembly, Steven Alan '93
 CO B Aersstin, Franklyn G P '64
 Austin, Stephen Coe '74
 Cleland, Alan S. '60
 King, C. Judson '56
 Kucera, Daniel J. '61
 Livingston, Robert McLean '57
 Merritt, Richard George '50
 Troutman, John Leo '65
 Verges, Hugo P. '49
 CT B Bonazzo, Vincent A. '80
 Hurley, John F. '66
 Mastracchio, Robert '64
 Staiger, Eugene Harold '57
 Thompson, Gerald Franklin '50
 Zajac, Gerald E. '68
 DE A Folsom, Steven Allen '77
 Hahn, Charles R. '73
 Swope, Richard Dale '60
 DC A Gillam IV, Isaac T. '53
 Wen, William '68
 DC B Gaffney, Joseph M. '83
 Murphy, Joseph A. '60
 Orzech, Joseph M. '71
 Roberts, Carol Ann '63
 Roberts, John Paul '62
 DC F Grassel, Herbert H. '77
 Mitchell, Reginald S. '65
 FL A Doernbach, Jay Dewey '62
 Ganson, William E. '50
 Iwens, Ralph P. '82
 Layman, Robert W. '68
 Lewis, Virgil Conley '91
 O'Steen, John Andrew '67
 Vande Walle, Robert J. '72
 FL B Alvarez, Vicente '64

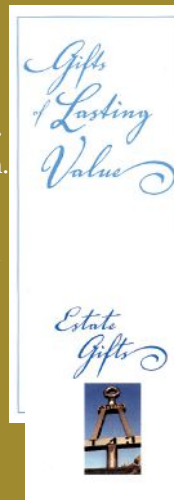
**TAU BETA PI
 PLANNED GIVING**

Tau Beta Pi's 26-page guide to planned-giving opportunities shows how your support can benefit both TBPI and your personal financial situation.

Topics include:

- Gifts of cash, stock, real estate, and life insurance,
- Charitable remainder trusts, and
- Charitable lead trusts.

To request a copy, email GivingBooklet@tbp.org or call 865-546-4578.



- FL G Duer, Edward A. '72
 Ball, Arthur Morley '70
 Brookins, Thomas Michael '81
 Dip, Anthony '86
 Fleming, Gerald Jeff '82
 Lyons Jr., Thomas Francis '76
 FL E Smith, Larry Michael '87
 FL Z Hatfield, Thomas Anthony '87
 GA A Austin, Edward Marvin '56
 Cooper Jr., Basil Pearson '65
 Dishong, Jefferson Lee '66
 Dixon, Daniel B. '63
 Hair, James Graham '59
 Hirth, Roy M. '78
 Kaduck Jr., William Walter '76
 Layden, Elizabeth C. '87
 Lorenzo, Donald Kevin '77
 Negro, James Eugene '68
 Peatman, John B. '65
 Smith, Michael Monroe '79
 Taylor, Hubbard Harvey '75
 Tundermann, John Hayes '63
 IL A Anderson, Raymond C. '50
 Beanblossom, Todd M. '80
 Chang, Milton Mow-Tack '64
 Clark, Elliot A. '83
 Elise III, Daniel Henry '73
 Ephgrave, James Thomas '52
 Hines, John William '56
 Holm, John R. '76
 Knox, Thomas David '86
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 Hansen, Peter Ernest '61
 Harris, Frederick A. '64
 Kirchoff, Dennis James '79
 Leeds, Thomas Murray '85
 Lempke, James D. '83
 McCormick, James Robert '58
 Pace Jr., George '61
 Propson, Thomas Peter '55
 Pulley, Craig M. '78
 Rogne, Timothy J. '78
 Schroth, James G. '82
 Van Zweden, John '68
 Vaughn, Wayne Allen '73
 Wilkes, James Oescroft '54
 Williams, Dean Stanton '61
 Wingard, Joseph '80
 Winter, Steven D. '81
 Youse, Rex Jacob '57

MI A Brining, Dennis W. '68
 Dauter, Walter P. '60
 Devere, Gerald W. '59
 Huber, Paul P. '57
 Smith, Charles O. '41

MI E Capraro, Michael A. '70
 Czarnota, Paul Steven '86
 Jerome Jr., George G. '94
 Klaetke, George H. '55
 Pogats, Russel Jay '92
 Sigler, David Rudolph '76

MI Z Cookman, Jordan C. '94
 Gillham, Gregory V. '83
 Kowalik Jr., John '72
 Lenz, Ronald L. '81
 Lobkovich, Thomas M. '83
 Reardon, Robert W. '74
 Roth, Maureen Lynn '91
 Verhoff, Stephen John '00
 Zywili, Gary Steven '76

MI H Allmendinger, Paul F. '44

MI O Bowen, Maureen Renee '80
 Kanfer, Marvin Elliot '71
 Messer, Bryan James '98

MI K Seymour Jr., Richard L. '97
 Sikkenga, Chad Douglas '98

MN A Adrian, Ronald J. '68
 Chapin Jr., George Gilman '47
 Halladay, Henry Earnest '64
 Hegna, Harwood Allan '69
 Hess, Craig A. '72
 Kaiser, Gary L. '70
 Loomis, Howard Burton '51
 Lucking, Rachel Mary '85
 Oss, Donald Gordon '58
 Sandell Jr., Nils Richard '70
 Schwantz, Gary Lynn '73

MS A Clements, Nathan Scott '96
 Gelman, Stephen '73
 Holeman, James M.W. '81
 Johnson, Rodger Lee '71
 Kaiser, C. Hayden '52
 Tisdale, Stanley R. '78
 Ware, Marcus '73

MS B Gray, James Michael '69

MO A Fitzgibbons, Thomas Joseph '87
 Grizzo, Ludwig Adam '58
 Manes Jr., Ezra Earl '69
 McKiernan, John William '47
 Miller, Raymond B. '53
 Ott, Ronald J. '71
 Young, Richard O. '62

MO B Agnew Jr., Lewis Edgar '50
 Bodenhamer, Steven D. '75
 Bondurant, David William '71
 Duderstadt, Edward C. '58
 Hahn, Gail Louise '82
 Hall, Johnnie Elyett '88
 Helwig, Arthur Woods '50
 McInnis, Edward Clair '71
 Myers, Kenneth R. '72
 Roam, John H. '69
 Schelin Jr., Harold Andrew '66
 Scherrer, Paul Keith '71
 Stevens II, Oramel D. '72
 Thompson, George W. '53
 Willoughby, Ronald D. '73

MO G Dyson, Karen K. '81
 Dyson, Peter Bernard '80
 Galbierz, Robert W. '64
 Lingren, Terry D. '80
 Paule, Donald W. '64
 Standridge, Charles Robert '75
 Turley Jr., Clarence Milton '50
 Williamson, Ronald Arthur '65

MT A Courville, George Eugene '59
 Jellison, Gabe Lee '98
 Kolb, Robert C. '61

MT B Aguirre, Stacy M. '86

NE A Cowling, Edgar Charles '75
 Kaminski, Wayne Alan '79
 Nelson, Stuart Owen '50
 Paxton, William Glenn '87
 Shanmugam, Alagappan '83
 Watson, Gene L. '85

NV A Jones, Keith Alan '85

NH A Amazeen, Bruce Edward '65
 Bickford, Maurice Dudley '59
 Greene, Prescott '57
 Lof, Richard J. '71
 Qualters, Kevin Robert '85
 Stephens, Jay Edward '73

NJ A Carucci, Vincent Anthony '69
 Denzer Jr., George C. '61
 Green Jr., John F. '66
 Meyer, Alfred P. '60
 Ricco, Robert P. '70
 Tibola, Michael David '84
 Wolf, Joseph Allen '55

NJ B Adams, Frank George '53
 Emmons, Harry LeRoy '40
 Errera, Samuel Joseph '49
 Futchko, Frederick '55
 Longo, Robert J. '75
 McCord, William F. '64

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What could be easier? Thank you to Arno W. Brill, TX A71, and Gerald E. Myers, AZ B70, who suggested the idea and have recently made gifts to Tau Beta Pi through this method.

For more information, contact Pat McDaniel at pat@tbp.org or call 865-546-4578.

Moench Jr., Fred R. '67
 Rshardja, Budiman '81
 Richards, John R. '76
 Sharma, Bhavender P. '69
 Shlestatk, Larry J. '75
 Wasiewicz, Richard A. '69
 Wolf, David '65

NJ G Andrus, James '02
 Bodek, Edward Joseph '51
 De Waal, Johannes '70
 Germain, Dorothy M. '73
 Husson III, Matthew A. '66
 Leach, Robert J. '82
 McWilliams, John Paul '65
 Pinto, Richard Cunha '56
 Spinnler, Gerard Francis '75
 Szabenyi, Thomas A. '69
 Tabor, Vincent J. '75
 Tubello, Jeffrey '76

NJ A Cole, Peter P. '72
 Mills, Franklin Perry '84
 Nash Jr., Raymond Allen '60
 Peters III, Fredrus N. '54
 Potts, Richard G. '64
 Usas, Alan Michael '71
 Weinmann, Winston Eason '80
 Whitesides Jr., Lawson E. '68

NM A Aragon, Frank G. '77
 Green, Jayson Dee '85
 Salas, Thomas M. '85

NM B Croll, John William '12

NY A Seader, David '67
 Baleno, Anthony Paul '66
 Glaser, Anthony J. '51
 Kaczmar, Michael J. '72
 Landau, Louis Herbert '49
 Lavery, Warren Thomas '67
 Monson, John Arthur '58
 Antelman, Robert W. '73
 Brenneman, Scott A. '83
 Capek, Thomas George '86
 Diefenbacher, Robert Henry '59
 Hopkins, Harold B. '51
 Lewandowski, Michael '96
 Maucher, Craig Allen '82
 Natale, Michael Robert '02
 Niederer, Melvin Mark '82
 Opsahl, Richard Bernard '53
 Place, Harry G. '51
 Schrier, Steven Brett '82
 Segal, Joshua L. '68
 Veldman, John Peter '70
 Yaros, Steven Francis '63

NY A Benedek, Roy '66
 Carino, Nicholas Joseph '69
 Funke, Richard H. '71
 Goldstein, Steven Mark '81
 Matyas, Robert M. '52
 Reth, Thomas B. '64
 Sasso, Joseph Allen '70

NY E Barto, Thomas Peter '70
 Duffy, John A. '71
 Hendrickson, John L. '71
 Hoffmann, Donald H. '62
 Markatos, Louis G. '65
 Mletzko, Alfred E. '64

NY Z Fontaine, Arthur '63
 Kaczmarek, Richard '73
 Schmur, Albert Alfons '62
 Shakun, Melvin F. '50

NY H Dec, Eugene Bernard '72
 Grubb, Michael A. '78
 Newman, Mitchell James '81
 Randall, Paul William '92
 Ziki, Ann Louise '86

NY I Gallo, Anthony M. '76
 Hartmann, Hans G. '70
 Hoffer, Jeffrey Norman '71
 Kayton, Myron '55
 Levy, Rami C. '92
 Liberatore, Federico '85
 Millman, David S. '72
 Schwartz, Richard '57

NY K Curtis, Johnson Ottawa '66
 Moskowitz, Ira '79
 Saueke, Alfred W. '60
 Singer, Bart A. '82

NY A Ciento, Eugene Vito '73
 Gross, Joseph Francis '53
 Madia, Michael '81
 Miller, Vicky C. '83

NY M Hansen, Jean G. '77

NY N Davis, James S. '70

Feldman, Scott '75
 Frick, James A. '83
 Hammond, Paul G. '72
 MacNeil, Randall Lewis '69
 Mann, Michael '77
 Nuding, Theodore G. '75
 Pardini, Thomas J. '77
 Boyle, Charles J. '76
 Costello, Joseph John '70
 Defelice, Nicholas J. '77
 Frawley, Robert James '68
 Machuca, Luis A. '69
 Rodriguez, Ernesto '85
 Short, Rosemarie '91
 Zipf, Peter John '79

NY O Eggleston, Peter A. '81
 Kadysewski, Stephen J. '76
 Spitz, Glenn Steven '87

NY P Hoelscher, James R. '71
 Albreo, Leslie Anthony '97
 Colella, Donald Anthony '78
 Lau, Soon '85
 Nereses, Annita '89
 Smith, Jason Stephen '95

NY T Olenik, Anthony Michael '08
 Torres, Peter '02
 Venable, Richard Robert '95

NC A Bishop, Ernest A. '73
 Clark, Jennifer Anne '79
 Cline, Arthur A. '49
 Cutchin IV, James McK. '62
 Doggett, William Ray '86
 Helms, Chester Ethane '74
 Jensen, Donald Nick '87
 Morse, Charles Allan '89
 Olds II, John Robert '87
 Sloop, Danny Hall '74

NC G Baxley, William Allison '55
 Behnken, Kenneth Charles '67
 Leo, Perry H. '81
 Peters, William T. '59

NC A Clark, Michael J. '75
 Le Grone Jr., Durall T. '80

NC E Blunk, Thomas Reynolds '92
 Crowder, Harry Richard '60
 Fay, James Maurice '82
 Hauf, Adolf W. '62
 Myrdal, Robert Wayne '51
 Nyhus, Orville Kenneth '63
 Reifschneider, Paul Henry '80
 Sack, Larry Elroy '59
 Sauvageau, Donald Richard '70

ND B Jesh, Mark Steven '86

ND A Allison, James F. '57
 Bracy, Kevin Norman '93
 Cassidy, Robert Blair '94
 Garman, Kenneth Calvin '44
 Herndon, Steven Bradford '79
 Hoh, John G. '63
 Kimmel, Paul R. '69
 Kowacki, Edward Joseph '67
 Martens, John D. '93
 Zurilla, Ronald W. '61

OH B Bach, Wayne S. '72
 Bobinger, Robert O. '69
 Cook, Kenneth Foster '74
 Lenz, Richard W. '66
 Lockard, Chad William '01
 Mayer, Robert Lawrence '69
 Nilsson, Nils Eric '71
 Oliver, Fred William '65

OH F Armstrong, Robert James '51
 Frey, Mary Ellen '89
 Mohr, John G. '63
 Nodes, Scott Everett '84
 Pladars, Valtis '56
 Price, Theodore Walter '59
 Shade Jr., Willard N. '70
 Stephonoff, Mark Stephens '79
 Stumbaugh, Gary Allen '66

OH A Hadley, Roger Adams '56
 McKittick, Ben James '60

OH E Dirks, Douglas Alan '83
 Gruszka, William '75
 Lemmers, Robert E. '82
 Seaman, Douglas David '73
 Susinskas, Kestutis P. '72

OH Z Babula, Maria '89
 Levey, Gary E. '74
 Rober, Kenneth J. '68
 Sussman, Arthur P. '49
 Woeller, Arthur Carl '70

OH H Crowder Jr., George E. '77

Davie Jr., Robert Nelson '69
 Eggers, James Arthur '72
 Freyer, Gustav John '60
 Gilbert, John E. '70
 Menna, Richard Joseph '62
 Miller, William Gilbert '88
 Niemeyer, Joseph Bernard '85
 Piske Jr., Andrew A. '70
 Centers, Robert E. '61

OH O Decker, John W. '65
 Kamowski, Dennis D. '73
 Kelly, John Bernard '67
 Miller, Michael Leo '78
 Rall, Richard Maurice '56
 Sero, Raymond James '67

OH I Boblenz, Thomas L. '63
 Marone, Victor D. '59

OH K Morrison, Robert Leroy '59
 Brattoli, Mark A. '79
 Dudek, Scott Andrew '90
 Paridon, Charles Albert '81
 Stimler, Jeff Joseph '82
 Stimler, William Edward '83

OH A Bikulege, Stanley B. '86
 Cregar, John Thomas '90
 Folk, Joseph William '98
 Hallochak, Andrew J. '77
 Oakley, Robert Ray '77
 Stiver, Alan Wayne '86

OH M Van Tassel, James H. '57

OK A Burton, Donald O. '71
 Duke, Chris '83
 Hysinger, T. Merl '63
 Patterson, John L. '85
 Wright, Roger McClain '55

OK B Hand, Ronald W. '72
 McConnell, Chuck G. '65
 Miller, Michael J. '81
 Weston, Kenneth C. '55

OK G Congram, Anthony R. '81

OR A Allen, Scotty Ross '82
 Devlin, Joseph T. '50
 Jarvis, Paul Edward '63
 Loughmiller, Bert E. '64
 Rodriguez, Ernesto '85

PA A Bakis, Charles Emanuel '81
 Bradley, Gordon Hoover '62
 Clegg Jr., Lee Milton '59
 Edwards, Alfred B. '71
 Hallberg Jr., Edwin Harold '51
 Malkemes Jr., Kenneth Lee '83
 Marshall, Steven J. '82
 Melvin, William Larkin '89
 Midkiff, Alan Haywood '85
 Muller, Eduardo E. '87
 Phelps, David Reeves '62
 Pondo, Fredric '75
 Tomkiele, Stanley Anthony '72
 Wismer, David A. '59

PA B Bova, Francesco Antonio '05
 Crecraft, Harold E. '60
 Irwin, Thomas J. '70
 Matthias, Tracey Dawn '89
 Overbaugh, Thomas M. '83
 Pasko, Thomas Joseph '59
 Pickenheim, Timothy R. '90
 Ripsom, George A. '60
 Wanenchak, Michael J. '69

PA G Kuhr, Ernestine Michelle '81
 Riedel, Frederick William '68
 Rouleau, Wilfred Thomas '51
 Sack, John Stuart '75
 Wierzbicki, Jeannette Marie '80

PA A Baxley, John Hirst '88
 Lang, David R. '85
 Long, Tian Ching '95
 Nackoney, Ogden G. '63
 Burdorf, Harriet Ann '70
 Gentilucci, Joseph A. '53
 Guest, Frederick C. '59
 Murgas, William J. '53
 Steel, Henry W. '58
 Yoder, Paul Eugene '49
 Young, Douglas Allen '86

PA Z Browne, Joseph Dominic '60
 Diener Jr., Henry Christian '51
 Duda, George E. '77
 Eisenberg, Eric Jay '88
 Fox, Ronald Norwood '69
 Holtzman, Arnold Harold '54
 Johnson, Robert Craig '70
 Kirsch, Paul Andrew '75
 Okada, Richard F. '54
 Shaffer, David E. '78
 Silvasi, John J. '70
 Squires, Stephen Lee '70

PA H Brouse, Eric L. '67
 Hackman, Timothy B. '68
 Noble, John W. '72

PA O Addotta, Robert F. '77
 Braun, James Francis '84
 Foza, Geza '63
 Lombardi, Charles G. '65
 McLaughlin Jr., Philip V. '61
 Norris, Clinton Joseph '61
 Orsatti, Louis G. '63
 Pela, Karen C. '84

PA I Lorenz, Bryen E. '76
 Sorg III, William '75

PA A Francisco, Amy Denise '99
 Gillott, Donald H. '56
 Hovanec, Andrew Stephen '58
 Kulik, David Benedict '83

PR A Archilla, Joaquin '68
 Fermaint, Carlos Juan '84
 Sanchez, Hector Luis '76

RI A Foster, Nigel John '80

RI B Matsui, Martin K. '80
 Burger, Laurie Alexander '76
 Chabson, Michael Joseph '81
 Cheever, Paul R. '52
 Kolb, Robert A. '66
 Lieberman, James '67
 Mastrostefano, Vincent A. '75
 Oliva, Stephen Arthur '67

Pavia Jr., Robert J. '92
 Post Jr., Arthur H. '57
 Silva, Ronald Ernest '74
 Smith, Robert Alan '83
 Verrier, Donald Charles '54
 Barnwell Jr., Thomas O. '69
 Brown Jr., Bevan Wood '49
 Brown, David J. '66
 Fowler, John W. '48
 Gramling, Jeffrey J. '85
 McCormac, Jack C. '48
 Wilson, Rick L. '81

SC A Frapp, Archibold Linley '66
 Lang, Christine Marie '80
 Walden, Gary R. '81

SC B Frapp, Archibold Linley '66
 Lang, Christine Marie '80
 Walden, Gary R. '81

SC I Baggett, Charlie Cleveland '63
 Barton Jr., Robert Harley '62
 Lightle, Ted L. '58
 Lucas, William R. '84
 Watkins, Terry L. '73

SD A Addy, Alva Leroy '58
 Ericson, James Michael '92
 Kretsch, Christopher Allen '06
 McCourie, Bonnie R. '80
 Shoup, Heather Zarie '95

TN A Blazier, Stephen Draper '74
 Brewington Jr., Percy '54
 Conway, Tammy Kay '82
 Fee, Gordon Gray '56
 Hutsell, Wilbur Riley '68
 Jackson, Karen E. '81
 Osborne, Bernie Bond '86
 Rogers, Marvin Dale '70
 Stewart, John Woods '65
 Tarrant, Charles Harrington '57
 Taylor, David R. '69
 Trivelpiece, Alvin William '53
 Warren, Donald Earl '71
 Whitehead, John C. '61

TN B Cook, George E. '60
 Gray, William Harvey '70
 Kammerud, John E. '70
 Morton, Wayne King '63

TN G Adams, John Anthony '63
 Dooley, Joseph Brooks '70
 Murphy, Fred Anthony '71
 Tutts, Richard Douglas '69

TN A Luttmann, Lisa M. '82
 Luttmann, Mark J. '82

TN E Cook, John Deag '01
 Funderburk, Rodger Miles '89
 TN Z Wilson, Matthew William '00
 TX A Foerster, Paul Adolph '57
 Garrett, Darrel W. '70
 Kessler, Harlan Larry '91
 Krieg, Raymond D. '60
 Nix Jr., Cecil A. '57
 Parent, Laurence Edward '81
 Peet, Ed '69
 Wales, Robert C. '65
 Wong, Lucas '84

TX B Boyd, Suzanna Ruth '81
 Jain, Ravinder K. '83
 Pasko, Thomas Joseph '59
 Koehler, Kerry Jon '92
 Moss, Michael W. '83
 Soules, James Gregory '79
 Talati, Deepak A. '84
 Valusek, John Robert '70
 Walter, Kevin Carl '88

TX F Avant, Richard Lee '83
 Dobbins, Porter K. '56
 Lesser, Herbert Arthur '60
 Tausch, Gilbert Henry '47
 Williamson, Kent A. '77

TX A Balusek, David K. '82
 Blaschke, Byron C. '60
 Bohlmann, Willy Frank '50
 Brittan, Charles L. '65
 Bunch, John Mark '81
 Crews, James A. '58
 Eng, Ronald Wey '71
 Foster, Scott A. '84
 Franke III, Henry G. '77
 Hanover, Joe Grady '40
 Kunze, Glenn Ray '77
 McClellan III, Wallace Roy '74
 McGinnis, Charles Irving '49
 Miesner Jr., Robert John '87
 Murthy, Prahlad N. '92
 Newton, Philip Lynn '67
 Paul, Thomas Charles '62
 Whitaker, Delbert Archer '66
 Wilson Jr., Edmond Doak '57

TX E Brown Jr., Thomas B. '72
 Damoff, Howard Anthony '84
 Douglas, William Johnson '70
 Martin, Samuel R. '83

TX H Benson, Marvin D. '79
 Dye, Steve Edgar '82
 Godwin, Albert Eugene '84
 Hightower, Janice M. '67
 Le, Anhnguyet Thi '90
 Loper, Thomas L. '82
 McBay, Michael R. '83
 Rivers, Larry David '75
 Springer, William Thomas '75
 Stoudt, Raymond Henry '74

TX O Goolsby, Tommy D. W. '84
 TX I Harris, E. Douglas '83
 TX K Alexander, Craig Steven '88
 Carter, Lawyer C. '79
 Jolley, Jason Oliver '87
 Coon, John W. '91

UT A Gehmlich, Dietrich Karl '53
 Jarrell, Reese P. '71
 Soss, David Albert '79

UT B Barger, Donald D. '82
 Hinman, Paul Victor '71
 Thompson, James Rowley '76

UT G Cleave, Mary Louise '79

UT A Cook, Barbara Karen '84
 Garno, Douglas Thomas '58
 Goddard, Eric H. '86

SECOND CENTURY CLUB, CONTINUED

VT B	Kloster, Mark Seawell '95	Heiskell, Jon M. '65	Luicke, Gerald '50	MI E	Berezowskyi, Oleh Daniel '76	Obernesser, Michael Edwin '59
VA A	Abraham, Ryan Thomas '09	Hill, Jo Ann Lucy '87	Mitchell, David James '94	MI E	Billion, Godwin Paul '75	Allen, Frederick Graham '44
	Ashton, Michael D. '74	Horan, Michael W. '82	Barr, Deborah Susan '81	NY A	Hill-Stramsak, Colleen Lynn '00	Hurta Jr., Gary Paul '06
	Bowen, Kelly George '82	Koerber, Matt J. '95	Hartman, Richard H. '63		Miesiak, Stephen J. '84	King, Darren Franklin '02
	Dye, Michael Loren '87	Seigman, Paul Andrew '95	Obrien, Harry Glenn '59		Nizko, Henry S. '53	Law, John S. '79
	Lee, Michael Q. '84	Vanwagoner, William T. '85	Taylor, James T. '52		Sieg, Mary H. '77	Willis III, William T. '66
	McGhee, Kenneth Hamilton '64	Farley, Robert P. '68	Wildin, Maurice W. '58	MI Z	Anderson, Bradley R. '86	Browning, Charles H. '63
	McNair, Grayson Eugene '62	CA I	Shields, Stuart L. '83	MI Z	Andon, Jerar '57	Elson, Stephen Edward '59
	Mizelle, Peter '76	CA A	Hakim, Hekma '58	KS B	Erickson, Adam Alexander '88	Ferraglio, Robert C. '74
	Rubenstein, David N. '79	CA M	Marietta, Kala J. '75	KS F	Godfrey, James E. '48	Gallo, Santo Vincent '72
	Sussman, Theodore D. '81	CA M	Miller, Laurence F. '64		Miller, Gene H. '67	Reber, Raymond Andrew '63
VA B	Brockenbrough, Thomas W. '42	CA N	Roberts, Thomas Carol '70		Tidrow, Raymond A. '65	Wolfson, Herbert L. '62
	Cassell II, Ray Vaughn '88	CA N	Heaberlin, James L. '56	MI H	Cole Jr., James J. '78	Yamasaki, Akira Arthur '51
	Haight, Roger Quentin '82	CA E	Long, Robert Ritchey '84		Leonard, Mark L. '84	Fallet, George '57
	Maloney, Melissa Marie '90	CA I	Patton, Bradley Davison '76		Longenecker, James R. '94	Hamm Jr., William L. '67
	Powell, James Davis '77	CA P	Cooper, Brian Edward '88	KY B	Cooper, Brian Edward '88	Sarcoma, Roy D. '68
	Smith Jr., Sidney C. '63	CA P	Moore, Richard William '71		Long, Michael C. '84	NY H
	Tacey, Charles Frederick '75	CA S	Reynolds, Joseph Carter '48	MI O	Stade, Phyllis R. '82	Badalamenti, Salvatore '75
VA G	Lashomb, Susan M. '83	CA S	Tockstein, Carl D. '74	MI I	Maue, Susanne C. '92	Diamond, Joseph E. '56
VA A	Bunch Jr., Jennings B. '50	CO A	Arman, Ara '55		Evans, Mike Edward '96	Welk, William '79
WA A	Coombs, Gregory Allen '77		Evans, Alfred Woodson '51	MN A	Barrows, Kenneth C. '56	Wolf, Murray '48
	Dean, Kenneth Jay '49		Hodapp Jr., Albert E. '61		Betterman, Larry R. '92	NY O
	Grant, Patrick William '75		Petitbone, John Baptiste '86		Cabak, Michael Richard '55	Chiang, Brian David '08
	Levin, Marc E. '80		Rider Jr., Milton J. '08		Grill, Susan Marie '82	Godlove, Katie Ann '02
	Miller, Stefan John '63	CO B	Slade Jr., Bill Ernest '61		Han, Keesook Julia '91	Harris, Everette C. '76
	Royalty, Christina '85		VanDeWeghe, Peggy Pitre '85	LA B	Malin, Wendell Raymond '59	Naber, Daniel Allen '66
	Schwam, Susan Elaine '88		Reuter III, James Victor '85	LA B	Osen, John Walter '81	Pallay, Barry Gene '68
	Strickland, Elizabeth Ann '77		Lazenby, Jerry Gray '65	LA F	Prickett, Gordon Odin '58	Quay, Jeffrey R. '85
WAB	Brower, Michael R. '70		Owen, Mark Enos '92	LA A	Wunder, Bernard Almond '68	Saviz, Camilla M. '87
	Hartup Jr., John Dewey '50		Falterman Jr., Gerald J. '89	LA A	Bethay, Joseph Arwood '56	Thiemann, Peter Ernest '79
	Nemitz, Rodney Eugene '86	ME A	Bowden, Warren W. '49		Dabney, Emily Catherine '88	Wells, Eugene Francis '50
WA G	Lock, Raymond Tan '83		Hackett, John A. '59		Moffett, James K. '84	Westrum, Don Herbert '67
WVA	Amrhein-Cain, Wendy Ann '94		Mortenson Jr., Victor A. '70	MO A	Gillum, Marvis Neal '61	Zurla, Colleen Ann '83
	Deakins, Ralph R. '58	CO F	Priest, Peter H. '77		Hardin, John W. '87	NY I
	Hegert, Donald Roy '65	CO A	Theriault, Lucien Joseph '51		Malin, Robert Clayton '83	Drogin, Barry J. '83
	King, Staci Renee '96	CO E	Whitten, Donald L. '57		Oberlag, Gerald Allan '66	NY K
	Lilly, Larry Joe '64	CO Z	Chang, William O. '61	MD A	Potter, Charles Jarrett '77	Leidig, Carl Frederick '55
	Palmer, Charles Bennett '69	CT A	Peters III, Edward Emil '50		Riegall, Deborah Vance '70	NY A
	Pennline, Dennis Eugene '73		Watson Jr., Richard Brown '73		Rodenberg, Gary Dale '77	Mizzi, John Vincent '63
	Schuler, Arthur Kurt '71	CT B	Berson, Bernard Raymond '57		Satterlee Jr., George L. '52	Chirripa, Robert R. '70
	Weekley Jr., Gene Rolland '63		Perreault, Gregory J. '84		Vetter, Louis H. '62	NY M
WVB	Capozzoli, Brent S. '84	CT F	Valerio, Clement V.A. '70		Weidinger, Robert P. '61	Brier III, Burgess B. '71
	Lorkowsky, Timothy Walter '93	DE A	Godbout, Louis Francis '72	MO B	Baer, Ted A. '64	Trachtman, Leslie Stuart '77
WI A	Cleasby, John L. '50		Rae, Kirk Alfred '88		Brodhacker, John Warren '44	NY N
	Davis, Scott Paul '78		Remondi, Benjamin William '67		Charles, Albert Lee '78	Frame, Barbara Rocks '80
	Detjen, Edson Reinhold '46	DC A	Witt, Jeffrey Lawrence '81		Cooce, Homer Eugene '52	Prosser, Neil M. '81
	Devoe, Michael James '78		Boddie, Sandra Anthony '80	MD F	Crafton, James W. '65	Siegel, Richard Mark '88
	Ellison, Henry Olaf '58	DC B	Delaney, Michael Learene '90		Ernst, Charles M. '61	NY E
	Flakas, Gerald Kenneth '66		Blair, Erin Elizabeth '06	MA A	Legeza Jr., Raymond J. '85	Bruzzone, Anthony F. '12
	Gorowsky, Blake Comstock '07	FL A	Douglas, Gavin Lee '63		Canon, Leonard L. '82	Eschbacher, Robert M. '73
	Oliver, Floyd Forrest '60		James, Matthew Leslie '80		Irwin, Michael J. '75	Kovac, Charles Vincent '51
	Rozek, John Stanislaus '59		Smith, Daniel J. '87		Jacques, Donald A. '83	Mohan, Anne Elizabeth '09
	Trnka, John Thomas '62		Wabbersen Jr., William G. '90	MA B	Marcaccio, Mario John '80	Perrotta, Thomas '82
WI B	Ellis, Thomas E. '84		York, Dennis J. '76		Paul, Bruce Franklin '56	NY O
	Jaye, Deborah Ann '03	FL B	Armenteros, Lourdes M. '82		Wyczalek, Floyd A. '46	Kogel, Lawrence J. '71
	Kormanik Jr., Nicholas J. '62		Berman, Gerald Adrian '55	MO F	White, Kimberly Elizabeth '94	Lamborg, Michael J. '83
	Kriofsky, Thomas A. '60		Holmes, Martin E. '82		Chamberlin, Charles E. '71	NY I
	Marcouiller, Roger A. '60	FL F	Routh, Andre Guy '73		Favre, Mark Edward '98	Turner, Clayton Phillip '90
	Penlesky, Richard J. '73		Glenn, Frederick '92		Kline, Samuel Aaron '94	NY P
	Piaseck-Roppella, Kristina M. '85	FL G	Rothrock, William Richard '86		Rittmann, Bruce E. '74	Noble, Robert Theodore '69
	Reak, Ronald Peter '63		Suter, Bruce W. '72	MT A	Swallow, Louis J. '54	Palmer III, Jacob Alexander '69
	Sobczak, Nancy E. '67	FL A	Sobczak, Robert Lynn '93		Jeffries, William Raine '42	Poindexter, Richard Clinton '64
	Sobczak, Robert Lynn '93	FL H	Reiner, Richard D. '94		Hess, Edwin John '55	Skinner, Julie H. '81
	Sommerville, Martin Glenn '94	FL O	Burrow, Gregg Duncan '11	NE A	Monaghan, Kaxandros '00	NY C
WI G	Griffin, Michael M. '93		Tracy, William Andersen '06		Penberthy, John Thomas '75	Leibel, Page Ives '82
	Herman, Jonathan Joseph '10	GA A	Avignone, Frank T. '60		Cox, John Dean '85	NY D
WI A	Palmer, Mark William '90		Cleveland, Paul H. '82		Fortik, Jason LaVern '98	Kallis, Adrian G. '88
WI E	Hubmann, Martin Thomas '13	MA A	Curry Jr., John Charles '58		Heimann, James E. '88	Seppanen, John Louis '86
	Langel, Daniel Edward '91		Flegal, William Malcolm '66		Iwan, Russel R. '81	NY B
WYA	Dwan, Terrence E. '68		Gebhart, Wilford W. '67		Pyle, Eliot Lawrence '56	Shoog, Donald C. '60
	Galles, Daniel Joseph '74		McLain, Donald R. '53		Zechmann, Edward L. '00	Schoer, Kristen Todd '97
	Simon, Ronald Wayne '81		Royer, Steven Lee '88	NV A	Ericksen, Spencer Lee '99	Steiger, Gene Paul '57
			Vesel, John Brian '99	NV B	Vodrazka Sr., Walter C. '55	Werner, Lawrence W. '70
				NH A	Novotny, Kirk Edward '94	Whitey O' Bartlett Jr., William Pollard '76
				NJ A	Amato, Corrado '76	Choyke, Wolfgang J. '48
					Hess, Edwin John '55	Grubmeyer Jr., Orville W. '60
					Newton, Thomas Joseph '58	Hashmi, Ahsan Abbas '00
					Rovins, William Ross '82	Hayne, James Wesley '51
					Swanson, Frederick James '68	Rauch, Conrad J. '52
					Wetter, Charles H. '51	OH A
					Badgley Jr., Robert Henry '60	Reese II, Jack R. '91
					Feder, Gerald Lewis '86	OH E
					Hagerman, Janet Susan '82	Boulter, Brian Thomas '91
					King, Caroline '02	Brandes, Thomas A. '72
					Masaryk, Joseph S. '67	Courey, Karim Joseph '86
					Regazzi, John R. '76	Gajzer, Attila Imre '95
					Rocca, Jeffrey J. '78	Hardoll, James Leon '91
					Viechicki, Dennis '62	Raddcliffe, Thomas Joseph '51
					Wavelle, Carol Ann B '80	O H
					Weber, Mark '00	Bick, Thomas M. '88
					Balma, Peter M. '75	Hazeltime, Nelson '63
					Becker Jr., George W. '66	Kristie, Frank M. '72
					Della Rovere, Richard '10	OH H
					Gumann, Ronald John '76	Hartman, Dean H. '99
					Hampel, Daniel '53	Houpis, Constantine Harry '47
					Kasuba, Peter Francis '65	Lloyd, Kenneth Bertram '61
					Kuchner, Robert Andrew '69	Palazzotto, Anthony Nicholas '55
					Labos, William Joseph '73	Starns, Alan R. '88
					Modersohn Jr., Robert J. '54	OH O
					Reznak, Frederick J. '69	Marks, Steven James '85
					Thompson, Susan M. '92	Mikalaukas, George A. '86
					Walters, Brian D. '67	Ralston, David William '71
					Adriano, H. L. Joseph '89	Trogus, Frank Joseph '69
					Bennett, Karl E. '76	OH I
					Chen, Ephraim Jonathan '09	Bennett, Dan A. '73
					Hiltunen, Dennis Richard '83	Stiles, Justin Austin '06
					Lasher, William Charles '76	OH K
					Leibold, Robert Allen '84	Bridges, William G. '79
					Linker, John Joseph '44	Miller, Christopher Andrew '91
					Mahowald, John Edward '77	OH A
					Melvin, James Coleman '86	George, Thomas E. '87
					Miecka, Richard G. '56	Weber, Donald William '90
					Reid, John B. '81	MO A
					Rice, Philip Alfred '59	Moore, Malcolm B. '62
					Sagaser, Donald D. '48	Seeman, Edward Earl '73
					Shastry, Rohit '05	OH B
					Smith Jr., William Bernard '47	Stostick, Robert Neil '00
					Tuttle, Alyson M. '98	OK A
					Wille, Donald J. '58	Seeman, Malcolm B. '62
					Klaes, Leo J. '55	Seeman, Edward Earl '73
					Nolan, James Henry '73	OK B
					Williams, William B. '55	Bostick, Robert Neil '00
					Wojechowski, Matthew P. '71	OK C
						Hanes, Larry Lewis '07

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AL B	Ashcraft Jr., James Harold '78		Spangrude, Gene Ronald '73		Morse, Douglas H. '84	NY C	Avellan, Michael Anthony '85
	Bobbitt, Billy T. '68	IL A	Angus, Richard Myers '57		Perkins, George Charles '64		Bremner, Anita Joyce '70
	Carr, Emily Gordy '77		Barton, Robert Oliver '49		Root, Christopher E. '82		Cline, Darrin O. '89
	Grider, Kelly V. '58		Budd Jr., Roger '62		Schoenfeld, Richard Alan '71		Curlless, Richard Anderson '68
	Naughton, Joseph D. '60		Highland, Steven D. '68		Taverna, Louis Mark '77		Denman, Gary '62
AL G	Nichols, Gary G. '78		Hillman III, Arthur Burgess '67	MA Z	Truxel, George H. '68		Schoog, Donald C. '60
AL D	McCartney, Crystal Laws '08		Jansen, Mark Allen '85		Cramer, Robert A. '80		Shoger, Kristen Todd '97
AL E	Rahman, Arifur '55		Kraft, Donald E. '52		Fiejdasz, Paul Andrew '85		Steiger, Gene Paul '57
AK A	Darrow, Margaret Marie '02		Kueck, Thomas L. '64	MA A	Gross, Stephen R. '80		Werner, Lawrence W. '70
AZ A	Chadik, Paul A. '84		Picus, Joel '79		Miller, Kendall Giftord '79		Whitey O' Bartlett Jr., William Pollard '76
	Dambro, Mark Richard '72		Reichelt, Karl L. '68	MA H	Whitney, Paul V. '59		Choyke, Wolfgang J. '48
	Fellner, Kenneth Mark '84		Schneider, David Ray '72		Garde, Sharon L. '86		Grubmeyer Jr., Orville W. '60
	Gundrey, Lana Bellus '88		Toepfer Jr., Richard Earl '56	MA H	Lajoie, Ronnie M. '84		Hashmi, Ahsan Abbas '00
	Whitlock, Charles N. '79		Zambier, George William '53	MA O	Craven, McCharles Anthony '91		Hayne, James Wesley '51
AR A	Barr, James C. '55	IL B	Duxbella, Joseph Charles '86		Furlong, Kim Marlene '87		Rauch, Conrad J. '52
	Moody, Charles Roger '58		Kohnen, Robert E. '79	MA I	Villamano, Mark John '75		OH A
	Morris, Stacey O. '73	IL F	Sasaki, Masahiro '51		Amar, Jack Joseph '75		Becker Jr., George W. '66
	Ryles, Gary W. '67	IL A	Yerby, Joel T. '56	MI A	Derby, Stephen G. '69		Della Rovere, Richard '10
	Walton, Trent A. '80	IL E	Mueth, Timothy Paul '89		Moravec, Michael J. '78		Gumann, Ronald John '76
CA A	Bocast, Donald Rocco '45	IN A	Beuchel, Patrick T. '81		Othmer, Hans George '65		Hampel, Daniel '53
	Fuller Jr., Clarence C. '48		Dix, Rollin Cumming '57		Suchyta, Paul Joseph '08		Kasuba, Peter Francis '65
	Hall, Robert M. '70		Hounshell, William H.		Thelen, Stanley Paul '83		Kuchner, Robert Andrew '69
	McManus, Robert Alan '77		Hunt, John T. '49	MI B	Jamar, John Woodbridge '52		Labos, William Joseph '73
	Wragg, Christopher John '89		Jepsen, Eric Richard '80		Klein, Raymond J. '84		Modersohn Jr., Robert J. '54
CA B	Bejmuk, Bohdan I. '64		Kerber, Ronald L. '65		Knutilla, Robert Lloyd '51		Reznak, Frederick J. '69
	Broido, Michael D. '70		Lee, Robert Edward '67		Phillips, Gerald Raymond '70		Thompson, Susan M. '92
	Villani, Daniel Dexter '69		Levine, Jerrold Louis '61		Rom, David Bruce '56		Walters, Brian D. '67
CA G	Batemore, Terry S. '58		Morgan, David Jack '60	MI F	Atkinson, David E. '60		Adriano, H. L. Joseph '89
	Barr, Eugene Darrell '54		Newby, Karl E. '82		Burnham, Lewis Alexis '55		Bennett, Karl E. '76
	Tedrow, James A. '70		Rieter, Robert F. '65		Chick, Kenneth Martin '91		Chen, Ephraim Jonathan '09
CA A	Bolliger, James E. '71		Ross, Elton C. '50		Hiltunen, Dennis Richard '83		Hiltunen, Dennis Richard '83
	Burks, Robert A. '56		Wolber, Raymond W. '80		Lasher, William Charles '76		Lasher, William Charles '76
CA E	Argabrite, A. Hugh '53	IN F	Kuehn, Nicholas Henry '63		Leibold, Robert Allen '84		Leibold, Robert Allen '84
	Axt, Robert D. '66		Springer, Denis Eugene '67		Linker, John Joseph '44		Linker, John Joseph '44
	Bienstock, Bernard						

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Woodward Chew '56 De Paul, Louis A '73 Flaminio, Herman '62 Fugate, David W '84 Moore, Bruce E '81 Mullen, Thomas Edward '82 Schneider, Christopher M '06 PA Δ Berger, Bruce Sutton '54 Fishstein, Bruce L '83 Lucas, Jay P '69 Silnutzer, Norman Roy '67	PA E Yaccarino, Robert Gerard '85 Bogden, Kenneth Michael '69 Cimei, A. Kevin '84 Cottrell, Martin M '67 Drosdick, Joseph William '55 Huber, Joseph Fowler '68 Johnson, David B '83 Santo, William John '53 Schenck, Arthur J '73 Skvoretz, David Mark '95 PA Z Angilletta, Gerald Vincent '79 Brecht, Howard E '63 Craighead, J. Jeffrey '78 Daly, Thomas Patrick '85 Daniels, Richard Edward '69 De Maio, Michael '76 McNamee, Bernard M '53 Robinson, William A '62 Shaffer III, Thomas Hillard '68 PA H Fruci, Natale Andrew '55 McMichael III, William '60 Swetsky, William John '65	PA Θ Capuzzi, Angelo Michael '71 Capuzzi, Lynda A '71 Dreiss, Steven Anthony '83 Sawyer, Stephen G '65 PA I Meixner, Henry M '67 PR A Acosta, Carlos A '88 Gay-Gotos, Hiram Alberto '96 Hernandez, Edgar '77 Pedraja, Jose R '84 Santana, Juan Carlos '97 Vega-Montijo, Madeline '01	RI B Castro, Mark Y '83 Sivolis, Herbert J '71	SC A Bedenbaugh, Boyd William '80 Calcutt, Walter Wade '91 Cox, Anthony James '83 Cox Jr., Jacob H '03 Hill, James C '61	SC B Davis, Charles M '58 Godbee, Dennis William '73 Hendricks, Irvine H '62	SC Γ Hinson, Mary Elizabeth '08 Marcuson III, William F '63	SD A Tomaski, Donald Martin '77 Eidness, Karen H '83 PA ILL Paulin, Robert Michael '50 Pirner, Steven Mark '72 SD B Brost, Bart David '97 Packard, Douglas Randall '64 TN A Broome, Joseph C '65 Garson, Arthur D '88 Graves, Ronald Lee '64 Hudson, Harold Dale '64 Irwin, Sibley Ronald '64 Jackson, Robert Harris '59 Kaley, John Straul '01 Kennedy, Earl Powell '60 Lambert, William Mark '91 Lambert, Lisa Vaughn '90 Lowe, Robert Alexander '70 Min, Tony C '52 Sewell, John Ike '54 Smith, Larry G '64 Stanton, Forrest Mckee '95 Waters, William E '51 Whaley, Christopher Lewis '94 Wunderlich, Walter O '56	TN B Abrams, Karen '86 Cummings, Becky Olive '76 Hawkins, Kenneth E '88 Lippert, Michael John '86 Noreen, Thomas Roger '84 TN Γ Clark, Tony Lee '89 Jennings, Patrick Charles '99 Moyers, Robert Lewis '05 TN E Edlund, Robert A '79 TN Z Foster, Edwin Powell '64 Keck, Christopher Clark '95 TX A Chen, Annie Y '85 Crippen, Robert L '60 Ellis, Charles Eugene '68 Heath, Margaret Irene '90 Hodges, Bobby Wayne '53 Irick, John Thomas '59 Moguel, Walter L '93 Musler, Jeffrey Lynn '90 Seaman, George Cook '66 Smith Jr., Horace V '64	TX B Wilson, Arthur E '65 TX A Albritton, Patrick Michael '96 Baker Jr., Marvin Elroy '86 Dunn, Luci Ann '86 Krieger Jr., Benny Jack '89 TX I Wilhelm, Debbie Jeanne '84 Kohler, Arthur D '58 Marshall, Tom Stanley '76 TX Δ Alexander, Grover L '55 Barksdale, Donald Lee '55 Beal, Patrick Val '88 Boatright, Paul A '70 Boutte, Jennifer Lynne '89 Casco, Andres Enrique '99 Gabert, Lenard Morris '49 Gibbs, Sam G '54 Massengale Jr., Levon '51 Nolen, Kenneth B '57 Oliver, Howard R '50 Pardue, Lon Hubert '63 Pechacek, Ronald David '78 Perkins, Thomas Keeble '52 Szymczak, Edward J '61 Tipton, Dewey R '64 Wornat, Richard O '49 TX E Bloshock, Mark J '77 Klos, William Anton '63 Parmely, Marjorie Anne '75 TX Z Broussard, Lance Armanee '97 McCabe, Glen H '82 Zwillenberg, Gordon D '79	TX H Uncapher, James Patrick '77 TX I Maguire, Daniel Myron '81 TX K Luke, Cheng-Tien '56 TX A Carter, Norman B '87 Hinojosa, Juan Jose '84 UT A Dommasch, Alex '90 Stewart, William V '60 UT B Ashby, Delroy '64 UT Γ Anderson, Matthew O '93 Espino, Robert Barton '04 Martineau, Robert T '79 VT A Bouchard, Donald Raul '81 VT B Svreck, Steven P '77	VA A Griffin Jr., Joseph Howerton '71 Griffith, Douglas Gene '61 Stansell Jr., Thomas Atlee '57 VA B Blanton, John C '76 Collie, Joseph Haslett '50 Dunkley, Barry T '71 Fox, Charles W '59 Math, Robert M '57 Obrien Jr., Walter Penton '60 Parsons, Jerome S '66 Pilgrim, Kurt Arthur '83 Saucice, Debra Clark '81 Spanglers, Edward G '79 VA Γ Boutte, Jennifer Lynne '89 WA A Semke, Leon Kirkland '58 Tanemura, Steve Ken '84 WA B Owens, William Leo '53 WA V Barlow, Kenneth William '89 Easterling, William S '81 Fisher, Ervin Charles '68 Bennett, Chris John '06 WA A Berman, Robert '55 Froh, David '74 Jens, Barry L '64 Salzman, Dennis R '65 Severson, Roger Eugene '76 Thompson, Kenneth Gary '77 Washechek, Howard C '50 WA B Barone, Frank J '62 Bell Jr., Robert B '01 Black, Jennifer A '61 Fons, Richard J '79 Koester, Fred William '59 Morris, Leslie Raymond '78 Mueller, Gregory John '68 Russell, Jeffrey Thomas '88 Splinter, August Marine '42 Svihla, Edward Bert '90 WA I Sullivan, Shawn Francis '02 WA E Holte, Jennifer Elizabeth '90 Holte, Kenneth Alan '89
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In Grateful Appreciation of Member-Contributors

AL A Bledsoe Jr., Michael Bradley '92 Clary, Jacob Michael '14 Huffman, Gary Leroy '77 Packard, James Donald '88 Pukish, Michael Sylvester '09	AL B Dodgen, Hugh E '62 Elmore, Gregory David '97 Foster, Jonathan Michael '13 Holliman, Harry H '63 Massey, Dianne Joy '70	AL Γ Etheridge, Brandon Scott '03 Kaez, Edmund Benjamin '92 Smitherman, Christopher B '07	AL Δ Dellaquila, Mark Edward '13 AL E Bunce, Jennifer Lynn '02 AK A Logan, Sidney Martin '85 AZ A Grubbs, Elmer Andrew '68 Sisson, David J '65 Van Veghel, Stephen J '72	AZ B Gembarowski, Charles Jerry '74 Lee, William H '04	AR A Chastain, J. Dee '59 McKinnie, Bruce Clay '80 McKimmie, Jane L '84 Mourat, Jonathan Benjamin '05 Pile, Stephen C '66	CA A Bernstein, Ralph '56 Demirjian, Richard S '79 Rossopoulos, Thanos George '09 Silva, Christopher P '82 Whisler, William D '59	CA B Andelin Jr., John Philip '55 Dixon, David A '71 Helfrey, Paul F '51 Munsil, Wesley Elwood '71 Whitehead, John C '82	CA Γ Boehme, Carl R '70 Karpel Jr., Edward James '01 Spaeth, Edmund Eugene '62 Stewart, John L '48	CA Δ Fung, Danny H '87 Gendotti, Patrick James '12 Grabowski, Eric Michael '91 Klein, Jerry A '61 Mehner, Warren L '65 Moore Jr., Victor E '61 Vawter, Verne Evan '48	CA E Durand, Helen Elaine '11 Gorder, Matthew S '81 Hinchey, John D '65 Lam, Khanh '92 Kiang, Michael Kai '15 Yoshida, Kenichi '89	CA Z Beyers, Daniel J.A. '15 Kamiya, Allison Yemi '13 Lee, Muzio John '79 Oven, Mark J '75	CA H Fuke, Chester Hisashi '67 Walsh, James E '59	CA Θ Boyd, Duane '72 Meade, Joseph P '87 Secrest, Delbert H '72 Doria, Robert Carl '89 Gong, Howard '82 Reid, Neville Oscar '11 Villa, Warito Pascas '97 CA K Clemens, Rick Arnold '74 Long, Marian Helen '82	CA A Buer, Stein M '74 Davis, Rory R '79 Niebuhr, Philip Martin '86 CA N Hoevel, Marilyn K.R. 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'15 Stokes, Wincott G '72	IL Δ Epp, Larry W '84 Plouzek, John Michael '86 Seiwel, Gary Dean '65 IL E Mukherjee, Biswanath '83 IL Z Lai, Katarzyna Agnieszka '91	IN A Aebi, Brian Dethlef '95 Berman, Mitchell L '74 Boydin, Michael S '81 Brennan Jr., Paul John '46 Dash, Sourabh Kumar '01 Elijah, Darrel Lawrence '64 Fleck, John W '48 Gkritza, Konstantina '06 Guzman, Jose Javier '93 Harrer, Robert D '70 Jochem, Stephen K '73 Jones, Norman A '68 Lafuse, Harry Gene '58 Linder, Frank W '66 Moore, Darrel Daniel '64 Paglee, Mario R '44 Schilling, William Joseph '55 Hook, Edgar Graham '60 Marjan, Peter Paul '84 Thornell, Richard Earl '64 Thorson, Robert Thomas '61 Walker, Neil R '69 Willhoff, Thomas Lee '52	IN B Badger, David Harry '53 Dekker, Don L '61 Gemmer, Baron Guy '85	Grammel, Cassandra Marie '10 Roll, Richard Russell '81	IN Γ Abot, Rosary C.T. '11 Durr, Christopher Jacob '10 Geist, John Michael '66 Hudson, Matthew Timothy '08 Massey, Mary Cecilia '82 Pisano, Nicola A '80 Riederer, Andrew James '99 Walters, Mary Augusta '86 Zavosky, David J '81	IN Δ Love-Pritt, Jennifer Marie '81 Sinko, Kenneth Michael '72	IN E Hosack, Mack B. D. '88 IN Z Brooks, Clarence Albert '13 IA A Adams, Clark F. '58 Buffington, Gregory D '67 Gallagher, Richard F '59 Graff, Richard Stanley '48 Hegg, Bob Allen '66 Leebl, Robert G '52 May, Judy V '58 McGuire, Jack Francis '63 Miller, Owen Wilton '69 Samer, James M. '52 Shih, Tom I-ping '76 Tekippe, George L '69 Tennant, Jerry R '61 Van Camp, Thomas George '54 IA B Baker, William James '49 Enemark, Donald C '60 Foss, Thomas W '69 Hofer, Larry Dean '79 Thoman, Stephen John '76	KS A Batchman, Theodore E '62 Coudeyras, James Christian '94 Cronemeyer, Donald C '45 Kulp Jr., Carl Raymond '82 Lake, Orley L '61 Mercer, Jane C '80 Milleret Jr., George R '70 Phillips, Robert Keith '88 Simpson, Trent Alan '89 KS B Groom, Kenneth Dale '60 Longacre, Charles Jacob '74 Stuart Jr., James F '67	KS Γ Oakes, Jon Solomon Dean '09 Whitfill, David Joseph '88	KY A Sims, Daniel J '84 KY B Badder, Christopher Shayne '12 Hughes, Earl Christopher '76 Scharff, Robert Paul '82	LA A Cizek, Eugene D '64 Eidt Jr., Clarence M '56 Hines, Cynthia James '81 Hollier, Joseph Keith '79 White, Bryan M '83 Wolf, Enrique Bernardo '67	LA Γ Bush, Steven Randall '72 Kareh, Ahmad Ragheb '85 Nugent, Larry Edward '61 Risley, Martin C '66 Costa, Eduardo C '60	LA Δ Pedro-Egbe, Mobyayo O '15 Scheidt, Robert Paul '82 Lau, Irene '84 ME A Chaudon, Lynnette W '99 Goodwin, Alice Margaret '00 Healy, Edwin David '59 Smith, Craig Hamilton '80 Stewart, Jonathan Matthew '93	MD A Nemhauser, George L '58 Ulanowicz, Robert E '64	MD B Ames, George Ronald '69 Donigian, Carl Drafts '78 Gillum Sr., Michael Joseph '91 Haney Jr., William Samuel '57 Louzon, Thomas M '84 Makar, Joseph S '78 McCoy, Charles Michael '68 Rader, Richard Andrew '62 Stewart, Larry Edwin '60 Worrell, Eric Edsel '81	MD Γ Early, David Thomas '97 Johnson, Holly Michelle '92 Weinert Jr., William E '83	MD E Smith, Willie L '97 Thompson, Grace Lynn '14 MA A Carlson, Ronald A '60 Dudevour, Wilfrid G '55 Skliutas, John Paul '79	MA B Brown, Paul Sherman '59 Chandar, Venkat Bala '06 Gardner, Richmond '57 Gelles, Stanley Harold '52 Gootenberg, Jonathan S '13 Lim, Pean '85 Walter, Robert F '72 Whitney, Alan Robert '66 Wiley, Robert Freeiland '66	MA A Brinn, Walter Keenan '44 Eckman, Nathaniel B '13 Walsh, James Ralph '90	MA E Bearer, Harvey Stewart '56 Duffy, David B '67 Keene, Andrew Russell '00 Marzetta, Aldo L '68 Offt, Kevin Alan '00 Stein, Kass Taylor '14	MA Z Hathaway, Wayne Herbert '70 Hawley, J.C., Michael '65 Liu, Irene '82 Tebo, David L '88	MA Θ Aste, Stephen Robert '99 McNally, Michael William '85 Semeter, Patricia M '85 Srivestri, Thomas A '89 MI A Braze, Ross Delaine '52 Duggan, Gregory Stephen '90 Flynn, Patrick Joseph '85 Haire, Kenneth E '62 McCollum, Kevin Lee '02 Putterbaugh, Kevin Douglas '85 Schlachter, Herbert J '52 Stevens, Claire A '49 Tuttle, Elvin Eugene '53	MI B Campbell, Edwin Herbert '64 Eldridge, John L '84 Holroy, Donald Leon '53 Hudson, Roger Dennis '62 Johnson, David N '66 Klungness, James Alan '49 Knoebel, David Harrison '61 McKindies, Gerald T '50 Stallard, David W '65 Wiersma, Ronald Gene '57	MI Γ Banghart, Edmund K '83 Bayer Jr., Charles M '77 Cayll, Magan '84 Dunlap, Roger '56 Forche, Robert F '64 Harris, Peter V '58 Hicks, Martha Kay '63 Kaercher, Gerald C '55 Margolose, Kate Mary '84 Marsh IV, Joseph '64
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McMullen, Christopher T. '13
Merte Jr., Herman J. '51
Moriarty, Brian M. '58
O'Brien, Thomas C. '61
Petrossian, Boghos '82
Richards, Charles Gilbert '57
Sessions, Louis William '43

MI A Cattani, Louis C. '61
Cerquone, Peter F. '61
Hubbel, Jacob James '50
Roberts, Earl Alexander '50
Ryntz Jr., Edward F. '61

MI E Klotz, James C. '01
Silver, Arthur G. '59

MI Z Chernenko Jr., James '90
Jester Jr., Herbert G. '51

MI H Bowden, George F. '48
Joseph, Robert Gehad '13
Ladouceur, Harold A. '63
Lindeman, William John '92
Ross, Hugh '79

MI O Herrmann, Robert Alan '75
MI I Doughan, Mariana '15
Rossi, Robert E. '85

MI A Domke, Eric Matthew '10
MN A Boller, Robert Andrew '45
Fulton, John D. '67
Jackels, Charles Frederick '68
Johnson, Dale E. '75
Lemke, John D. '88
Schmidt, Douglas A. '84

MS A Heintz, Sarah Marie '13
Mowry, Kathleen Culpepper '08
Odom Brackett, Cornelia A. '83

MO A Fairbanks, Robert William '62
Haley, Chaitan '85
Haves, David E. '86
Henry, Michael Wayne '82
Magers, Dillon Leon '92

MO B Coleman, Fred Jackson '57
Eydmann, Phillip Steck '69
Huffman, Dyrk S. '96
Lytle Jr., Glenn A. '66
McDermott, Sean Finn '97
McLeane, Robert Wassell '52
Mokhtari, Shawn '84
Owens Jr., Malachi '87
Shofner, Terrence David '73
Spirk, Donald E. '65
Wolff, Thomas F. '70

MO G Kosman, Katherine Ann '03
Mustoe, Anthony McDowell '09
Peters, Christopher John '09
Scheurer, Ryan Alexander '06
Thomas, Arthur '50

MO A Blancett, John Michael Lee '92
MO E Carrier, William L. '81
Kranz, Eugene F. '54

NE A Ceele, Chad Adam '07
Frenzel, Gary G. '59
Johnson, James A. '85
Ruhrdanz, Michael P. '83
Wilmes, Gary Joseph '87
Wolff, Nicholas Lowell '00

NV A Wilson, Kenneth M. '93
NH A Hewes, Robert Pennell '86
Rand, John '59

NJ A Buce, Stephen John '86
Goller, Karl Richard '52
Hutchison, Dylan De A. '15
Menafra, Dominic Bernard '04
Smith, Linda Gilda '88

NJ B Beke, Peter S. '90
Burke, Hilary A. '81
Cornell, Jay B. '83
Kossmann, Richard John '55
Kuopp, John A. '85
Wasserman, Kenneth Jay '11

NJ G Cventzel, David '57
D'Onofrio, Michael '37
Daley, James Michael '85
Garcia, Elizabeth '66
Hanesian, Deran '52
Heuer, Ava R. '72
Igneri, Ronald John '77
McDermott, Kevin J. '65
Morgan, Robert P. '77
Perna, Angelo Joseph '57
Pisz, Frank Andrew '71
Rosenham, Robert '95
Shilling, Norman Z. '66

NJ A Connelly Jr., Thomas Martin '74
NMA Gentle, Phillip Dean '80
Smith, Anthony Younger '77
Swift, Theresa Janine '89

NMB Applegate, Charles Lewis '01
Lacatena, Stephen Joseph '86
Nava, Edward John '79

NY A Cachules, Gary Neil '85
Levan, John William '84
Schneider, Bethany Noelle '12
Zelikson, Robert Eric '88
Zhai, Eric Xiaoyuan '03

NY B Chamby, Jeffrey D. '78
Chambers, Steven Craig '68
Kulpa, Theodore Andrew '62
Mogish Jr., Andrew '78
Rzepka, William '64

NY G Canavan, Kevin Joseph '92
Collins, Donald Francis '09
Harris, Robert Phillip '74
Haslett, Robert A. '58
Kellis Jr., Robert F. '78
Pabiz, Ronald Arthur '96
Peltz, Adrienne Nicole '07
Widly, George J. '58
Wilcox, Bruce '51

NY A Chu, Kenneth Yong-Kang '11
George, Glenn Russell '85
Newman, Howard Michael '65
Ramamurthy, Subramanian '76
Russell, Robert H. '49
Stahlman, Jason Lee '90
Suss, Eric B. '86

WI A (University of Wisconsin-Madison) Match Challenge

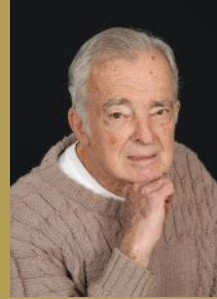
The first step to endow the Wisconsin Alpha Chapter at University of Wisconsin-Madison has been taken by **John Bolender, WI A '51**.

John graduated with a bachelor's degree in mechanical engineering and joined the Boeing Company for a 38-year career as a mechanical designer. He was involved in the development of civilian and military aircraft, satellites, the International Space Station, and several classified programs. Included was a four-year military leave of absence as a U.S. Naval aviator. John is happily retired and resides in the Seattle, WA, area.

He was inspired by the recent generosity of **Franklin "Pitch" Johnson Jr., CA '75**, who pledged a match in support of his chapter at Stanford University. John's commitment of \$20,000 begins with a \$5,000 gift followed by a pledge to match the next three gifts from others designating \$5,000 minimum for WI A.

This gift is in support of our Chapter Endowment Initiative to permanently endow the Association's activities that support any of our 245 student chapters. While gifts of a minimum of \$100,000 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 WI A!

For additional information on this opportunity or to learn more, visit www.tbp.org/give/chapter_endowment.cfm or contact Sherry Jennings-King at (612) 226-2922 or sherry.jenningsking@tbp.org.



Rowland, Benjamin Charles '06
Rowland, Sarah Lanay '06
Ward, Robert Lee '88

OH K Jennings, Alan Lance '06
Yurick, Raymond M. '83

OH A Repko, Raymond '77
Dresback, Kendra May '99
Fore, Sharon Gayle '77
Granato, Matthew Adolph '11
Jenneman, Jeffrey H. '08
Martin, James David '62
Strawser, Donald E. '71
Marx, Kenneth Donald '61
Sedaghat, Golriz '15

OH I Oberoi, Damanjit Singh '04
Anderson, Grant Spencer '62
Kearney, Edward Rutledge '53
Kraemer, Kenneth R. '65
Lucadamo, Gene Anthony '71
Minter Jr., Edgar Frederick '57
Polyniak, Gregory Joseph '95
Shumbata, Francis J. '67
Walsh, Christopher D. '88
Gray, Kevin T. '85
Hemler, Robert J. '70
Johnson, Michael Benjamin '08
Lunde, John Christopher '95
Maley, Sir Katrina '15
Mudrinich, Richard T. '85
Rishel, Rick D. '79
Rohrer, Thomas Allen '13
Thomas, Kathleen Denise '80
Yeaton, Zachary Tyler '11

PA G Bhatt, Mukul Harshad '12
Dzombak, David A. '79
Jacobson, Annette Moff '79
Seaverson, Erin Rockwell '00
Valarezo, Christopher J. '06
Kaskin, Jonathan David '71
Lehmer, John Roland '66
Till, Walter J. '52

PA E Baker, Jr., Eugene '49
Bera, John Peter '70
Frabizzio, Michael Anthony '96
Hair, Glen Leroy '79
Inqui, Dena D. '13
Johnson, Floyd Charles '49
Kazda, Joseph Stanley '75

Pudleiner, James D. '76
Spencer, David Bruce '67
Bobyock, Stephen J. '84
Borig, Walter Alexander '49
Cheever, William Henry '56
Katz, Joseph Rubin '55
Ritchie, Allan R. '53

PA O Cochetto, Alan Matthew '83
Scharif, Christopher K. '95
Werner, Karl Edward '90

PA K Sobel, Lawrence David '77
PA A Beece, Robert Emery '90
Breitenstein, Darryl S. '86
Catallo, Victor J. '80
Christian, Robert Francis '07
Matey, John Gerald '78
Sawyer Jr., Stephen Gerard '98
Whiteside, Raymond A. '81
Nicholas, Kathleen Sara '12

PR A Acevedo, Jorge L. '66
Burgos-Rubio, Concepcion '89
Rodriguez, Nestor A. '85
Toro-Troche, Evelyn '93

RI A Matsuzaki, Ryu Goldberg '10
RI B Caranci, Manfred L. '72
Di Spirito, Karen Marie '87
Palmer, Robert Perry '59

SC A Bondreaux, Anne Renee '86
Frazzelle, Chase Gilbert '15
Hagen Jr., Paul Amberg '57
Harbeck, Christopher Paul '94
Pate, Joseph '16
Pate, Thomas M. '76
Waddington, David Mark '84

SC B Dickson, Raymond S. '59
Hammond Jr., Leon F. '68
Henry, Peter James '08
Pierce, Charles E. '91

SC F Druffel, Lawrence Edward '63
Sprull, Joseph Lawrence '54

SD A Baker, Gary Allen '72
Byg-Jerald Norman '72
Jorgenson, P.C.E. '80
Mead, S. Edward '62
Mosier, Donald Earl '78
Wiesner, Brady Neil '09

TN A Boone, Mark B. '82
Brown, John Buchanan '50

Connelly, J. Alvin '64
Griffith, Linuel Hoyt '57
LaPierre, Bonnie Louise '08
Siller Jr., Curtis Albert '66

TN B Thomas, Claude Anderson '64
TNI F Chandley Jr., Charles Alex '88
Nuyt, Gary Michael '72
Robertson, Franklin Lee '64
Tatum, Brian Alan '85
Torbett, Jeffery Lynn '92

TN A Klein, Sally Ann '89
TN E Hong, Michael S. '83
TX A Briggs, George Strickland '61
Chambers, Walter Wayne '70
Eisenmann, Frederick G. '96
Glavan, John Richard '88
Hajousky, Robert '63
Maha, Curtis Harry '52
Ribe, Fred Linden '44
Thomas, Kurt O. '79
Tseng, Shiao Chung '86
Turnquist, Robert B. '80
Wall, Kellen Levi '10

TX B Anderson, Roger Kent '60
Thompson, Justin Dewayne '06
Watts, Jack Darwin '58
Winder, Charles Franklin '12

TX F Adams, Glenn David '84
Droste, Carl Sanders '61
Lange, Elaine Austin '75
O'Rear III, Edgar Allen '75
Ricken, Mathias Guenter '04
Stetter, Walter James '50

TX A Gregg Jr., John Ernest '46
Hughes, Roy Neal '50
Hunt, Julia Ann '84
Knutson, James LeRoy '55
Molina Jr., Cesar Jose '84
Newton, Richard Wayne '70
Pivonka, Thomas Gerald '72
Slack, Michael Lewis '73
Thompson, Tommie Normon '68

TX E Iyer, K.V. Krishna '91
TX Z Bayless, Jack Hinton '56

TX H Brant, Kelly Miller '88
Cole, Robert L. '89
Freeman, Larry J. '80
Legere, Ronald James '85
Suley, Eniola Oluwasola '14

TX O Quiroz, Brenda '02

TX K Harness Jr., Jerry Wayne '03
Marsh, Pa'Trima Gabriella '09
Vigilant, Tamara Chelsea '08

TX A Amaya, Joseph Anthony '04
Pizana Jr., Robert '93
UT A Kephart Jr., John Thatcher '48
Miner, Gayle Fred '59
Ross, Wayne A. '68

UT I Beal, Weston R. '92
Reese, Kenneth Bryce '04

VT A Brush, Donald C. '71
Cooke, Thomas Hunter '77
Rohyans, Kevin J. '00
Scott, Melissa Turner '93
Buekman Jr., Paul Carson '52
Chevalier, Charles Elwood '52
Grady, Stephen Patrick '85
Melzar, Jonathan Preston '85

VA A Colen, Rodney B. '83
Gritton, Charles W.K. '76
Myers, Griffin Kyle '00
Yao, Yao '10

VA B Armbruster, Ralph L. '66
Frieman, Robert Philip '67
Gross Jr., Vernon Carl '63

VA G Cusakuma, Tracy Meafelia '09
Edwards, Woodrow Hunter '07
Engelund, Walter C. '86
Robinson, Bryan Douglas '03
Stanley, Bradford L. '81
Khalek, David Nabil '01
O'Connor, Justus Kevin '08
Radford Jr., Norman D. '65

VA E Filler, Robert Douglas '08

WAA A Johnson, Brian E. '83
Laakso, Melvin T. '70
Meyerholtz, Steven Z. '85
Rone Jr., Kenneth John '71
Schueman, Gerald Martin '64
Yutani, Nobuo '52

WAB Gray, Jake Travis '15
Pearsall, Jamie Marie '05
Pfeifer, Vickie Ann E. '83
Tupper, Leland C. '50

WAF Zorich, John B. '86

WVA Watanabe, Masakatsu K. '86
WVB Handley, Scott M. '83
Jilla, Robert John '73

WI A Anderson Jr., George James '48
Burbey, Ingrid K. '82
Caldwell, John R. '44
Carroll, Richard D. '71
Epping, Erin Lynn '80
Frazzelle, Marshall F. '61
Legault, Kathryn A. '85
Thomas, Wayne Albert '62
Tibbitts, Lewis W. '53
Tubbs, Dennis Howard '86
Webster, James L. '72

WI B Bridges, Robert Bruce '45
Gawlik, Michal Andrew '14
Hughes Jr., John J. '54
Novak, David A. '77
Vebber, William O. '57
Weber, Steven Curtis '82

WI E Buecher, Stacey Sharon '88
WYA Bowen, Douglas G. '75



East Carolina University

FOUNDED AS East Carolina Teachers Training School in 1907, East Carolina University (ECU) is a public university recognized for preparing family physicians and educators, and for cultural and performing arts programs, as well as emerging engineering and technology programs.

It was originally chartered as a two-year school with the first class of 174 students enrolling in 1909. In 1921, the school was renamed East Carolina Teacher's College with four-year degrees. It added academic programs, becoming East Carolina College in 1951 and achieved university status in 1967. Engineering was added in 2004.

Today, East Carolina University is a national research university enrolling more than 27,000 undergraduate, graduate and doctoral students and is North Carolina's largest preparer of education and health care professionals. ECU is one of 17 constituent members in the University of North Carolina System and is the third largest university in the state by student enrollment. It operates on three campuses in Greenville, NC, with the main campus spanning 520 acres and containing more than 3.5 million square feet of academic, research, residential, and dining space. The main campus features the Thomas Harriot College of Arts and Sciences, the College of Business, the College of Education, the College of Fine Arts and Communication, the College of Health and Human Performance, and the College of Engineering and Technology.

The main campus is also home to a 400-student Honors College. The Health Sciences campus, adjacent to Vidant Medical Center, a large research and teaching hospital, contains the Brody School of Medicine, the College of Nursing, College of Allied Health Sciences, and the School of Dental Medicine. The West Research Campus houses four research buildings on 600 acres and includes research space for ecology as well as an archeological project to restore the remains of *The Queen Anne's Revenge*, Blackbeard's pirate ship, found off the coast of North Carolina in 1996.

The newly-named College of Engineering and Technology (CET), formerly the College of



Technology and Computer Science, houses four programs which include computer science, construction management, engineering, and technology systems. The college's vision is to develop leaders whose knowledge, skills, and abilities improve the quality of life and promote economic development and regional transformation. Nearly 100% of ECU engineering graduates are employed or enrolled in a graduate school program within three months of graduation. Alumni have gone on to excellent positions in industry throughout the country and many have chosen to remain in eastern North Carolina. Some have also elected to attend graduate programs at top research universities.

CET places a strong emphasis on excellence in undergraduate education and believes that is measured not only is the number of students who complete degrees, but even more importantly in the type of jobs and careers alumni embark on upon graduation.

The motto of East Carolina University is *Servire - to serve*. This has been a core value of the university since its founding. Eastern North Carolina is a region in transformation and East Carolina University is a key player. The region has a strong agricultural and military heritage and has many issues including socioeconomic concerns and limited healthcare access. Eastern North Carolina is now home to several advanced manufacturing facilities and Greenville is the largest medical hub in the state east of I-95. Students, faculty, and staff at ECU are actively engaged in partnerships throughout the region to provide access to healthcare, offer educational outreach to local schools, and to develop innovative solutions to improve industrial productivity and the overall quality of life. Many classes emphasize leadership and service.

Current Demands

The undergraduate program features a general engineering curriculum and students are required to pursue a specialization. Current engineering offerings include biomedical, bioprocess, electrical, environmental, industrial and systems, and mechanical. In 2014, ECU engineering began offering its first graduate program with an MS in biomedical engineering. The department works with an advisory board of professionals in local industry, government, and military to ensure that graduates meet current demands.

ECU students have 35,000 square feet of modern laboratories, which allows them to couple hands-on learning with traditional classroom instruction. The curriculum emphasizes problem-solving and critical-thinking, professional skills, such as oral and written communication, and hands-on training to produce well-rounded graduates who can make an immediate impact.

With just over 600 students, small classes



PHOTOS: (clockwise from top left) ECU Administration Building, CET Building (Credit: ECU), working on a quadcopter (Credit: Jay Clark), and wind tunnel research (Credit: Michael Litwin).

This article was compiled by Ricky T. Castles, Ph.D., Virginia Beta '03, the new Chapter's Chief Advisor, and Margaret Turner, director of marketing and outreach for ECU's College of Engineering and Technology.

promote high faculty-student interaction and individual attention. The program is growing in enrollment and has doubled in size over the last five years. The current plan is to grow to 1,000 undergraduates and 25 graduate students.

ECU engineering faculty and students are actively engaged in many research projects including collaborations with other departments and activities to support local industry. Recent projects have contributed to telemedicine, biomechanics, tissue engineering, injury prevention and rehabilitation, unmanned aerial vehicles, composite materials, healthcare data management, manufacturing, facilities design, energy, materials engineering, and more.





IN THE COLLEGES

SPOTLIGHT

Immigrant Role Rises

Immigrants went from making up 16% of the U.S. science and engineering workforce to 18% during the years 2003-13, according to a new report from the National Science Foundation's National Center for Science and Engineering Statistics (NCSES).

The total number of scientists and engineers in the U.S. rose from 21.6 million to 29 million, with immigrant numbers increasing from 3.4 million to 5.2 million.

In 2013, the latest year for which numbers are available, 63% of them were naturalized citizens, while 22% were permanent residents and 15% were temporary visa holders.

- 57% were born in Asia.
- 20% were born in North America (excluding the U.S.), Central America, the Caribbean or South America.
- 16% were born in Europe.
- 6% were born in Africa.
- Less than 1% were born in Oceania.

STEM Strength

The National Science Foundation is asking the scientific community to improve diversity so STEM "is fully and widely inclusive."

A new initiative dubbed NSF INCLUDES has been launched by the foundation. The acronym stands for "Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science."

While increasing the share of women and minorities in STEM fields would likely have a strong effect on systemic wage gaps, NSF director France Cordova argues: "Diversity—of thought, perspective, and experience—is essential for excellence in research and innovation in science and engineering."

- The Georgia House higher education committee passed Bill 801, which would increase the points

given to college students who take difficult STEM courses in calculating their GPAs. House Speaker Pro Tem Jan Jones says the bill would encourage more students to take challenging STEM classes because they would not have to worry as much about lower GPAs that could affect their scholarships.

Petroleum Numbers Dip

Reuters reports that enrollment in U.S. petroleum engineering degree programs fell for the first time in 13 years last fall, as an oil industry slump makes college students wary of entering the boom and bust world of oil and gas.

The drop, revealed by data from the country's 21 petroleum engineering departments and made available to Reuters, is modest—the number of enrollments dipped just 1% from a record high of 11,332 hit in 2014 when oil was around \$100 a barrel.

With recent lower prices, the 21 departments estimated that enrollments would fall by a further 7% this year.

Coming after years of steep gains that could mark the start of a long slide similar to one that followed an oil price slump in the 1980s and continues to leave a hole in the industry's workforce, some department heads and industry experts said.

Presidential Perks?

The Chronicle of Higher Education has found that despite pressure to cut costs at colleges and universities, "the compensation of private college presidents continues to climb," growing 5.6% to a median of \$436,000 between 2012 and 2013.

The report said the presidents of 32 private colleges earned over \$1 million in 2013, adding that Columbia University president Lee Bollinger (lawyer) and University of Pennsylvania president Amy Gutmann (political scientist) topped the list.

PEOPLE

Richard C. Benson, Ph.D., *New York Kappa '73*, is the new president of



The University of Texas at Dallas. Previously the dean of Virginia Tech's college of engineering, he was head of the department of mechanical engineering at Pennsylvania State University before that. Benson begins his new role in July and succeeds

David E. Daniel, Ph.D., *Texas Alpha '72*, who has become The University of Texas System deputy chancellor.

Doreen D. Edwards, Ph.D., *New York Sigma '97*, has been named



dean of the college of engineering at Rochester Institute of Technology. She is currently engineering dean at Alfred University, and joins RIT on July 1. Edwards

earned her B.S. in chemistry from the South Dakota School of Mines and Technology. She succeeds **Harvey J. Palmer, Ph.D., P.E.,** *New York Kappa '67*, who is retiring, and was an advisor at New York Pi.

Ralph M. Ford, Ph.D., *New York Theta '87*, is now the chancellor of



Penn State Erie, The Behrend College, after serving as interim chancellor for six months. A former Fulbright Scholar, he was previously director of the school of

engineering and associate dean for industry and external relations at the college, which he joined in 1994

as a faculty member in electrical and computer engineering.

Alec D. Gallimore, Ph.D., *New York Gamma '86*, has been appointed engineering dean at the University of Michigan. During 24 years as a scholar, educator and administrator at Michigan Engineering, he has been associate dean for academic affairs, and held two named aerospace engineering professorships. Gallimore's lab is currently working on the thrusters that may take humans to Mars. He succeeds **David C. Munson Jr., Ph.D., *Delaware Alpha '75***.



Domenico Grasso, Ph.D., P.E., *Michigan Gamma '87*, is now provost at the University of Delaware and professor of civil and environmental engineering there. He was previously The University of Vermont's vice president for research and dean of the graduate college. Grasso has been a visiting scholar at UC-Berkeley, a NATO fellow, and an invited technical expert to the United Nations. He has served as vice-chair of the United States Environmental Protection Agency science advisory board.



Patrick T. Mather, Ph.D., *Pennsylvania Beta '89*, is the new dean of Bucknell University's college of engineering. He moved from Syracuse University where he was professor of biomedical and chemical engineering. Mather was also the founding director and for eight years led the Syracuse Biomaterials Institute, an interdisciplinary center spanning three institutions and eight departments.



FACILITIES

University of Michigan is collaborating with Toyota Motor Corp. which is building a facility near the university's campus in Ann Arbor to further research into autonomous vehicles. It is the third center in a \$1 billion investment by the automaker.

This was announced by **Gill Pratt, Ph.D., *Massachusetts Beta '83***, chief executive officer of the Toyota Research Institute, who said "co-opetition" among automakers was key to saving the 1.2 million lives lost to traffic fatalities worldwide each year. Toyota hired Pratt, who was the U.S. military's top robotics engineer, last September.

The institute also is creating centers in Palo Alto, CA, and Cambridge, MA. The three facilities will work on artificial intelligence, materials science and robotics research.

• **University of Michigan** plans to spend \$12 million to create a nuclear engineering laboratory in the space where it disassembled its nuclear reactor more than ten years ago.

The lab will focus on applications to promote nuclear nonproliferation and improvements to nuclear power plants, and will be oriented at detection and imaging of radioactive sources.

Virginia Tech's nuclear science and engineering lab in Arlington, VA, and the **U.S. Naval Academy's** newest academic program, nuclear engineering, have joined in a research and educational partnership.

The agreement will launch research collaboration opportunities engaging faculty, students, and resources from both partners. It will enable other activities such as guest lectures, seminars, workshops, lectures, and short courses. Every summer a number of midshipmen will intern at the Virginia Tech lab.

The partnership leverages the close proximity between the U.S.

Naval Academy in Annapolis, MD, and the Virginia Tech National Capital Region campus.

Montana State University has received a \$3 million grant from the National Science Foundation to create the Montana Nanotechnology Facility.

Nanotechnology hasn't played a big role yet in agriculture, but potential applications include reducing applications of plant protection products, minimizing nutrient losses in fertilization, and increasing yields through better nutrient management. Food security, food safety, nutrition and environmental protection hold promise, too.

The grant will help researchers from outside MSU use equipment at the labs, enhance the education of MSU undergraduate and graduate students and create opportunities for public school teachers.

The university will use some of the money to add new equipment, allowing researchers to better study materials down to four nanometers in size, or the width of 40 to 50 atoms.

Pharma giant Bayer has announced plans to establish a new life science R&D center in Cambridge, MA, called the East Coast Innovation Center, in an effort to use the biotech hub's resources and connections. Rivals like Johnson & Johnson and Pfizer have opened similar innovation centers in the Boston area over the past several years.

Head of Bayer's U.S. pharmaceuticals division Habib Dable said of the plan, "We want to be a partner of choice in the industry—one that collaborates effectively with not only scientists from the great research hubs in the U.S., but also clinicians, patient advocates and other key players essential to bringing novel medicines to market."

While details of the office's size and scope have not yet been disclosed, Bayer has set up other similar centers before. In addition to its San Francisco Innovation Center, Bayer has innovation offices in Berlin, Beijing, Osaka, and Singapore.



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. You may report the death of a member by sending an email to chapter.eternal@tbp.org.

- AL A '44 **Fuller II, Asa B.**; February 15, 2016.
 '44 **Lett Jr., Philip Wood**; June 6, 2014.
 '49 **Eddins Jr., John William**; February 6, 2010.
 '53 **Watwood, James Gasoway**; November 22, 2010.
 '06 **Arnold, Jeremy Michael**; February 5, 2010.
 AL B '41 **Aguilera, Enrique Passig**; March 26, 2010.
 '44 **Owen, Charles Robert**; February 10, 2010.
 '48 **Bray, John William**; October 19, 2009.
 '48 **Zyne, Michael Patrick**; May 9, 2011.
 '50 **Burch, John Lee**; December 22, 2010.
 '51 **Price, Thomas Joseph**; July 1, 2010.
 '58 **Link, John Thelbert**; October 30, 2009.
 '63 **Antrim, William Dean**; June 7, 2011.
 '63 **Dunn, William Elmer**; November 7, 2009.
 AL Γ '80 **Darby, Barry Phillip**; October 3, 2009.
 AL E '57 **Douglas, George William**; May 18, 2011.
 AZ A '51 **Shannon, John H.**; July 10, 2007.
 '58 **Held, Robert Blaine**; November 14, 2015.
 AZ B '61 **Allen, Forest Ray**; June 17, 2011.
 '66 **Bates, Gary Dunreath**; July 22, 2011.
 '92 **Hykes, Linda Marie**; August 5, 2009.
 AR A '40 **White, James Ellis**; December 18, 2015.
 '41 **Randolph Jr., Joseph Peyton**; August 8, 2011.
 '48 **Reynolds Jr., Joseph E.**; August 20, 2010.
 '50 **Johnson, Drew Tea**; August 16, 2009.
 '71 **Cunningham, Morris David**; June 21, 2010.
 '73 **Reed, Stanley Eldon**; July 15, 2011.
 CA A '43 **Nelson, Theodore Richard**; June 15, 2009.
 '44 **Crocker, Angus McLeod**; March 9, 2010.
 '45 **Sherby, Oleg Dimitri**; November 9, 2015.
 '47 **Saville Jr., Thorndike**; November 5, 2014.
 '50 **George, Richard Emerson**; July 19, 2010.
 '50 **Monsen, William Harry**; November 3, 1997.
 '50 **Morris, Harold David**; September 11, 2009.
 '52 **Scriven II, L. Edward**; August 3, 2007.
 '62 **Swartz, Jerald Francis**; March 28, 2010.
 '67 **Hayashi, Tommy Takahiko**; April 10, 2011.
 '70 **Appel, Peter Charles**; September 15, 2010.
 CA B '48 **Waters, Alfred Earnest**; February 16, 2016.
 '56 **Peters, Rex Bredesen**; July 2, 2011.
 '97 **Linde, Dmitri**; January 19, 2010.
 CA Γ '40 **Trowbridge, Roy Post**; January 17, 2016.
 '42 **Schrock, Norman Burris**; June 17, 2011.
 '52 **Steele, Roderic Eadmund**; April 2, 2011.
 '54 **Whipple, Albert Jay**; October 9, 2013.
 '58 **Riggs, Henry Earle**; June 10, 2015.
 '72 **Raya, Thomas Edward**; June 2, 2011.
 '78 **Ashkenas, David John**; July 21, 2010.
 CA Δ '50 **Campbell, Bernard Alton**; January 31, 2010.
 '56 **White, William Homer**; December 10, 2009.
 CA E '54 **Lawton, Neill B.**; March 5, 2016.
 '76 **Swift, Gerald Wayne**; June 6, 2011.
 CA Z '51 **Turturici, Anthony Robert**; December 6, 2015.
 '70 **Blok, Jacques Joanness**; May 7, 2011.
 '74 **Campagna, Glen Paul**; July 30, 2010.
 CA H '61 **Coble, Darrell Vernon**; April 24, 2010.
 '65 **Morgin, Russell Lowell**; April 16, 2010.
 CA Θ '44 **Amrhein, James Edward**; May 22, 2011.
 '62 **Rosser, Charles Edwin**; April 20, 2011.
 '76 **Malloy, Barbara Kathryn**; July 20, 2011.
 '96 **Shihabi, Ehab Yassin**; February 5, 2010.
 CA I '75 **Nicholas, Gerald Alwyn**; August 9, 2011.
 CA K '75 **Megginson, Barry Jay**; June 7, 2010.
 '93 **Wilson, Jeffrey Allan**; October 6, 2009.
 '94 **Doan, Mike H.**; May 5, 2010.
 CA Λ '75 **Furlong, Daniel Burton**; February 13, 2010.
 CA M '78 **Chasuk, John Casey**; July 14, 2009.
 '85 **Navarro, Arthur Christopher**; April 3, 2011.
 '87 **Runyon, John Rex**; July 2, 2010.
 '01 **Allen, Andrew James**; May 3, 2011.
 CA N '55 **Irvine, Robert Gerald**; March 11, 2010.
 '73 **Crago, Terril Maurice**; June 10, 2010.
 '73 **Jochai, Harold Mark**; January 26, 2010.
 '91 **Nguyen, Hieu Cong**; July 31, 2010.
 CA Ξ '86 **Cavanaugh, Robert Emmett**; November 13, 2010.
 '93 **Keller, Susan Mary**; April 26, 2011.
 CA Π '71 **Webster, John Ogilvie**; December 20, 2009.
 '79 **Roberts, Phillip Allen**; July 21, 2011.
 CA P '85 **Kearns, John Charles**; August 15, 2011.
 CA T '85 **Hollick, Frank Carl**; October 1, 2009.
 CA Y '89 **Runte, Matthew John**; November 27, 2009.
 CO B '42 **Alden, Lee Halbert**; August 8, 2009.
 '44 **Pinamont, Carl James**; December 27, 2009.
 '45 **Becker, Floyd Kenneth**; October 25, 2010.
 '45 **Miller, James Raymann**; September 7, 2009.
 '45 **Roberts, John M.**; December 21, 2009.
 '47 **Strief, Eugene Ellis**; December 6, 2009.
 '51 **Troeltzsch, Robert Edward**; March 12, 2016.
 '52 **Olander, Robert Gray**; June 18, 2011.
 '57 **Ellis, David Ralph**; October 26, 2010.
 '58 **Sjaardema, Duane Richard**; February 19, 2016.
 '61 **Bakala, Ronald Louis**; July 30, 2009.
 '62 **Hubbard, Robert Mack**; January 23, 2016.
 '68 **Prull, Dale Eugene**; May 2, 2010.
 CO Γ '50 **Crary, James Herbert**; April 21, 2010.
 CO Δ '96 **Marker, John Thomas**; June 16, 2010.
 '05 **Maraccini, Michael Brad**; August 10, 2010.
 CT A '47 **Hawley Jr., Chester G.**; February 18, 2016.
 '50 **Booth Jr., Frederick Earl**; October 26, 2009.
 '98 **Gerstein, Moshe**; June 16, 2011.
 CT B '67 **Kay, James Michael**; January 4, 2011.
 CT Γ '97 **Upton, Zachary Michael**; May 3, 2011.
 DC A '77 **Parker, Gregory Martin**; September 1, 2009.
 DC B '52 **Soteriades, Michael Cosmas**; November 13, 2010.
 DC Γ '58 **Schick, Irvin Henry**; September 4, 2009.
 FL A '47 **Green, Robert William**; June 24, 2011.
 '61 **Hench, Larry Leroy**; December 16, 2015.
 '86 **Parmenter, Deborah Lynn**; September 8, 2009.
 '92 **Wolan Jr., John Thaddeus**; August 17, 2011.
 FL B '71 **Cordsmeyer, Joel Edward**; December 14, 2010.
 '75 **Burner Jr., Daniel F.**; May 8, 2011.
 FL Γ '84 **Mack, Gregory Alan**; June 30, 2011.
 FL Δ '68 **Wiedenbeck, Richard John**; September 6, 2009.
 '93 **Ahrens, Michael David**; April 27, 2011.
 '96 **Johnson, Harry Wilbur**; November 10, 2010.
 FL E '57 **Helmken, Henry Frederic**; April 12, 2011.
 '15 **Romulus, Josué Junior**; December 18, 2015.
 FL H '93 **McGee, Michael John**; August 31, 2010.
 GA A '41 **Brannen, Francis Mather**; December 19, 2009.
 '41 **Schulze, Robert Allison**; August 12, 2009.
 '42 **Ivey, Henry Reese**; December 28, 2010.
 '43 **Futrell, Taylor Morgan**; April 16, 2011.
 '45 **Jongedyk, Robert Peter**; December 18, 2009.
 '46 **Houstoun, Richard Charles**; August 26, 2010.

- '47 **Spencer, Robert E.**; April 19, 2010.
 '48 **Anderson, Edwin Lamont**; June 24, 2010.
 '49 **Barker, Dale Lockard**; April 20, 2011.
 '50 **Bowers, Daniel Eugene**; December 10, 2009.
 '50 **Sanders, Otis Edward**; March 23, 2010.
 '50 **Stempel, John Hugh**; November 6, 2010.
 '51 **Harvey, Donald Malcolm**; July 20, 2009.
 '52 **Humphrey, Robert Eugene**; September 2, 2010.
 '55 **Arrington, Claude Thomas**; January 27, 2015.
 '55 **Wear, Kenneth Burdette**; May 8, 2010.
 '57 **Volmar, Walter John**; July 14, 2009.
 '59 **Akridge, James M. Elmo**; November 21, 2015.
 '59 **Culpepper, Ronald M.**; January 31, 2010.
 '59 **Villanueva, Jose**; May 31, 2011.
 '60 **Sudbury, Roger Wheatley**; August 22, 2010.
 '63 **Harris, Paul Robert**; July 14, 2011.
 '64 **Heller, Rainer**; June 22, 2011.
 '65 **Drees, Carl Bernard**; November 26, 2009.
 '66 **Freeman, James Rush**; August 4, 2010.
 '67 **Clark, Thomas Bowles**; March 21, 2011.
 '75 **Ehrhardt, Mark Ernest**; March 24, 2011.
 '76 **Bernstein, Robert David**; November 3, 2010.
 GA B '02 **Millwood, Trey M.**; no details.
 IL A '44 **Goodell, Warren Franklin**; June 28, 2010.
 '44 **McVey, Charles Bernard**; September 14, 2010.
 '46 **Turner, Harold Eugene**; December 14, 2009.
 '49 **Kraft, Ralph Glenn**; October 8, 2009.
 '49 **Levine, Alvin Seymour**; January 3, 2011.
 '50 **Schnake, John William**; March 13, 2010.
 '50 **Walls, Harvey Eugene**; August 7, 2009.
 '52 **Houser-Van den Roye, Frederick**; Aug. 18, 2015.
 '52 **Lundeen, Thomas Curt**; August 12, 2009.
 '53 **Burnett, Donald Reid**; September 11, 2010.
 '54 **Quinn, John Albert**; February 8, 2016.
 '55 **Briggs, James Bernard**; January 1, 2011.
 '55 **Luders, Richard David**; December 16, 2009.
 '56 **Desimone, Daniel Van**; September 15, 2009.
 '57 **Brunnenmeyer, Richard L.**; November 14, 2009.
 '57 **Delzell, Robert Paul**; September 16, 2009.
 '58 **Baird, Robert Jackson**; March 10, 2010.
 '58 **Gartner, Joseph R.**; June 10, 2015.
 '60 **Carlson, Donald Earle**; August 21, 2010.
 '62 **Bredok, Roger Solem**; August 28, 2009.
 '76 **Covey, Roger Ecard**; July 30, 2013.
 '76 **Kuban, Daniel P.**; July 22, 2010.
 '78 **Laybourne, Ned Robert**; September 2, 2009.
 '84 **Snider, Michael James**; July 3, 2010.
 IL B '41 **Harmon, Robert Harrison**; March 18, 2010.
 '50 **Dygdon, John Thomas**; December 18, 2014.
 '52 **Swenson, George Edward**; November 6, 2009.
 '55 **Booth, Leonard John**; November 25, 2009.
 '59 **Dobias, Otto Charles**; January 21, 2016.
 '59 **Joseph, Daniel D.**; May 24, 2011.
 '89 **Such, Kurt J.**; July 16, 2011.
 '93 **Monaco, Garry A.**; April 20, 2011.
 IL Γ '45 **Cuthbertson, William Hull**; April 1, 2010.
 '47 **Dowd, Merle Edward**; December 1, 2010.
 '48 **Read, John Granville**; July 25, 2011.
 '51 **Tallmadge, Gene Edward**; January 7, 2010.
 '52 **Schmid, Lee Dwight**; March 15, 2011.
 '53 **Nylander, Reinhold F.**; September 20, 2009.
 '71 **Caldwell, John William**; January 15, 2010.
 IN A '42 **Truitt, Harry Hyde**; no details.
 '43 **Cooper, George Robert**; June 8, 2010.
 '43 **Schaaf, Robert Paul**; November 17, 2010.
 '43 **Seddon Jr., Arthur Hugh**; March 15, 2015.
 '43 **Suss Jr., Louis**; May 24, 2011.
 '44 **Pita, Edward Gerald**; July 24, 2010.
 '45 **Montgomery, John Campbell**; May 17, 2011.
 '45 **Moss, James Manley**; May 28, 2011.
 '47 **Canfield, William Chase**; November 5, 2009.
 '47 **Davies, James Samuel**; August 17, 2009.
 '48 **Dankert, James Edward**; January 31, 2016.
 '48 **Leavitt, Edward H.**; April 6, 2011.
 '48 **Sims, James Wilbur**; December 11, 2009.
 '49 **Burrough, Donald E.**; December 16, 2010.
 '49 **Felsted, Ernest Albert**; September 7, 2009.
 '49 **Holler, John Raymond**; October 29, 2010.
 '49 **Imoehl, James William**; December 17, 2010.
 '49 **Shearer, Jerry Trego**; November 10, 2010.
 '49 **Wallenhorst, Edwin Linus**; May 6, 2010.
 '49 **Zervas, James E.**; November 2, 2010.
 '50 **McNew, Robert Lee**; July 28, 2010.
 '50 **Pickering, James Robert**; May 27, 2011.
 '50 **Schwartzkopf, Glen Edward**; June 25, 2011.
 '51 **Govits, Jerome**; August 23, 2010.
 '51 **Ingle, Gene Ewing**; September 29, 2009.
 '51 **Pitts, George Leland**; January 21, 2010.
 '52 **Newman, Harry Lewis**; July 17, 2010.
 '53 **Barnett, Jack Nolan**; November 10, 2009.
 '53 **Dunk, Allan Carlton**; December 2, 2009.
 '53 **Gelezunas, Vincent Lucian**; June 3, 2010.
 '53 **Kirklin, Arlen Lee**; June 1, 2010.
 '55 **Marshall, John Philip**; February 1, 2010.
 '55 **McCracken, Philip Glen**; June 22, 2010.
 '57 **Kersey, Orville Edward**; August 13, 2011.
 '57 **Sage Jr., Andrew Patrick**; October 31, 2014.
 '58 **Cochran, James Amos**; June 28, 2011.
 '58 **Smith, Clayton Sutherland**; June 21, 2011.
 '60 **Elderkin, Charles Bruce**; September 10, 2010.
 '61 **McGrew, Billy Lee**; March 2, 2010.
 '62 **Peacock, Arthur Lewis**; February 27, 2010.
 '62 **Peery, James Harve**; March 28, 2011.
 '63 **Bauer, John Joseph**; August 7, 2011.
 '63 **Schnarr, Cecil R.**; July 18, 2011.
 '64 **Konegen, Rudolf Robert**; July 17, 2011.
 '65 **Hamilton, William Joseph**; July 26, 2010.
 '65 **Johnson, Ernest Edward**; August 8, 2011.
 '65 **Wilson, Harry Lee**; August 25, 2009.
 '66 **Flegal, Thomas Milton**; December 11, 2010.
 '66 **Furgalus, Keith Allen**; April 9, 2010.
 '68 **Gaska, Leonard Zigmont**; April 8, 2011.
 '71 **Klein, John William**; May 27, 2011.
 '73 **Sullivan, Thomas McCall**; September 23, 2009.
 '75 **Yost, William Henry**; February 26, 2010.
 IN B '48 **Burandt, Richard P.**; August 19, 2009.
 IN Γ '61 **Donlon, Jerome Arthur**; October 12, 2009.
 '63 **Brunner, Thomas William**; November 7, 2009.
 IN Δ '71 **Kirschenmann, Kendrick Charles**; March 9, 2016.
 IA A '40 **Nelson, Bradley Howard**; October 28, 2015.
 '42 **Graham, James Craig**; December 31, 2009.
 '42 **Thompson, Wayne Arthur**; July 4, 2011.
 '44 **Ragan, Ralph Roland**; July 15, 2014.
 '47 **Dove, Richard Charles**; March 29, 2011.
 '48 **Serovy, George Kaspar**; November 14, 2014.
 '50 **Reynolds, Richard John**; April 26, 2010.
 '51 **Huber, Robert Edmund**; December 19, 2010.
 '52 **Clark, Maurice Leland**; November 12, 2009.
 '52 **Clausing, Don Paul**; December 20, 2010.
 '53 **Ried, Kenneth August**; September 30, 2009.
 '58 **Grandfield, Allen Lee**; July 22, 2011.
 '58 **Wicks, Kendall Lee**; May 30, 2010.
 '59 **Matthys, Edward Lawrence**; June 13, 2010.
 '60 **Dillman, Norman Gregg**; November 21, 2010.
 '61 **Roskopf, Robert Frank**; July 9, 2010.
 '64 **Shanklin Jr., John Pack**; July 2, 2010.
 '66 **Schwendemann, Myles F.**; November 5, 2010.
 '68 **Hoveland, Richard Allen**; December 29, 2009.
 '71 **Smith, Donald Gary**; August 15, 2010.
 IA B '48 **Todd, James Carr**; July 2, 2011.
 '49 **Chantry, William Amdor**; July 2, 2011.
 '49 **De Haven, Clark Glen**; October 28, 2010.

- '50 **Hotz, John Ralph**; August 30, 2010.
 '50 **Kauzlarich, James Joseph**; January 7, 2015.
 KS A '42 **North, Ray Stemen**; April 26, 2011.
 '45 **Cousins, Donald**; January 15, 2016.
 '49 **Raper, Marion Eldon**; November 23, 2015.
 '50 **Englund, Stanley Monroe**; June 6, 2011.
 '50 **Hoover, Isaac Herbert**; July 4, 2010.
 '50 **McMurray, Donald Dean**; September 3, 2009.
 '50 **Thomas, Rex Eugene**; November 21, 2009.
 '51 **Szabo, Ted Tibor**; June 3, 2011.
 '52 **Luttrell, John George**; May 25, 2010.
 '55 **Lukenbill, Robert Seiler**; June 11, 2010.
 '60 **Shields, John Franklyn**; November 2, 2009.
 '61 **Coupe, David Lee**; September 11, 2010.
 '61 **Fleming, Alan Wayne**; January 6, 2010.
 '62 **Kuttler, David LeRoy**; March 24, 2010.
 '76 **Alexander, John Patrick**; June 2, 2010.
 KS B '65 **Penn, William Dale**; March 4, 2010.
 '67 **Kinney, William Harold**; August 21, 2009.
 '96 **Soice, Scott Eric**; July 15, 2011.
 KS Γ '48 **Stevenson, Paul Nelson**; December 4, 2009.
 '84 **Tangeman, John Gerard**; no details.
 '98 **Ouattara, Siendou**; December 21, 2010.
 KY A '48 **Peak Jr., Bart Nixon**; January 18, 2016.
 '50 **Khoury, Nicholas**; November 21, 2010.
 '65 **Myers, Daniel Nohl**; April 6, 2011.
 '98 **Doyon, Joshua J.**; July 18, 2011.
 '00 **Katzman, Nikki Jo**; July 22, 2011.
 KY B '53 **Miller, C. Eugene**; August 4, 2011.
 LA A '53 **Franks, Wayne A.**; August 22, 2009.
 LA Γ '48 **Killgore, Ellis Millord**; November 4, 2010.
 '74 **Aiken, Thomas Marshall**; May 23, 2010.
 LA Δ '50 **Mehrhoff, Joseph Cyril**; October 5, 2009.
 ME A '40 **Holland, Stanley Robert**; April 20, 2010.
 '44 **Miller, Philip D.**; November 20, 2009.
 '47 **Wylie, Douglas Wilson**; May 3, 2011.
 '51 **Longley, John Marlin**; January 23, 2016.
 '51 **Young, Robert Eric**; April 18, 2011.
 '53 **Chaisson, William Thomas**; February 7, 2016.
 '54 **Vreeland, Jay Henry**; November 14, 2009.
 '66 **Beenfeldt, Eric P.**; December 15, 2010.
 MD A '51 **Phillips, Edwin Robert**; August 10, 2011.
 '53 **Raichlen, Fredric**; December 13, 2014.
 '57 **Conn, Andrew Frank**; November 6, 2015.
 '63 **Citrenbaum, Ronald Lee**; November 8, 2010.
 '76 **Carlson, Henry Eugene**; February 20, 2010.
 '97 **Susil, Robert Charles**; February 5, 2010.
 MD B '48 **Mendoza, Donald Charles**; no details.
 '49 **Brown, Marshall John**; November 22, 2009.
 '50 **Steffler, James Gilchrist**; July 2, 2010.
 '58 **Staley, Ira Bowlus**; July 21, 2009.
 '61 **Lubbes Jr., Herman Otto**; May 29, 2011.
 '61 **Marsh, William Joseph**; March 7, 2010.
 '99 **Dahmas, Tariq Ahmad**; June 28, 2011.
 MD Γ '99 **Graczyk, Jeremy James**; July 12, 2011.
 MA A '42 **Harding, Warren Gamaliel**; April 27, 2010.
 '44 **Gregory Jr., George White**; March 1, 2010.
 '48 **Shaw, Robert Holcomb**; September 11, 2010.
 '50 **Horton, Malcolm David**; September 28, 2009.
 '52 **Krauss, Donald Mott**; August 14, 2010.
 '53 **Burger, Henry Karl**; April 8, 2010.
 '55 **Horstmann, Peter Henry**; August 19, 2009.
 '57 **Pomeroy, Collins Musgrove**; April 24, 2010.
 MA B '41 **Williams, Robert Sydney**; June 27, 2011.
 '44 **Margolskee, Justin Melvin**; December 11, 2009.
 '47 **Hyatt, Kent**; April 4, 2010.
 '49 **Crooks, Robert Gladden**; September 7, 2009.
 '50 **Long, Carl Ferdinand**; February 25, 2010.
 '52 **Gorman, Dennis Stevens**; January 5, 2010.
 '54 **Dekker, Jack**; April 8, 2011.
 '54 **Gleckman, William Barnett**; July 25, 2011.
 '54 **Leung, Edward Yan Wood**; June 29, 2010.
 '54 **Winslow, Benedict R. H.**; December 15, 2009.
 '55 **Peterson, Gene Stuart**; August 28, 2009.
 '57 **Strawson, David George**; July 12, 2011.
 '58 **Fiorelli, Arthur Christopher**; January 5, 2011.
 '59 **Haller, Neil Messenger**; July 3, 2011.
 '65 **Stegeman, Frederick C.**; December 11, 2009.
 '79 **Cammarata II, Robert Charles**; January 13, 2016.
 MA Δ '41 **Klema, Ernest Donald**; October 14, 2008.
 '47 **Williams, Harold Leroy**; June 28, 2009.
 '57 **Barry, John Mathew**; January 20, 2010.
 '60 **Gough, John Winslow**; August 7, 2011.
 MA E '44 **Paradis, John Baptiste**; June 5, 2014.
 '57 **Tuck, John Sanborn**; August 15, 2015.
 '57 **Zikas, Algirdas Julius**; December 3, 2010.
 '72 **Veinot, Philip Lester**; February 24, 2010.
 '76 **Hegarty, Thomas Michael**; June 29, 2010.
 '83 **Mack, David Joseph**; July 27, 2009.
 MA Z '50 **Cunningham, Terrence Edward**; August 9, 2009.
 '61 **Dunleavy Jr., James Edward**; November 9, 2010.
 '70 **Sadlowski, Michael Thomas**; December 23, 2009.
 MA Θ '92 **Meachum, Larry R.**; February 18, 2010.
 MI A '70 **Potter, Christopher Allen**; January 6, 2011.
 '04 **Dashkovitz, Joshua Michael**; June 19, 2010.
 MI B '44 **Maykuth, Daniel John**; November 20, 2010.
 '49 **Marin, Martin John**; May 27, 2010.
 '49 **Nekervis, William F.**; December 8, 2000.
 '49 **Vichich, Michael Frank**; January 6, 2010.
 '50 **Trusock, George Joseph**; March 13, 2010.
 '54 **Martin, Chauncey Lee**; April 18, 2010.
 '57 **Trax, Richard Victor**; April 11, 2010.
 '58 **Shebuski, Robert Charles**; October 23, 2009.
 '60 **Hetzel, Thomas Robert**; October 1, 2009.
 '62 **Manning, James Harvey**; January 20, 2010.
 '64 **Link, Bruce Lee**; February 5, 2010.
 '66 **Powell, David Edgar**; October 17, 2009.
 MI Γ '41 **Hamilton, Herbert Dewey**; June 10, 2010.
 '42 **Hagen, Grant Roosevelt**; March 20, 2015.
 '43 **Bowman, Brice Maynard**; September 5, 2010.
 '43 **Tootle, James Noble**; May 30, 2010.
 '43 **Verduin, Lee Cornelius**; July 11, 2011.
 '45 **Crim, Hugh Samuel**; November 12, 2009.
 '46 **Hess, Robert William**; September 3, 2009.
 '48 **Burton, James Robert**; January 19, 2016.
 '48 **Clarke, P. John**; July 31, 2010.
 '48 **Haft, Harry Hawkins**; September 10, 2010.
 '48 **Underwood, Jack Franklin**; June 28, 2011.
 '50 **Bay, Kenneth King**; March 21, 2011.
 '50 **Lemm, Rollin Gordon**; October 28, 2010.
 '50 **Randall, Richard Gerald**; January 14, 2010.
 '51 **Harger, John Edward**; December 4, 2010.
 '55 **Dambrauskas, Vincent**; September 11, 2009.
 '57 **Krynski, Edwin Peter**; September 3, 2009.
 '59 **Smith, Gene E.**; July 13, 2010.
 '64 **Bierma, Thomas Robert**; April 21, 2011.
 '66 **Gerow, James Robert**; August 24, 2010.
 '74 **Rockwell, Lawrence Edward**; January 17, 2010.
 MI Δ '52 **Stoll, Arthur James**; June 12, 2010.
 '52 **Syrowik, Leonard Richard**; December 9, 2009.
 '53 **Marshall, Robert Paul**; February 3, 2016.
 '57 **Desa, Edward Donald**; January 26, 2010.
 MI E '41 **Bauer, Frederick**; August 6, 2011.
 '53 **Hangstefer, James Burton**; July 25, 2009.
 '54 **Godzak, Steve George**; November 26, 2010.
 '63 **Renton, George W.**; June 27, 2015.
 MI Z '47 **Bernhardt, David Edward**; December 26, 2010.
 '55 **Ross, Giles L.**; June 3, 2011.
 '58 **Long, James Edward**; December 12, 2010.
 '77 **Roy, Michael Allen**; August 8, 2010.
 MI H '88 **Ferrington, Gregory John**; May 30, 2011.
 '92 **Brewer, James D.**; November 3, 2009.
 '98 **Babinski, Kevin Jerome**; July 20, 2010.
 MI Θ '01 **Bello, Yaritza Annette**; March 9, 2007.

MI I '74 **Natarajan, Narasimhamurthi**; January 30, 2016.
 '84 **Libby, Sharon**; December 16, 2010.
 MN A '47 **Hinz, Earl Robert**; November 17, 2009.
 '49 **Sexton, Joseph R.**; February 15, 2016.
 '71 **Klein, Thomas William**; April 19, 2011.
 MS A '40 **Landrum, Thomas Walter**; May 18, 2011.
 '48 **Flanagan, James Loton**; August 25, 2015.
 '49 **Shaw, Ralph Wright**; August 1, 2011.
 '58 **Walters, Clyde Hiram**; May 29, 2010.
 '15 **Jinkerson, Jeffrey Lee**; December 18, 2015.
 MO A '66 **Garrison, Donald Wayne**; April 27, 2011.
 MO B '43 **Keevil, Albert Sidney**; February 22, 2010.
 '47 **Harms, Harold Barnard**; December 31, 2010.
 '48 **Chaffin, James Earl**; January 15, 2010.
 '49 **Tichy, Nick**; November 13, 2010.
 '50 **Pollock, William Edward**; November 28, 2014.
 '50 **Smith, George Robert**; September 17, 2011.
 '53 **Robel, Michael Charles**; April 21, 2010.
 '54 **Shields, Lyle Henry**; February 20, 2010.
 '56 **Stewart, Jack Douglas**; March 15, 2010.
 '58 **Pool, Robert Harold**; July 19, 2010.
 '58 **Stanton, Mack Junior**; September 7, 2009.
 '59 **Randels, Dale Kenneth**; May 18, 2010.
 '59 **Walker, Willis Lynn**; June 9, 2010.
 '61 **Brady, Harold Francis**; April 25, 2011.
 '61 **Brixey, Harley Dwayne**; May 8, 2010.
 '62 **Hertel, Thomas Phillip**; July 19, 2010.
 '63 **Rintoul, Richard Oliver**; May 2, 2011.
 '70 **Hardy, Gerald Douglas**; July 16, 2009.
 '81 **Colasuonno, Kenneth Thomas**; March 18, 2010.
 '82 **Motamedi, Sharvin**; December 6, 2010.
 MO Γ '43 **Franzel, Harvey Lee**; November 26, 2009.
 '43 **Neuhoff, Paul Sidney**; July 1, 2011.
 '44 **Waldner, Michael**; December 17, 2010.
 '45 **Nadler, Gerald**; no details.
 '48 **Demey, Henry Kerth**; April 3, 2011.
 '50 **Baxter, William Arrington**; July 14, 2011.
 '53 **Berger, Raymond Harry**; June 11, 2011.
 '57 **Hooper, Jack Allen**; December 16, 2010.
 MT A '41 **Knebel, Harvey Leroy**; June 4, 2010.
 '42 **Mullin, Gordon O.**; August 23, 2009.
 '59 **Hogan, Ralph T.**; December 31, 2010.
 '61 **Boyd, Donald William**; March 29, 2011.
 '63 **Fuhrman, Ronald Dean**; March 30, 2011.
 '75 **Traeholt, Alan Dean**; June 29, 2011.
 NE A '81 **Hyde, Neal Thomas**; March 28, 2010.
 NH A '77 **Riley, Cynthia Jones**; November 19, 2009.
 NJ A '41 **Burel, William Jacob**; March 29, 2011.
 '44 **Rooney, Francis Joseph**; December 28, 2009.
 '47 **Ross, Frank Angelo**; June 29, 2011.
 '50 **Feehan, John David**; May 15, 2010.
 '65 **Starita, Joseph Michael**; November 17, 2009.
 '69 **Clayton, Ronald Allen**; July 14, 2011.
 NJ B '42 **Steele, Thomas Wilkinson**; December 1, 2010.
 '48 **Romaine, Benjamin Hall**; June 2, 2011.
 '56 **Chae, Yong Suk**; January 13, 2010.
 '71 **Kirkpatrick, Jeffrey Allan**; April 12, 2010.
 '81 **Bara, William Edward**; February 2, 2010.
 NJ Γ '42 **Lipton, Martin H.**; March 20, 2011.
 '42 **Rips, Ervine Milton**; November 11, 2009.
 '50 **Albanes, Nicholas James**; March 30, 2010.
 '51 **Borders, Charles Lindburgh**; November 20, 2009.
 '52 **Apostolina, Alexander**; January 23, 2016.
 '53 **Preuss, Ernest August**; September 12, 2010.
 '58 **Carlyle, Robert Jerry**; January 30, 2010.
 '60 **Zusin, Edmund C.**; August 5, 2009.
 '68 **Selden, Gerald Paul**; December 17, 2010.
 '72 **Meyer, John Alton**; April 15, 2010.
 '94 **Johnson, Michael G.**; May 31, 2011.
 NJ Δ '77 **Langenhan, James Paul**; May 28, 2010.
 '92 **Wang, Reynold Clifton**; October 8, 2009.
 NM A '94 **Niemi, Belinda Trone**; December 16, 2015.
 NM B '52 **Barnes, William Lincoln**; March 24, 2011.
 '52 **Mottola, Alexander Carl**; July 1, 2010.
 '86 **Tucker, Edwin Darol**; November 2, 2009.
 NY A '47 **Weidenbaum, Sherman Sol**; December 29, 2009.
 '48 **Friedman, Morton B.**; June 3, 2014.
 '54 **Highland Jr., Patrick Albert**; June 18, 2010.
 NY B '41 **Miller, Blanchard Sheldon**; August 16, 2009.
 '49 **Keefe, Leonard Joseph**; June 10, 2011.
 '50 **Balaban, Lester**; May 18, 2011.
 '50 **Billings, Theodore Everett**; December 25, 2010.
 '60 **Rider, Bernard Myron**; July 13, 2010.
 '61 **Hammel, Gene Paul**; September 10, 2009.
 '64 **Bicevskis, Imants**; March 13, 2010.
 NY Γ '40 **Ebeling, Dolph George Phillip**; no details.
 '44 **Powell, George Lauck**; July 22, 2010.
 '45 **Williams, Stanley Brayton**; July 28, 2011.
 '49 **Silkworth, George Hiram**; March 5, 2016.
 '50 **La Torre, Michael Joseph**; November 7, 2010.
 '50 **Radany, Ernest William**; January 3, 2010.
 '51 **Brown, Warren Flores**; April 18, 2011.
 '51 **Gahan, John William**; June 29, 2010.
 '51 **Kosloff, William Abraham**; November 14, 2010.
 '51 **Mosteller, Michael**; February 6, 2010.
 '51 **Wawrousek, Hans W.**; December 18, 2010.
 '52 **Zabriskie, William Lum**; November 25, 2010.
 '53 **Ford, Willard Lawrence**; February 17, 2016.
 '53 **Kunz, Harold Russell**; March 4, 2015.
 '53 **Pratt, Stanley Lyman**; December 1, 2009.
 '54 **Matthies, Harry Ernest**; September 3, 2010.
 '54 **Yount, George Raymond**; May 28, 2011.
 '61 **Fischer, John Edward**; June 28, 2011.
 '63 **Tomlinson, Raymond S.**; March 5, 2016.
 '85 **Stanten, Raymond Anthony**; April 9, 2010.
 NY Δ '44 **Rothfuss, William John**; July 1, 2010.
 '50 **Elder, Thomas James**; February 3, 2016.
 '82 **Dineen, Jeremiah Robert**; February 6, 2009.
 NY E '41 **Amico, Gaetano Vincent**; February 2, 2016.
 '52 **Pitz, Richard Lester**; May 31, 2011.
 '57 **Tallon, John Edward**; January 1, 2011.
 '65 **Cafiero, Albert F.**; August 23, 2009.
 NY H '41 **Giusti, Victor Frank**; January 23, 2016.
 '45 **Kahn, Elliott Herbert**; May 15, 2011.
 '49 **Lederer, Paul S.**; October 15, 2015.
 '50 **Levine, Martin**; April 26, 2011.
 '55 **Healy, Philip Francis**; August 15, 2010.
 '55 **Spitz, Bernard**; November 10, 2015.
 '60 **Grove, Andrew Steven**; March 21, 2016.
 '88 **Jones, Brian**; December 13, 2010.
 NY Θ '50 **Fiedler, Walter Howard**; February 4, 2016.
 '50 **Jumps, Carl Frederick**; March 11, 2016.
 '50 **Steinborn, Herman Joseph**; May 7, 2010.
 '69 **Aiken, Edward George**; November 14, 2010.
 '80 **Valente, Arthur**; May 6, 2010.
 NY I '48 **Garrison, Walter Edward**; November 6, 2014.
 '67 **Sparacin, William George**; October 22, 2009.
 '73 **Vickers, Maxim**; November 29, 2010.
 NY K '97 **Brumbaugh, David Jeremiah**; April 29, 2011.
 NY Λ '50 **Dill, Joseph John**; December 4, 2009.
 '50 **Karpen, Edward William**; October 24, 2010.
 '51 **Rubio, Abdon**; February 16, 2010.
 '53 **Spiegel, Stanley S.**; March 4, 2016.
 '55 **Smedfeld, John Birger**; March 27, 2011.
 NY N '54 **Gilbert, Paul Harry**; May 30, 2011.
 '78 **Dracker, Raymond Joseph**; June 25, 2010.
 '80 **Maglione, Bonnie Fay**; December 30, 2010.
 '85 **Busch, Robert Karl**; November 10, 2010.
 NY Ξ '64 **Bello, Vincent George**; March 15, 2002.
 '66 **Gratzer, Frank Joseph**; October 24, 2010.
 NY Π '03 **Gunawan, Suryadi**; November 11, 2010.
 NC A '53 **Elleman, Thomas Smith**; July 22, 2010.
 '56 **Grigsby, Robert B.**; March 7, 2015.
 '61 **Bridgman, Charles James**; November 15, 2015.

'64 Grove, Robert Barry; September 5, 2010.
 '69 Lyles, Donald Rupert; March 13, 2016.
 '83 Moore, Charles Albert; May 5, 2011.
 NC Γ '52 Harvey, Frank Herbert; February 2, 2010.
 '52 Murray Jr., Malcolm Gibson; December 17, 2015.
 '57 Sheppard, Frederick Gayle; November 17, 2010.
 NC Δ '91 Coomes, Mark Alexander; June 14, 2010.
 NC E '89 Bromell, Stephanie Michelle; January 6, 2011.
 ND A '53 Edam, Donald Merle; July 11, 2010.
 '54 Wyatt, Gerald Alfred; January 28, 2016.
 '67 Shotzbarger, John David; March 20, 2011.
 '71 Doernbrack, Egon H.; May 20, 2010.
 '87 Jilek, Duwayne Arnold; April 11, 2010.
 '94 Sinkula, David Craig; April 14, 2010.
 '13 Traut, Samuel Al; June 23, 2015.
 ND B '87 Yesel, Leon Philip; February 6, 2010.
 OH A '42 Taylor, Donald Earl; September 14, 2010.
 '43 Pfaff, Robert Wilson; April 27, 2011.
 '45 Vanderwist, Donald Charles; May 3, 2010.
 '48 Schreiber, Howard B.; November 7, 2010.
 '48 Smith, Robert Joseph; November 7, 2009.
 '49 Berlincourt, Don Arthur; August 9, 2010.
 '50 Kallman, Robert Richard; July 22, 2011.
 '62 McRae, Clifford John; December 1, 2009.
 '67 Rinehart, Ronald Wayne; December 11, 2009.
 '74 Patterson, Thomas Graham; August 1, 2011.
 OH B '45 Hoch, Michael; February 5, 2010.
 '52 Bell, Thomas Van Dyke; June 2, 2010.
 '62 Boggs, Joseph Stanley; December 23, 2009.
 '63 Melchioris, Michael Francis; August 2, 2011.
 '63 Sirois, Gerard O.; July 16, 2015.
 OH Γ '41 Lersch, William Harwood; September 8, 2009.
 '42 Haidet, Richard Terence; March 24, 2010.
 '44 Kornichuk, Arthur; May 29, 2010.
 '48 Cocherell, Arthur Leonard; July 24, 2009.
 '49 Gleason, William Joseph; March 14, 2010.
 '49 Kragle, Harry Arthur; January 20, 2010.
 '50 Piper, James Ernest; January 4, 2011.
 '50 Stephenson, Benjamin Taylor; January 25, 2010.
 '51 Arnold, Roy Orville; December 22, 2010.
 '51 Leist, Walter Curtis; August 4, 2011.
 '51 Monahan, Norman Rodney; March 5, 2016.
 '51 Rutter, Vance Elwood; October 28, 2010.
 '51 Syfert, Thomas Isaac; October 9, 2009.
 '52 Steger, Charles Brashears; December 23, 2010.
 '53 Walters, Jack Denham; July 20, 2011.
 '54 Sandefur, John Everett; September 17, 2009.
 '56 Martin, Willis Gerald; December 20, 2009.
 '58 Noble, Lester Dean; June 28, 2015.
 '67 Cressman, David Earl; November 13, 2010.
 '77 Schwickert, James Albert; June 2, 2010.
 '90 Sawyer, James Henry; April 19, 2011.
 OH Δ '62 Zwahlen, Helmut Traugott; February 28, 2010.
 OH E '47 Stone, Leonard Richard; June 10, 2011.
 '48 Rhodes, Robert Russell; July 19, 2011.
 '49 Miller, William Ralph; May 22, 2010.
 '53 Wills, Richard Hanson; July 9, 2010.
 '54 Hancock, Robert Owen; November 24, 2010.
 '72 Rettig, Alan K.; September 8, 2009.
 OH Z '42 Merritt, Clarence Eugene; August 14, 2008.
 '80 Kosmyna, Robert W.; March 25, 2011.
 OH H '60 Carpenter, Donald Gilbert; March 27, 2011.
 OH Θ '86 Pentrack, George Thomas; November 23, 2009.
 OH I '49 Johnston, Lester L.; February 8, 2016.
 '61 Maier Jr., Leo Robert; February 3, 2016.
 OH K '53 Nichols, Richard G.; March 19, 2011.
 '95 Busko, John Fred; June 30, 2011.
 OH Λ '82 Zimmer Jr., James Albert; March 28, 2010.
 OH M '65 Bethke, Richard James; February 15, 2010.
 OK A '44 Alpern, Alva Melvin; July 20, 2009.
 '48 Forney, Bill Earl; December 20, 2009.
 '60 Alvis, Robert Lawrence; December 24, 2015.
 '61 Urban, Robert Gene; July 27, 2010.
 '64 Hoelzer, Ronald Newton; October 30, 2010.
 OK Γ '47 Schrader, George Frederick; August 9, 2009.
 OR A '43 Barnes, Robert George; November 7, 2009.
 '43 Knudsen, James George; January 25, 2010.
 '46 McConnell, Delmar Lamont; June 7, 2011.
 '46 Ott, Roland Elwood; June 2, 2010.
 '50 Fredrickson, Gilbert Fredrick; April 21, 2010.
 '53 Engdahl, Rodney Allen; April 15, 2011.
 '68 Kuenzi, Vernon Leroy; November 15, 2010.
 '69 Walt, Thomas Dale; August 15, 2009.
 '76 Yamamuro, Jerry Alan; August 18, 2010.
 PA A '42 Clark, Robert Wesley; December 26, 2010.
 '43 Mueller, John Haines; August 23, 2009.
 '49 Lenz, Robert William; July 2, 2010.
 '50 Miller, Donald Floyd; July 14, 2011.
 '51 Griffin, Thomas McLain; October 17, 2010.
 '53 Begley, Richard Thomas; May 15, 2011.
 '55 Ryerson, George Douglas; October 30, 2015.
 '57 Johnson, Peter Moore; March 28, 2011.
 '57 Romer, Richard Powell; August 10, 2010.
 '58 Campbell, Malcolm Larry; April 4, 2010.
 '83 Jones, Kenneth Shannon; May 24, 2011.
 '84 Schwenk, James Allen; July 16, 2009.
 PA B '42 Walton, Harold Vincent; May 1, 2009.
 '48 Turrell, Douglas Walter; November 28, 2010.
 '67 De Biase, John Louis; March 2, 2010.
 '72 Imm, Robert Charles; November 10, 2010.
 '82 Brown, Steven Edward; April 29, 2011.
 '94 Strine, Sean B.; December 7, 2010.
 PA Γ '56 Billetdeaux, Adrian Carlyle; July 24, 2009.
 '66 Provance, David William; July 13, 2010.
 PA Δ '47 Bricklin, Baruch; March 2, 2010.
 '50 Hart, Oliver James; March 15, 2016.
 PA E '53 Bomberger, John Christian; February 8, 2016.
 '54 Tunner Jr., Joseph Robert; May 9, 2010.
 PA Z '44 Black, Raymond Harris; May 23, 2010.
 '45 Cogan, Isadore; November 27, 2010.
 '47 Johnson, James R.; September 12, 2009.
 '48 Talbot, John Philip; June 11, 2011.
 '49 Harris, John Herbert; February 17, 2007.
 '50 Pleskacz, Victor John; January 6, 2011.
 '51 Schmidt, George Charles; October 1, 2009.
 '52 Seif, Eric; August 5, 2011.
 '52 Stangler, Donald Maurice; November 18, 2010.
 '53 Hertel, Paul Herman; May 22, 2010.
 '55 Burke, Richard Million; July 15, 2010.
 '93 Roberts, Stephen Gerald; August 29, 2010.
 PA H '47 Gloisten, Richard Frederick; February 7, 2010.
 '50 Baran, Alexander Stanley; April 20, 2011.
 PA Θ '44 Demmy, Richard Hortman; April 8, 2010.
 '46 Cox Jr., Burton N.; September 15, 2010.
 '57 Bresan, Vincent Peter; July 30, 2011.
 '59 Coppa, Paul Louis; October 25, 2015.
 '81 Fulton, Edward W.; January 1, 2011.
 PA I '87 Doyle, Thomas Edward; August 15, 2011.
 PA K '50 Miller, Clayton Leonard; May 17, 2011.
 PA Λ '77 Shaw, Cynthia A.; October 31, 2009.
 RI A '43 Tamburri, Thomas Nicola; May 11, 2011.
 RI B '75 Sirois, Gilbert Aurel; January 25, 2016.
 SC A '82 Crawford Jr., William Franklin; June 19, 2010.
 '87 Tubbs, Michael Eugene; December 8, 2009.
 SC B '49 Plaxco, William Todd; March 3, 2010.
 '50 Whiteside, Robert Erwin; July 24, 2011.
 '57 Bonnell, Ronald David; July 31, 2010.
 '58 Housholder Jr., William Ray; February 13, 2016.
 SC Γ '48 Beckett, William Wade; June 14, 2011.
 '49 Beckett, Jerome Scroggs; March 26, 2010.
 '68 Abbott, Byron Arthur; December 20, 2015.
 SD A '95 Mattox, David Alan; January 23, 2016.
 SD B '94 Stoos, Michael Alan; March 14, 2010.
 TN A '50 Rion, Pat F.; May 29, 2010.

'50 **Schell, Robert Johnson**; October 28, 2014.
 '52 **Min, Tony C.**; no details.
 '56 **Harber, Bobby Donald**; March 13, 2010.
 '58 **Stinson, Billy Gene**; July 17, 2009.
 '59 **Williams, Charles Wesley**; February 11, 2016.
 '63 **Robertson, Lynn Franklin**; December 5, 2010.
 '65 **Bailey, Walter Howard**; February 9, 2016.
 TN B '55 **Rowan Jr., William Hamilton**; January 6, 2015.
 TN Γ '56 **Barnett, William Eugene**; February 5, 2016.
 TN E '75 **Knight, Edward L.**; April 20, 2010.
 TX A '49 **Phillips Jr., Victor D.**; July 11, 2015.
 '49 **Reese, Lymon Clifton**; September 14, 2009.
 '50 **Rodrique, Henry J.**; November 27, 2010.
 '51 **Powers, Kerns Harrington**; June 5, 2010.
 '52 **McDonald, John Scott**; April 10, 2011.
 '57 **Soward, Wamac Franklin**; November 25, 2015.
 '61 **Ferguson, William Wade**; December 29, 2010.
 '78 **Bennett, Michael Steven**; August 21, 2010.
 '78 **Woodside, Gayle**; February 11, 2010.
 '84 **Prado, Rafael**; June 15, 2011.
 '86 **Bernstein, David Mark**; November 20, 2010.
 TX B '44 **Watkins, Valton Derwin**; April 22, 2011.
 '48 **McElroy, John H.**; August 9, 2011.
 '50 **Evarts, William Welch**; August 13, 2009.
 '52 **Meenaghan, George Francis**; July 22, 2007.
 '55 **Green, Carl Weldon**; January 16, 2016.
 '58 **Meadows, Robert Alan**; July 28, 2009.
 '60 **Roe, Weston Arthur**; February 8, 2016.
 '70 **White, Russell Wayne**; February 9, 2016.
 '73 **Gad, Scott Michael**; April 22, 2010.
 '91 **Billingsley, Bill Edward**; July 3, 2010.
 TX Γ '41 **Owens, James Beverly**; November 2, 2009.
 '42 **Mobley, Burton Leroy**; January 12, 2010.
 '44 **Broz, Igor R.**; May 18, 2010.
 '46 **Missimer, Dale Joe**; January 29, 2010.
 '56 **Sauer, Ray Neal**; February 1, 2010.
 TX Δ '41 **Wheeler, Eldred Brown**; May 18, 2000.
 '43 **Tatum, Freeman Arthur**; December 29, 2009.
 '49 **McPhail, James Frances**; April 25, 2010.
 '49 **Shannon, Ralph Lonzo**; November 30, 2009.
 '49 **Walkow, Arnold Maury**; December 2, 2010.
 '50 **Kotara, Archie Henry**; July 11, 2011.
 '51 **Deborde, Donald Donman**; May 23, 2011.
 '51 **Jackson, Charles**; August 3, 2010.
 '52 **Souther, Robert Pat**; October 25, 2009.
 '55 **Russell, Jacob Bruce**; April 5, 2011.
 '57 **Bahlmann, George Edward**; May 27, 2010.
 '61 **Gopffarth, Wilford Hugo**; December 30, 2009.
 '61 **Patterson, Walter Hale**; March 13, 2010.
 '62 **Wesselski, Clarence James**; April 25, 2011.
 '63 **Berkovsky, Edwin John**; May 28, 2010.
 '67 **Cannon, Michael Dell**; April 20, 2011.
 '68 **Rapp, Donald Gustave**; December 30, 2009.
 '69 **Goldstein, Kenneth L.**; July 27, 2010.
 '69 **Lasalle, Charles Carleton**; December 30, 2010.
 '71 **Baker, William Duncan**; October 30, 2014.
 '83 **Reed, Randy Scott**; October 1, 2009.
 TX E '47 **Ostrowsky, Benjamin**; February 2016.
 '61 **Grierson, Joseph Benjamin**; November 8, 2010.
 '79 **McGee, Michael Patrick**; November 30, 2010.
 '93 **Chen, Beverly Joyce**; November 21, 2009.
 '94 **Pickett, Clifford Woodrow**; April 1, 2011.
 TX Z '73 **Runnels, David Joe**; June 7, 2010.
 TX H '74 **Balthrop, Chris Alan**; July 20, 2011.
 '76 **Barron, Bernard Joseph**; February 11, 2010.
 '82 **Walters, Bruce Leo**; April 30, 2011.
 '84 **Brumback, Julie Lynn**; November 4, 2010.
 '86 **Cooke, Daniel Earl**; October 30, 2010.
 TX K '89 **Moore, Carla A.**; September 9, 2010.
 UT A '51 **Timothy, Keith O.**; May 5, 2011.
 '57 **Schreiner, John Christian**; August 14, 2009.
 '65 **Parker, George Elmer**; February 20, 2008.
 '71 **Anderson, Steven Victor**; April 20, 2010.
 UT Γ '73 **Dillon, Gary Eugene**; May 12, 2010.
 '78 **Hasfurther, Kenneth W.**; February 4, 2014.
 VA A '35 **Payne, William Walker**; December 20, 2010.
 '58 **Rucker, David McDaniel**; November 4, 2010.
 '70 **Rowland Jr., Frank Monroe**; August 22, 2010.
 '96 **Jonas, Dawn Deann**; November 2, 2010.
 '01 **Axisa, Jonathan Charles**; July 8, 2010.
 VA B '50 **Watkins Jr., Carl Ashley**; May 7, 2011.
 '57 **Pardue, William Marshall**; February 2016..
 '59 **Jones, Enoch Morse**; February 26, 2016.
 '74 **Conner, Michael Lynn**; September 17, 2009.
 '81 **Cates, Randy Lee**; June 18, 2010.
 WA A '48 **Babb, Albert Leslie**; October 22, 2014.
 '48 **Parks, Robert Guy**; August 26, 2010.
 '48 **Peters, Richard Keith**; November 9, 2010.
 '49 **Tupper, Howard Thomas**; July 9, 2010.
 '54 **Miller, Thomas Wayne**; March 21, 2011.
 '58 **Geer II, Leonard Darr**; July 8, 2010.
 '60 **Terrel, Ronald Lee**; March 24, 2011.
 WA B '41 **Erikson, Lester O.**; July 23, 2010.
 '42 **Wegner, Glenn Wright**; November 26, 2009.
 '43 **Morgan, David McGaughey**; March 23, 2010.
 '48 **Lagers, Warren Lester**; August 4, 2011.
 '51 **Kelly, William Scott**; July 14, 2009.
 '52 **Livingston, Philip Dwight**; October 17, 2009.
 '58 **Shatila, Hassan A.**; August 18, 2010.
 '61 **Krohn, Howard Emil**; August 25, 2009.
 '62 **Delaney, Ladin Harold**; September 7, 2010.
 '70 **Nielsen, Robert Roy**; July 15, 2011.
 WV A '54 **Swickert, Charles Walter**; August 24, 2009.
 '78 **Long, Timothy Lyle**; February 11, 2016.
 WV B '74 **Keaton, Arnold Roy**; July 26, 2009.
 WI A '41 **Desch, Philip Foster**; April 29, 2011.
 '41 **Webbere, Fred John**; April 1, 2010.
 '46 **Andrae, Richard William**; September 13, 2010.
 '48 **Young, Robert Gerald**; May 23, 2010.
 '49 **Bertz, Ralph Harrison**; June 4, 2014.
 '49 **Conley, John Edward**; March 20, 2010.
 '49 **Kleefisch, Arthur John**; July 15, 2010.
 '49 **Timmel, Frederick Gustav**; January 18, 2010.
 '50 **Berg, Arnold Milton**; December 29, 2010.
 '50 **Fritz, Alfred Hermann**; July 7, 2010.
 '50 **Meissner, Paul Filip**; May 9, 2010.
 '50 **Schoessow, Robert Henry**; October 24, 2009.
 '51 **Burton, James Charles**; August 13, 2010.
 '51 **Crump, Jesse Meyers**; July 18, 2011.
 '54 **Anderson, Ronald Oliver**; July 18, 2010.
 '54 **Genke, Richard Marshall**; May 14, 2010.
 '89 **Kohles, Darin Robert**; January 9, 2016.
 '89 **Leung, Wing Sze Agnes**; June 23, 2010.
 WI B '42 **Madden, Ralph Joseph**; July 22, 2010.
 '43 **Loos, Robert Fredrick**; October 30, 2010.
 '44 **Heil, Richard J.**; December 4, 2010.
 '46 **Cavagnaro, Walter John**; July 18, 2011.
 '50 **Lemke, Warren Julius**; January 5, 2011.
 '50 **Wessa, Wallace Wayne**; November 23, 2010.
 '52 **Geller, Thomas Lee**; December 26, 2010.
 '56 **Wolff, Richard Paul**; June 23, 2010.
 '62 **Horkheimer, Ronald W.**; December 14, 2015.
 '64 **Abler, Joseph Herman**; December 14, 2009.
 '66 **Neal, Lonnie George**; January 9, 2010.
 '67 **Fisher, Sheldon**; February 20, 2010.
 '67 **Osborn, John Edward**; March 27, 2010.
 '71 **Priest, David Lee**; March 13, 2010.
 '71 **Weber, Thomas Paul**; June 3, 2010.
 WI Γ '49 **Goetsch, Herbert A.**; June 8, 2015.
 '80 **Kalski, Scott Stanley**; January 7, 2011.
 '87 **Navine, Marc Louis**; September 26, 2009.
 WY A '76 **Moody, Theodore James**; July 23, 2011.
 '94 **Huntington, George Slocum**; August 14, 2014.



Brain Ticklers

RESULTS FROM WINTER

Perfect

*Bohdan, Timothy E.	IN	Γ	'85
Brule, Mark		Son of member	
*Couillard, J. Gregory	IL	A	'89
Garcia, Agustin M.	NY	O	'80
Jones, John F.	WI	A	'59
Jones, Jeffery C.		Son of member	
Kenny, Thomas A.	NY	Θ	'89
Kimsey, David B.	AL	A	'71
*Norris, Thomas G.	OK	A	'56
Prince, Lawrence R.	CT	B	'91
*Schmidt, V. Hugo	WA	B	'51
*Slegel, Timothy J.	PA	A	'80
Slegel, Craig M.		Son of member	
*Spong, Robert N.	UT	A	'58
*Strong, Michael D.	PA	A	'84

Other

Alexander, Jay A.	IL	Γ	'86
Aron, Gert	IA	B	'58
Beaudet, Paul R.		Father of member	
*Celani, Paul E.	MD	Γ	'97
Colbourne, Richard J.	PA	E	'78
*Crawford, Martin	TN	A	'54
Handley, Vernon K.	GA	A	'86
*Johnson, Mark C.	IL	A	'00
Johnson, Roger W.	MN	A	'79
Jones, Donlan F.	CA	Z	'52
Lalinsky, Mark A.	MI	Γ	'77
Maritch, Mark J.	PA	E	'03
Marrone, James I.	IN	A	'61
Parks, Christopher J.	NY	Γ	'82
Pendleton III, Winston	MI	Γ	'62
Quan, Richard	CA	X	'01
Rentz, Peter E.	IN	A	'55
Richards, John R.	NJ	B	'76
Riedesel, Jeremy M.	OH	B	'96
Rogli, Victor L.	TX	Γ	'73
Schweitzer, Robert W.	NY	Z	'52
Sigillito, Vincent G.	MD	B	'58
*Skowronski, Victor J.	NJ	A	'71
*Smith, Ronald E.	PA	A	'86
Stadlin, Walter O.	NJ	Γ	'56
Stribling, Jeffrey R.	CA	A	'92
Summerfield, Steven L.	MO	Γ	'85
Sutor, David C.		Son of member	
Svetik, J. Frank	MI	A	'67
Vegeais, James A.	IL	A	'86
*Verkuilen, William W.	WI	B	'92
Voellinger, Edward J.		Non-member	
*Widmer, Mark T.	OH	A	'84

* Denotes correct bonus solution

WINTER REVIEW

The most difficult regular problems were No.1, about green cubes touching a red cube, and No. 3, about the number of times the calendar date uses the digits 1 to 9 each once, with about 2/3 of the answers being correct. Only about half the answers to the Bonus, about BINGO odds, were correct.

SPRING SOLUTIONS

Readers' entries for the Spring Ticklers will be acknowledged in the Fall *BENT*. Meanwhile, here are the answers:

1 TRY×THIS = TICKLER translates to **986x9203 = 9074158**. This is a fairly difficult cryptic. One approach, which uses a spreadsheet, is as follows. Start by assuming T = 9, then look at possible values for Y and S and generate a table giving Y*S mod(10) which is equal to R. Then, generate a second table which is TRY for possible values of Y (TRY = 900 + 10×R + Y). Next, pick H and I and generate another table with values for THIS (THIS = 9000 + 100×H + 10×I + S). Finally, create a table which calculates TRY×THIS=TICKLER. Examine the entries in the table to find values of TICKLER which start with 9, have a second digit equal to I and have all 7 digits different. It isn't too difficult to find the answer.

2 $7^{2048} - 1$ is divisible by 4^7 . Start by factoring $(7^{2048} - 1) = (7 - 1)(7 + 1)(7^2 + 1)(7^4 + 1) \dots (7^{1024} + 1)$. It is obvious that $7^y + 1$ is divisible by 2 for all positive integral y . Now, $7^2 = 49 \equiv 1 \pmod{4}$. Squaring gives $7^4 \equiv 1 \pmod{4}$; squaring again gives $7^8 \equiv 1 \pmod{4}$, or in general, $7^m \equiv 1 \pmod{4}$, where $m=2x$, with x a positive integer. Adding 1 gives $7^m + 1 \equiv 2 \pmod{4}$; thus $7^m + 1$ is divisible by 2 but not by 4. The factorization of $(7^{2048} - 1)$ has 10 such factors plus the factors $(7 - 1)$ and $(7 + 1)$; $(7 + 1)$ is divisible by 2^3 , while $(7 - 1)$ is divisible by 2. Thus, $(7^{2048} - 1)$ is divisible by $2^{10+3+1} = 2^{14} = 4^7$, so $n = 7$. An alternative approach to the solution is to rewrite $7^{2048} - 1$ as $(8 - 1)^{2048} - 1$, and after binomial expansion, consider the divisibility of each addend.

3 The colors and corresponding sizes of the wooden cubes are: **a=4, b=9, c=11, d=1, e=3, f=2, g=12, h=10, i=8, j=7, k=6, l=5**. Let uppercase letters A through L represent the respective volumes of the twelve

wooden cubes. Each side is an integral number of cm, so the possible values for the volumes are 1, 8, 27, 64, 125, 216, 343, 512, 729, 1000, 1331, and 1728. The twins discovered balances represented by the following four equations:

- (1) $D + G = B + H$
- (2) $K = A + E + L$
- (3) $E + G + J + K = A + B + D + F + H + I$
- (4) $B = D + I + K$

Considering equation (1), there are only two pairs of volumes that have the same sum: $1 + 1728 = 729 + 1000$. From (4), we know that $B > D$, so the quadruple (B, D, G, H) must be one of (1728, 1000, 729, 1), (1728, 729, 1000, 1), (1000, 1, 1728, 729) or (729, 1, 1728, 1000).

Rearranging (4), we see that $B - D = I + K$, so $I + K$ must be one of 728 or 999. No two volumes sum to 999, and only $216 + 512 = 728$, so I, K must be 216 and 512 in some order. Therefore, we know (B, D, G, H) is either (1728, 1000, 729, 1) or (729, 1, 1728, 1000).

Now, examining equation (2), we must choose three of 8, 27, 64, 125, and 343 to sum to either 216 or 512. K cannot be 512, because no combination of three of the remaining five cubes sum properly. But since $216 = 27 + 64 + 125$, $K = 216$, $I = 512$, and A, E, L are each one of 27, 64, and 125.

Subtracting (1) from (3) and replacing K and I with their known values, we get (5) $E + J = A + 2D + F + 296$. We know that: A and E come from the set of 27, 64 and 125; F and J come from the remaining values 8, 343 and 1331; and D is either 1 or 1000. There's no E and J large enough for $D = 1000$ in (5), so $D = 1$ (which implies $B = 729$, $H = 1000$, $G = 1728$) and (5) reduces to $E + J = A + F + 298$. We resort to trial and error to determine $E = 27$, $J = 343$, $A = 64$, $F = 8$. Then, by default $L = 125$, and $C = 1331$.

4 Jill made a **5x5x5 cube and painted one face**; Jackie built a **6x6x6 cube and painted four faces**. The number of small unit cubes mak-

ing up a large cube with an edge length of n is n^3 , and the number of internal small cubes = $(n-2)^3$. Now, $(n-2)^3 \leq 100$, so $n < 7$, and $n^3 > 100$ so $n > 4$, therefore $n = 5$ for Jill and $n = 6$ for Jackie. For a given n , the number of external blocks equals $n^3 - (n-2)^3$, and the number of unpainted external blocks is $100 - (n-2)^3$, so the number of painted blocks is $n^3 - 100$. For $n = 5$, the number of painted blocks is $5^3 - 100 = 25$, which means that Jill painted exactly one face of her large cube. A similar calculation for Jackie's 6-cm cube shows that $6^3 - 100 = 116$ of her small cubes were painted, that is, $100 - 4^3 = 36$ external cubes were unpainted. Allowing for small cubes along the edges, 2 adjacent faces of the large cube were left unpainted, so exactly 4 faces of the large cube were painted.

5 Three passes through the copier at magnifications of **125%, 125%, and 128% will enlarge the linear dimensions of a picture by a factor of exactly 2**. We are looking for a sequence of five (or fewer) factors f_i whose product is exactly 2. Each f_i is an integral percentage greater than 1, but no more than 1.55. Each f_i can be represented as a rational fraction $F_i/100$, where F_i is an integer between 101 and 155 inclusive. Let p equal the product of these fractions. The denominator of p is $100^n = 2^{2n}5^{2n}$, where n is the number of passes through the copier. Since the denominator consists of an equal number of 2's and 5's, and since p is exactly 2, the prime factorization of the product of the F_i 's must be $2^{2n+1}5^{2n}$, that is, one more 2 than 5 and no other factor. The only integers between 101 and 155 whose only prime factors are 2's and/or 5's are $125 = 5^3$ and $128 = 2^7$. For $n = 3$, one factor of 128 and two factors of 125 give $2^7 5^6$, one more 2 than 5, so the sequence of 125%, 125%, 128% gives an enlargement by a factor of exactly 2.

Bonus. The tenth smallest integer which is simultaneously the sum of two and three consecutive squares is **302,991,312,620,897,818,205**, and

the ratio of the $(n+1)$ st such number to the n th such number is **$49+20\sqrt{6} = 97.98979486$** . The equation for numbers of the type considered here can be written as $N = n^2 + (n+1)^2 = (m-1)^2 + m^2 + (m+1)^2$. Combining terms and multiplying by 2 yields $4n^2 + 4n + 2 = p^2 + 1 = 6m^2 + 4$, or $p^2 + 1 = 6m^2 + 4$. Rearranging gives the Pell equation $p^2 - 6m^2 = 3$, where $p = 2n+1$. A solution to this equation gives m , and m gives $N = 3m^2 + 2$. Number theory shows that, given a solution to this Pell equation, an infinite number of other solutions can be generated. We need both a solution to $p_0^2 - 6m_0^2 = 1$ and a solution to $r^2 - 6s^2 = 3$. Then $(p_0 + m_0\sqrt{6})^n(r+s\sqrt{6}) = (p_n + m_n\sqrt{6})$ will generate as many solutions (p_n, m_n) as we desire. By inspection, $5^2 - 6(2)^2 = 1$, and $3^2 - 6(1)^2 = 3$, so $(p_0, m_0) = (5, 2)$, and $(r, s) = (3, 1)$. Then, $p_1 = 5(3)+6(2)(1) = 27$ and $m_1 = 2(3)+5(1) = 11$, so $N_1 = 3m_1^2 + 2 = 3(11^2) + 2 = 365$. Next, we get $p_2 = 5(27)+6(2)(11) = 267$, $m_2 = 2(27)+5(11) = 109$, and $N_2 = 3(109^2) + 2 = 35,645$. Continuing to $n=10$, we get the 21-digit number given above. To determine the ratio of N_{n+1}/N_n , start by determining the ratio for p_n and m_n ; this ratio is: $R = (p_0 + m_0\sqrt{6})^{n+1}(r+s\sqrt{6}) / (p_0 + m_0\sqrt{6})^n (r+s\sqrt{6}) = (p_0 + m_0\sqrt{6}) = (5+2\sqrt{6})$; but this is the ratio for m , and since N is a function of m^2 , we need the square of this value, or $R = (5+2\sqrt{6})^2 = 49+20\sqrt{6}$.

Computer Bonus The two smallest bases such that ba exactly divides $abcde$ are **1182** and **14,194**. Converting $abcde_n$ and ba_n into decimal notation gives $10n^4 + 11n^3 + 12n^2 + 13n + 14$ and $11n + 10$, so what we want is $(10n^4 + 11n^3 + 12n^2 + 13n + 14) / (11n + 10)$ to be an integer. When $n=1182$, we have $19,537,736,900,876/13,012 = 1,501,516,823$ and for $n=14,194$, then $405,931,600,977,692,352/156,144 = 2,599,725,900,308$. It is quite surprising that we would find a solution at such large bases.

Double Bonus The # operation we had in mind is to **add the two numbers on either side of # and subtract from 10**. Thus, $4 \# 4 = 2$. Finding an alternate solution seems to be

limited only by the ingenuity of the solver.

NEW SUMMER PROBLEMS

1 The planet Topsis is unusual in that each "hemisphere" is a right-circular cone of height 3000 km and base radius 4000 km. The two cones are joined base to base, so that the equator is the base circle and the vertical distance between the poles is 6000 km. Topsy and Turvy are two cities located on the planet's equator 180 degrees apart. To the nearest km, what is the shortest distance between the two cities, assuming that one must travel along the surface of the planet?

—*Superior Mathematical Puzzles*
by Howard P. Dinesman

2 A fair coin is flipped ten thousand times. What is the expected value of the absolute difference between the number of heads and the number of tails? Express your answer to four significant figures.

—**Kevin M.T. Stewart**, *NJ* Δ '77

3 The digits 1, 2, and 3 can be combined in 27 different ways to form a three digit number, e.g., 111, 112, 123, 232, 321, ..., 333. Arrange nine 1's, nine 2's and nine 3's around a circle so that each of the 27 combinations of these three digits appear exactly once when reading the arrangement in a clockwise direction. For example, the sequence 1112321 would give the first five values above. Express your answer as a 27 digit number, starting with 1112 and proceeding around the circle.

—*Problem Solving Through Recreational Mathematics* by Bonnie Averbach and Orin Chein

4 Five soccer playing countries were entered in 2016 European Consolation Cup and played the usual one game against each of the others. Each nation played two games at home, two games away, and there were no draws. Exactly three of the games were won by the away side. No two countries won the same number of games. Azerbaijan won two. Belarus was away at Azerbai-

jan and at Cyprus. Cyprus played away at Azerbaijan. Denmark was home against Estonia. How many games did each nation win?

—A Tantalizer by Martin Hollis
in *New Scientist*

5 Starting with 1, write the positive integers in continuous order without separating them as if you were writing a single number: 1234567891011121314... The first and tenth digits in this number each are clearly 1. In addition to those first two, what are the hundredth, thousandth, ..., through trillionth digits in this number? That is, what digits occupy places 10^n , for $n=0$ through 12? Express your answer as a sequence of 13 digits.

—*Mathematical Recreations*
by Maurice Kraitchik

Bonus Alf, Bert, Charlie, and Doug were the first to volunteer as the crew for the British spacecraft. At the time with which our story is concerned, they were moving through space at a speed, and in a direction, such that the hands of their special chronometer, which allowed for local variations in time, had, since liftoff, been moving exactly twice as fast as those of the Greenwich Mean Time (GMT) clock. In the following exchange, all references to the passing of time as recorded by the GMT clock are in italics (*time*, *minutes*, *hours*, etc.), and all references to time recorded by the ship's chronometer are in a regular font (time, minutes, hours, etc.). The four space travelers speak, with their statements starting at 5 *minute* intervals:

Doug: Oh, Alf! Oh, Bert! That all should come so clear! In less than half an hour, tomorrow's here, and our today is one with yesteryear.

Alf: Yes, your today perhaps, but not so mine! You watch the clock; myself, I watch the *time*. *10 minutes* since I heard the *hour* sound; and when another *23 minutes* have passed, then $2\frac{1}{2}$ hours will have elapsed, since that moment we boarded, 34 minutes before we left the ground.

Bert: *Tomorrow* and tomorrow and *tomorrow*! When will they both arrive? In more than *2 hours*. Alas! Before the *time* is what the time is now, only a *half an hour* must pass. Oh, Alf and Charlie, ere then I do pray, repent of the lies you've told this day. (In case I fail to make my meaning plain, you're liars both. Try not to lie again!)

Charlie: I'm not a very clever chap. I cannot tell the time. I cannot add, nor yet subtract, much less compute a prime. I never learnt to cut a rug, some say that I'm uncouth. But unlike those liars Bert and Doug, Alf and I do tell the truth.

Everything a speaker says is either all true or else everything he says is false. Prior to launch, the ship's chronometer is synchronized with GMT, and each speaker knows the veracity of every other speaker. What was the *time* (GMT) when they lifted off?

—*Brain Puzzlers Delight*
by E.R. Emmet

Computer Bonus In 2015, after a long career teaching mathematics, Dr. E. Trig retired. It was his habit each year to ask his students to find the smallest number which, when multiplied by the year, would result in an integer all of whose digits were either 0's or 1's. For example, 5,568,978 times 1995 equals the 11-digit number 11,110,111,110. In 1945, the first year he asked, most of his students were able to find a

suitable four digit number. Of the years for which Dr. Trig posed his question, which one had the longest required number and what was that number?

—An Enigma by Susan Denham
in *New Scientist*

Send your answers to any or all of the Summer Brain Ticklers to Curt Gomulinski, Tau Beta Pi, P. O. Box 2697, Knoxville, TN 37901-2697 or email to BrainTicklers@tbp.org, plain text preferred. The cutoff date for entries to the Summer column is the appearance of the Fall *BENT* in late September (the digital distribution is a few days earlier). The method of solution is not necessary. The judges welcome any interesting problems that might be suitable for the column. The Computer Bonus is not graded. Curt will forward your entries to the judges who are **H.G. McIlvried III**, *PA* Γ '53; **F.J. Tydeman**, *CA* Δ '73; **D.A. Dechman**, *TX* *A* '57; and the columnist for this issue, **J.C. Rasbold**, *OH* *A* '83.

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District 8 Conference attendees gather around the Bent at Southern Illinois University-Carbondale.

DISTRICT 7

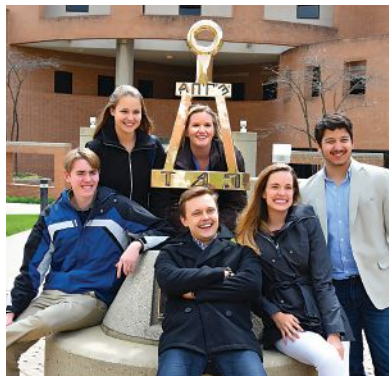
The **Michigan Gamma** Chapter at the University of Michigan is working on a new initiative to connect current TBP students with our most valuable resource... YOU! If you are a MI G alum and are interested in connecting with current students, please fill out this form: <https://goo.gl/Ad5zLe>. Any questions? Contact Andrew Rapin (tbp-corporate@umich.edu).

The **District 7 Conference** was held at Wright State University, located just outside of Dayton, OH, April 8-9. Students learned optimal chapter operating procedures via a simulated semester, were informed of the latest Tau Beta Pi opportunities and strategic initiatives by Executive Director Curt Gomulinski, and asked alumni, "What is next?" Students and alumni left with new connections as well as ideas and tools to improve their chapters.

Alumni questions?
Email tricia@tbp.org

Connect with D7

Were you initiated into a Tau Beta Pi chapter in Michigan or Ohio? Do you live in Michigan or Ohio? Are you connected to the area in any way? If so, District 7 invites you to join other District 7 Tau Bates in their new LinkedIn group: <https://www.linkedin.com/groups/8507926>. Make connections, participate in discussions, and hear about district happenings. Network with us!



Ohio Xi members at the D7 Conference (clockwise from left): Recording Secretary Drake E. Brunner, '16, President Michelle N. Kojs, '16, Vice President Megan Stoy, '16, Sebastian Diaz-Rodriguez, '17, Sarah A. Chapman, '15, and Treasurer Patryk Giza, '16.

DISTRICT 8

Fourteen undergraduate and four alumni chapters were represented at the **District 8 Conference** hosted by Illinois Epsilon at Southern Illinois University—Carbondale on April 16-17. Activities included workshops on chapter operations and officer transitions, as well as presentations on the best projects in the district. Alumni chapter members were joined by area alumni to form a panel and answer career questions from the students. Saturday evening was topped off with bowling and billiards competitions at the SIUC Student Center.

DISTRICT 12

Wyoming Alpha hosted the **District 12 Conference** on Saturday, February 27, in Laramie, WY. All 14 chapters were represented by nearly 60 student attendees, 4 advisors, and the 3 District Directors. Activities started Friday night with dinner on campus. The next morning included remarks from Executive Counciller Sue Holl using Google Hangouts (pictured left) and chapter reporting presentations that were especially well done with great participation from the students. During lunch, Kipp Coddington, the Director of the UW Carbon Mgmt. Institute, presented available opportunities. Following DICE and a group photo, an alumni panel discussion wrapped up the conference.

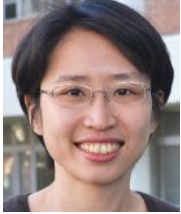




ALUMNI NOTES

California Gamma

Yvonne Y. Chen, Ph.D., '04, has received a National Science Foundation CAREER Award, the NSF's highest honor for faculty members at the start of their research and teaching careers. The five-year \$505,000 grant will support her research on engineering tumor-specific T cells for cancer immunotherapy. Chen is an assistant professor of chemical and biomolecular engineering and a chapter advisor at the UCLA school of engineering and applied science.



California Delta

J. Scott Goldstein, Ph.D., '97, has joined advanced technologies provider ENSCO, Inc., as chief strategy and technology officer. Previously, he was chief technologist and manager of the advanced missions solutions group at Dynetics. Goldstein has more than 30 years of experience leading organizations and programs with DARPA, the intelligence community, and the military.



Colorado Delta

Heather L. Trantham, Ph.D., P.E., '92, and **Jason L. Hevelone, '92**, were chapter officers together, got married, and started a business. Jason is now president and inspired distiller at CopperMuse, an artisan distillery,



in Fort Collins, CO. Heather is now a principal geotechnical engineer at Stantec. In an article for the *CSU Source*, Jason discussed the role of engineering and his wife on his distilling success. "An engineering degree is going to give you a foundation to launch you pretty much anywhere," he said. "Heather enables me to take this on; it's a team effort." After earning their bachelor's degrees, Jason supported the family so Heather could pursue her master's and Ph.D.

Florida Delta

Linda J. Trocine, Ph.D., '98, has joined Keller Williams Realty in Altamonte Springs, FL, as an associate. Until 2010 she was senior scientist for NASA in the discrete event simulation modeling and analysis center at Kennedy Space Center. Prior to that, she was an assistant professor of systems engineering for Embry-Riddle Aeronautical University.



Illinois Alpha

James P. Holloway, Ph.D., '83, has become vice provost for global and engaged education and professor of nuclear engineering and radiological sciences at the University of Michigan. He joined the faculty there as an assistant professor in 1990 and became associate dean for undergraduate education for the college of engineering in 2007. Holloway is now focused on ways in which the U-M engages the world through both scholarship and education.



Indiana Alpha

Barbara B. Haney, '79, was recognized as the outstanding engineer of the year by the Phoenix E-Week organization for "outstanding contributions to the engineering profession" during National Engineers Week 2016. She was nominated by the Phoenix section of the Society of Women Engineers. Barbara and her husband, **Walter C. Riordan, Arizona Alpha '80**, live in Phoenix, AZ. Haney is Vice President of the Phoenix Alumni Chapter of TBII.



Indiana Gamma

Matthew C. King, '89, has joined Facebook as an accessibility specialist. He is part of a team that focuses on making websites and mobile apps friendlier for people like him with disabilities. King is blind and previously spent more than 20 years at IBM as a software engineer.



Maryland Beta

David H. Layer, '81, has received *Radio World* magazine's excellence in engineering award. He is senior director, advanced engineering, in the technology department of the National Association of Broadcasters. Layer was recognized for his work in radio technology advocacy and education, as well as in broadcast standards setting, for his enthusiastic support of numerous leading



engineering organizations, and for his apparently inexhaustible energy.

Massachusetts Beta

Kurt L. Glitzenstein, '88, is a patent lawyer and principal at Fish & Richardson where he



has been named leader for the litigation group. He will oversee premier intellectual property and commercial litigation, with 250

lawyers in 12 offices. Glitzenstein's focus will be on patent litigation in life sciences, computers and electrical engineering, medical devices, financial services, cleantech, energy, chemistry, and consumer products.

Missouri Beta

Matthew J. O'Keefe, Ph.D., '85, has been named by Missouri University of Science and Technology as chair of the materials science and engineering department. O'Keefe, who joined the faculty in 1999, is also



professor of materials science and engineering, and director of the Materials Research Center at Missouri S&T.

Missouri Gamma

Joseph P. Wojtal, '86, recently retired from a 20-plus year career at Cisco as the vice president of development solutions, services, and operations. He has now been elected chairman of the board of the Loop Media Hub, a not for profit corporation focused on developing innovation neighborhoods, in conjunction with the Cortex, St. Louis Innovation District. Loop Media Hub is also focused on ensuring people have access to high-speed networking, content, and IT services.



Ohio Epsilon

Chaitanya J. Lomte, '11 has joined Roll-Kraft, a Mentor, OH-based supplier of roll tooling to tube and pipe and roll forming manufacturers, as a mechanical design engineer. Previously, he



held the position of design engineer at GE Lighting.

Pennsylvania Alpha

Jessica T. LaFond, '95, is chief engineer of minivans at Fiat Chrysler Automobiles. The 21-year FCA veteran was recently profiled by *The Detroit Free Press* which described her decision to turn down several promotions so she



could remain in her job as lead engineer for the 2017 Chrysler Pacifica and see out the \$2.6 billion development project from beginning to end.

Pennsylvania Beta

Morgan N. Smith, '76, has become president and CEO of Consolidated Nuclear Security, LLC., responsible for management and operations of the Pantex Plant, in Amarillo, TX, and Y-12 National Security Complex, at Oak Ridge, TN,



key production facilities in the U.S. Nuclear Security Enterprise. Smith had been the CNS COO since the company took over management of the two sites in 2014. Previously, he was instrumental in the consolidation of Bettis and Knolls Atomic Power Laboratories into a single organization run by Bechtel.

Texas Alpha

Muhammad Mustafa Hussain, Ph.D., '05, has developed an inexpensive 'smart skin' that can multitask like the real thing using household goods, such as paper, aluminum foil,



and tape. Hussain is professor of electrical engineering at King Abdullah University of Science and Technology in Saudi Arabia. He says the

technology could "be used to make prosthetics smarter, make wearable technology even more wearable and give robots a more sophisticated sense of touch." Past efforts to make smart skins have been based on "pricey two-dimensional components such as carbon nanotubes."

Wisconsin Alpha

Rachel Clark Hughey, J.D., '00, is a partner with intellectual property law firm Merchant & Gould and has received a Twin Cities 40 Under 40 award for 2016 from the *Minneapolis/St. Paul Business Journal*. A former



chapter president, she is a patent litigator and last year secured a significant Federal Circuit victory for a Minnesota company and, as a volunteer attorney for the Advocates for Human Rights, successfully obtained legal status for an asylum seeker. Hughey also helped the University of Minnesota Law Review celebrate its 100th Volume as president of the alumni advisory board.

Write Your Own Note!

Your fellow Tau Bates are interested in news about you. Send items about civic activities, honors won, weddings, births, promotions, changes in address, etc. to Tau Beta Pi, P.O. Box 2697, Knoxville, TN 37901-2697 or to alumnote@tbp.org. Material for publication must be received for the **Spring** issue by February 1, **Summer** issue by May 1, **Fall** issue by August 1, and **Winter** issue by November 1. Include name, address, chapter, class year, and email address or phone number. Thank you!

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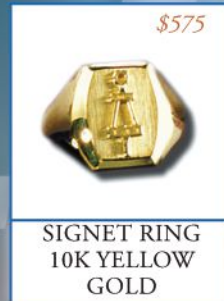


SMALL BENT
CHARM/PIN



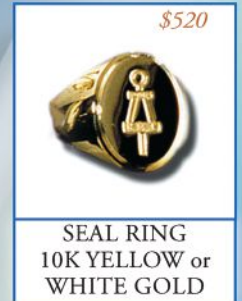
10k Gold \$91

Gold finish \$24
TIE TACK/
RECOGNITION
BUTTON



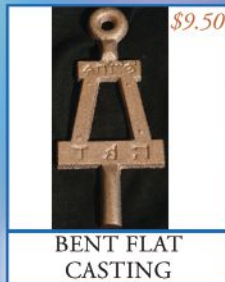
\$575

SIGNET RING
10K YELLOW
GOLD



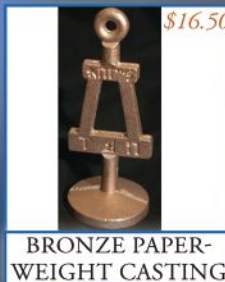
\$520

SEAL RING
10K YELLOW or
WHITE GOLD



\$9.50

BENT FLAT
CASTING



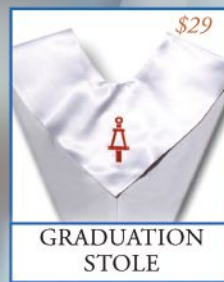
\$16.50

BRONZE PAPER-
WEIGHT CASTING



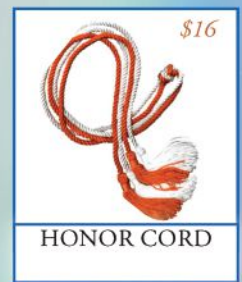
\$46

STERLING SILVER
TIE TACK



\$29

GRADUATION
STOLE



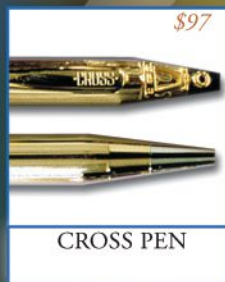
\$16

HONOR CORD



3 for \$5

INK PENS
BLUE/BLACK



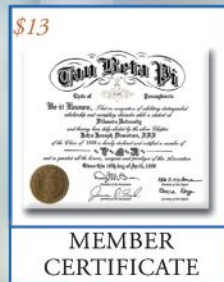
\$97

CROSS PEN



\$16

STAINLESS STEEL
TRAVEL MUG



\$13

MEMBER
CERTIFICATE



\$5

CONV LONG-SLEEVE
SWEAT & T-SHIRT



\$50

XXL
add \$2

GOLF SHIRTS
(GREG NORMAN)



\$16

XXL

\$18

SILVER/NAVY or
GOLD/BLACK T-SHIRT



\$25

INSIGNIA LICENSE
PLATE FRAMES



\$16

ENGINEER SHIRT
10 COLORS (XXL-\$18)



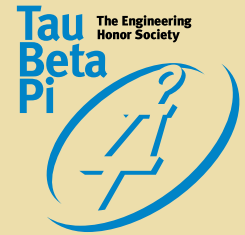
\$28

HOODIES
8 COLORS (XXL-\$33)

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To start something...
you just need a trailer...
a great idea...
and your own winning team...



YAHOO! was started in a Stanford University campus trailer in 1994 by Chih-Yuan "Jerry" Yang, *California Gamma '90*, left, and David R. Filo, *Louisiana Beta '88*, who were electrical engineering graduate students when they created a website named "Jerry and David's Guide to the World Wide Web." This was a directory of other websites, organized in a hierarchy, as opposed to a searchable index of pages. In April 1994, "Jerry and David's Guide to the World Wide Web" was renamed "Yahoo!" The rest is history. They worked together and with others to build a team. This became a multinational corporation with more than 12,500 employees and 2015 total equity of \$29.04 billion.

Tau Beta Pi's Engineering Futures Program teaches students the special skills needed to create and run such effective teams, like resolving interpersonal problems, conducting effective meetings, and presenting results to stakeholders. Your chapter can schedule an Engineering Futures session by contacting sherry@tbp.org.

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