

THE BENT

OF TAU BETA PI

The Engineering Honor Society

Fall 2016



**Engineering a
Work of Art
Honorees and
Scholars Named**

CHAPTERS

ALUMNI CHAPTERS (73)

District 1 • denotes active chapter

- Central Connecticut, Hartford
- Greater Boston Area, MA

District 2

- Buffalo, NY
- Central Jersey, NJ
- Long Island Suburban, NY
- Newark, NJ
- New York City, NY
- New York Capital District, NY
- Rochester, NY
- Southern Tier, Binghamton, NY

District 3

- Lehigh Valley, Bethlehem, PA
- Philadelphia, PA
- Pittsburgh, PA
- Wilmington, DE

District 4

- Baltimore, MD
- Hampton Roads, Newport News, VA
- Kanawha Valley, Charleston, WV
- Research Triangle, Durham-Chapel Hill-Raleigh, NC
- Richmond, VA
- Washington, DC

District 5

- Atlanta, GA
- Central Florida, Orlando
- Daytona Beach, FL
- Gainesville, FL
- Miami, FL
- Midlands, Columbia, SC
- Palm Beach/Broward, FL
- Piedmont, Clemson, SC
- Puerto Rico
- Tampa Bay, FL

District 6

- Bluegrass, Lexington-Frankfort, KY
- Central Alabama, Birmingham
- Great Smoky Mountains, Knoxville-Oak Ridge, TN
- Greater Gulf Coast, Mobile, AL
- Louisville, KY
- Mid-South, Memphis, TN
- Rocket City, Huntsville, AL

District 7

- Ann Arbor Area, MI
- Central Michigan, Lansing
- Cincinnati, OH
- Columbus, OH
- Dayton, OH
- Flint, MI
- Ohio's North Coast, Cleveland
- Southeastern Michigan, Detroit
- West Michigan, Grand Rapids

District 8

- Chicago Area, IL
- Central Illinois, Urbana-Champaign
- Indianapolis, IN
- Milwaukee, WI

District 9

- Rolla, MO
- St. Louis, MO

District 10

- Central Texas (Austin/San Antonio)
- Greater New Orleans, LA
- Texas Gulf Coast, Houston

District 11

- Ames, IA
- Minnesota, Twin Cities, MN

District 12

- Pikes Peak, CO
- Front Range, CO/WY
- Salt Lake City, UT
- Treasure Valley, Boise, ID

District 13

- El Paso, TX
- Phoenix, AZ
- Sun City, AZ
- Tucson, AZ

District 14

- Columbia River Basin, Richland, WA
- Portland, OR
- Puget Sound, Seattle, WA

District 15

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

District 16

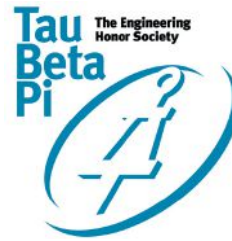
- Greater San Diego, CA
- Southern California, Los Angeles

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 D 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 D 13	Embry-Riddle Aero. Univ., Prescott
AR A 9	Univ. of Arkansas
CA A 15	Univ. of California, Berkeley
CA B 16	California Inst. of Technology
CA F 15	Stanford Univ.
CA D 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	NJ G 2	New Jersey Inst. of Technology
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 16	Northrop Univ. (inactive)	NM G 13	New Mexico Inst. of Mining & Tech.
CA S 15	California State Univ., Fresno	NY A 2	Columbia Univ.
CA T 15	Univ. of California, Santa Barbara	NY B 2	Syracuse Univ.
CA Y 15	Univ. of California, Irvine	NY G 2	Rensselaer Polytechnic Inst.
CA X 16	California State Univ., Sacramento	NY A 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 Y 16	Univ. of California, San Diego	NY H 2	City College of CUNY
CA Z 16	Harvey Mudd College	NY O 2	Clarkson Univ.
CA AA 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
GA B 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 D 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 7	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

the Bent of Tau Beta Pi



Fall 2016
Vol. CVII / No. 4

*f*ounded at Lehigh University, South Bethlehem, Pennsylvania, June 15, 1885, by Edward H. Williams Jr., A.B., A.C., E.M., Sc.D., LL.D. (1849-1933). Key and name registered in U.S. Patent and Trademark Office. Member, American Society for Engineering Education and (co-founder) Association of College Honor Societies. Affiliate, American Association for the Advancement of Science.

Features

2016 Outstanding Advisor 11

2016 McDonald Mentor 13

2016 Laureates 14

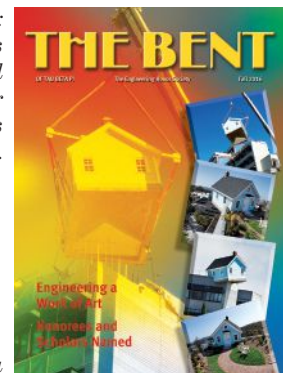
2016 Distinguished Alumni 16

Engineering & Architecture..... 18
by Jeffrey Saikali, *OH B '96*

Leadership: John Hennessy 24
by Alan S. Brown

TBPI Names 210 Scholars 28

ON THE COVER:
Jeffrey Saikali explains how engineering and architecture came together to realize an artist's dream.



Cover artist: Dali Polivka

Reports

Executive Council Nominations..... 6

Contributors to 2016 Alumni Giving Program..... 32

Executive Director's Report..... 37

Departments

Council's Corner2

Caption Contest.....3

Editorial.....4

Letters.....8

Who's Who.....12

Association Briefs.....23

In the Colleges.....42

Chapter Eternal.....44

Brain Ticklers50

Alumni Notes54

Insignia56

Tau Beta Pi:
THE BENT



Editor: Curtis D. Gomulinski, MI E '01 Editorial Assistant: David S. Roberts
Editorial Board: Lyle D. Feisel, Ph.D., P.E., IA A '61; James D. Froula, P.E. (ret.), TN A '67; and John W. Prados, Ph.D., P.E., TN A '54

The Bent of Tau Beta Pi® (ISSN 0005-884X) is published quarterly for \$10 per year by The Tau Beta Pi Association, Inc., Room 508, Dougherty Engg., The University of Tennessee, Knoxville, Tennessee 37996-2215; www.tbp.org; FAX: 865/546-4579; email: tbp@tbp.org. Life subscriptions are \$75. Printed in U.S.A. Periodicals postage paid at Knoxville, TN, and at additional mailing offices. SUBSCRIBERS and POSTMASTER: Send address change, request for online subs., & other correspondence to tbp@tbp.org or to: The Bent of Tau Beta Pi / P.O. Box 2697 / Knoxville, TN 37901-2697. Telephone: 865/546-4578

Copyright © 2016 by The Tau Beta Pi Association, Incorporated, www.tbp.org. The Bent is the official publication of The Tau Beta Pi Association, Inc., The Engineering Honor Society. Title reg. U.S. Patent and Trademark Office. All rights reserved. Ideas expressed in articles with by-lines in this magazine and in paid advertisements do not necessarily reflect the policy or opinions of the Association.

ADVERTISING REPRESENTATIVE:
UniDiversity
Telephone: 434/244-9776
Email: adv@tbp.org



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

College? It's About More Than Money

RECENTLY WE HAVE SEEN a number of articles with the theme, “I ruined my life by going to college.” The assertion is that people’s lives have been “ruined” because their college experience resulted in significant student debt load and not much else.

These are troubling stories, and since I am surrounded by students, it made me wonder how engineering students fare in this “debt load” situation. I have not found data by major, but it is likely that since engineers tend to be individuals with focus and a good sense of planning, they are not generally in as difficult a debt situation as others. It is the case that wherever they go, they are able to create successful lives contributing to commerce, to invention, and to society as good citizens. A university education continues to provide well-rounded preparation for success in the world. Accomplished college-educated engineers are represented in all fields: entertainment, business, academia, medicine, science and, of course, industry.

Unfortunately, technical programs, although growing, still comprise a very small fraction of total university students in the U.S. Various figures have been reported but some claim that China and India produce 12 times more engineers per year. We believe our colleges provide the best educations. Those educated in the United States are creative and innovative; these essential qualities are nurtured and developed as the foundational skills are taught. We are proud that our graduates are productive from the first day they report to work. As an educator, I sincerely hope the trend of more students choosing engineering continues even though these majors remain some of the most difficult to complete.

A more fundamental question is, “What is the goal when going to college?” If the ambition is clearly articulated, the price to achieve satisfaction will make more sense. If prestige is the objective, the cost may be higher than if the goal is achieving the highest quality education. A specific career is rarely a reasonable aim because university was never intended to be vocational. American higher education is formed by the historical view that students were to be prepared for the service of society (and the church); students were educated to become better citizens and the result was, undoubtedly, a richer life in all areas. Even professionally-oriented programs like engineering want to develop their students to meet the broad demands of life in our complex world.

There are so many choices for higher education—public, private, four-year, two-year, and others. Students

who are interested in college as training for a career might, in fact, be better off to go directly into the workforce or to earn a degree from a technical school. As a contrast, university educated individuals are exposed to a larger variety of subjects and perspectives during their college years, which allows them to think deeply and creatively as they address all the situations they encounter in their lives—their whole lives not just their working ones.



College has never followed a consumer model. A university education is an investment in the future; higher education must be supported by society because having an educated citizenry improves the common good. Student loans and public institutions of higher learning are a value both to particular individuals and also to society. As it applies to individual students, we need to think of the return-on-investment for a

university education as we do any long-term spending. Students need to understand that long-term investments pay dividends slowly; the outlay now, for the future, is preparation for bigger picture results. Although a university education should not be perceived as transactional, the process ought to provide graduates experiences they can capitalize on to address their future financial needs. In fact, a university education yields profits not just in a career but in every aspect of life—educated people are better citizens, build better relationships, have more ability to serve, and, also are likely to have better, more satisfying careers with more opportunities for success.

Our students must be prepared to make smart choices, which sometimes means difficult decisions. As an academician, I believe a university education is not just a means to network for future monetary success, nor is it a means for our young people to hang on to adolescence. A good education does provide an important transition to adulthood but that is really a by-product of the process. Students should be prepared to set goals, work hard, and explore the richness of the opportunities presented to them. The specifics of each one’s unique experience should include thoughts about the future, but attending college should not be seen as merely career preparation.

Universities and society need to assume their share of the responsibility for creating the current situation

in which students incur too much debt. People are often seduced into thinking the “big” name university is going to provide intangibles that will guarantee monetary success. These institutions need to better prepare their students to understand the limitations of what they provide, perhaps by offering data on where all grads create lives and not highlight only the very successful.

Society can influence this difficult debt situation by reminding students that willingness to work hard and making an effort in everything they attempt are keys to future success. We must remind them that anything worth doing is worth exerting effort. They should not choose a major because it is trendy or “easy,” and if they intend to graduate from their program in four or five years, they should expect to put a full-time amount of work into their studies. Helping students to understand that paying for college will not “buy” a specific post-graduation outcome will reframe the perception of the “cost” vs. “satisfaction” associated with earning a degree.

—Susan L. R. Holl, Ph.D.,
California Lambda '76, Councillor

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

Send in your clever captions for this snapshot from *The Bent* archives, and if it is judged one of the best, you will win a TBP t-shirt!

The picture, chosen for its seasonal flavor, appeared in the Winter 1987 issue of *The Bent*, and was taken on Halloween during the 1986 Convention in College



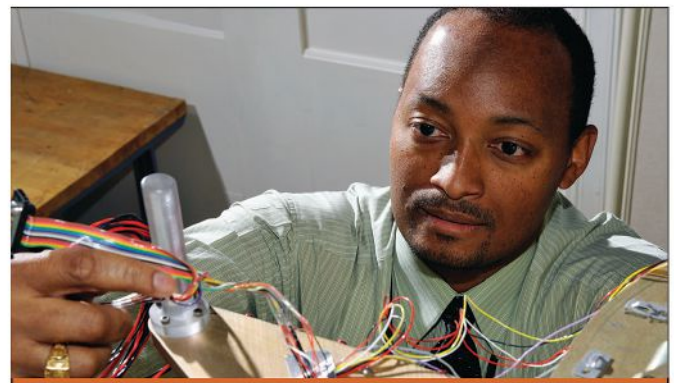
Park, MD. Send entries to pat@tbp.org or mail them to HQ by Monday, November 7, 2016.

The photo for the Summer Contest was taken during the 71st Convention in College Station, TX, in October, 1976. It shows Secretary-Treasurer Nagel clarifying some points for Larke E. Reeber, CA A '77.

The judges mulled over 38 captions submitted by 22 readers. In another near tie for the top spot, Jack W. Osgood, P.E., MI A '49, took first place for his caption: “The answer is NO! Fugeddaboutit!!”

Close behind was Thomas J. Brennan, OH Θ '83, with: “And if you are serious about becoming an engineer young lady, the piece of white tape needs to go right ‘here’ on your glasses.”

An Honorable Mention goes to Martin D. Slade, NY B '80, for: “You’re... You’re.....You’re a girl!”



MIT LINCOLN LABORATORY

Imagine it. Build it. Be the first.

Since 1951, MIT Lincoln Laboratory has been applying advanced technology to solve problems critical to national security. Since its inception, our people have envisioned incredible technology, and projects that start out as vital to national security often become vital to the everyday technology of the future. More than 700 patents have been granted for technologies developed by the Laboratory’s staff. In the past six years, Lincoln Laboratory has been awarded 26 R&D 100 Awards that recognize the year’s 100 most technologically significant innovations.

If you’d like to contribute to U.S. national security in an environment of extraordinary innovation – then begin your career at MIT Lincoln Laboratory.

Aerospace or Mechanical Engineering
Algorithm Development
Applied Math
Circuit Design and Laser Development
Computer Engineering
Computer Science and SW Engineering
Cyber Security
Digital Signal Processing
Electrical Engineering
Machine Learning and Computer Vision
Modeling and Systems Architecture
Physics

All positions are located in Lexington, MA.

**For information on our current opportunities,
please visit
www.ll.mit.edu/employment**

MIT Lincoln Laboratory is an Equal Employment Opportunity (EEO) employer. All qualified applicants will receive consideration for employment and will not be discriminated against on the basis of race, color, religion, sex, sexual orientation, gender identity, national origin, age, veteran status, disability status, or genetic information. Due to the unique nature of our work, we require U.S. citizenship.

LINCOLN LABORATORY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY



EDITORIAL

Vision, Mission, and Planning—Your Thoughts?

Just above Sue’s Council’s Corner on page two is the Preamble to the Tau Beta Pi Constitution which has served as the de facto mission statement since our founding. In fact, the 1898 Constitution includes as its Preamble, “*To mark in a fitting manner those who have conferred honor upon their Alma Mater by a high grade of scholarship as undergraduates, or by their attainments as alumni, and to foster a spirit of liberal culture in the Technical and Scientific Schools of America.*” Noticeably absent is any mention about members demonstrating exemplary character. Founder Williams emphasized its importance in his early writings, and the language was incorporated into the Preamble in the 1920s.

When Jim Froula announced his retirement as Executive Director six years ago, the Executive Council took the opportunity to explore the mission and vision of the Association.

They convened a Vision Development Group to do *blue sky thinking* for Tau Beta Pi. This group included distinguished TBPi leaders in industry and academia, and their work was featured in the



Fall 2011 and Winter 2013 issues of *The Bent*. Their work provided valuable insight into possible directions for the Association and laid the groundwork for our current endeavor to develop a strategic plan.

A little over a year ago, Tau Beta Pi engaged the services of Dr. Brad Gray from the Center for Non-profit Management to work with the Executive Council, Headquarters, and our members to develop a strategic plan and update our vision and mission. In addition, he assisted in developing a plan for restructuring the Executive Council which was passed by the Convention, ratified by the chapters, and reviewed by Vice President Pih in the Summer 2016 issue of *The Bent*. Dr. Gray met with the leadership of the Association in June 2015 and conducted surveys and focus groups with students and alumni at the 2015 Convention. The Executive Council has met with him regularly over the past year to analyze the data. The next step in this process was refining the

vision to reflect what the Association aspires to be in the future and enhancing the mission to focus our efforts as we move forward. I am pleased to now share with you our updated vision and mission.

Our Vision

Tau Beta Pi Engineers Making Extraordinary Contributions to Create a Better World.

Our Mission

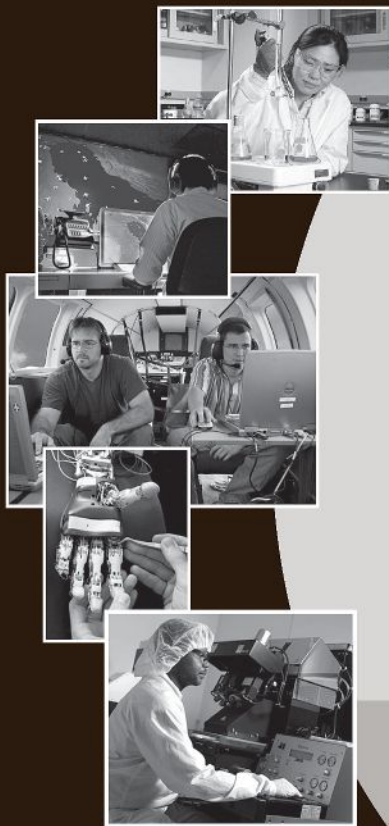
As the only honor society for engineers in all disciplines, Tau Beta Pi:

- Recognizes academic and professional excellence rooted in personal integrity,
- Promotes a well-rounded education essential for success,
- Provides opportunities for leadership development and promotes lifelong learning,
- Cultivates a community of dedicated high achievers.

As you can see, the updated mission does not dramatically deviate from our original mission as defined over a century ago. It does, however, add elements that our members indicated are important aspects of the work of Tau Beta Pi. In addition, it utilizes modern 21st century language to better express our objectives.

As we enter the final phase of strategic planning, an important piece to the puzzle is **the input of you, our members**. The Executive Council is interested in your suggestions on the direction of Tau Beta Pi in the short term (the next three to five years) as well as in the long term (five to ten years). A survey is available at www.tbp.org/?survey for you to share your thoughts as we work to complete the strategic plan. If you would prefer a copy be mailed to you, contact Headquarters at 865/546-4578. The deadline to provide feedback is November 15, 2016. I hope many of you will take this opportunity to guide the direction of your Association and to “Elevate” Tau Beta Pi to the next level.

Until later,



Apply Your Talent. Shape the Future.

We are seeking people who want to make a difference. The staff members of the **Johns Hopkins Applied Physics Laboratory (APL)** are thwarting sophisticated cyber attacks, engineering pocket-sized robots that can navigate and maneuver in difficult environments, and testing the ability of body armor to protect soldiers against blast and ballistic impacts. We are exploring the expanses of the solar system from Pluto to Mercury, and developing methods to detect and characterize biological pathogens.

We are primarily seeking candidates with experience in **electrical engineering, computer engineering, computer science, cyber security, information systems, systems engineering, mechanical engineering, aerospace engineering, applied math and applied physics** to join our team of dedicated contributors. Eligibility requirements include U.S. citizenship. Applicants may be subject to a government security investigation and must meet the eligibility requirements for access to classified information.

Confront the nation's toughest challenges and help shape the future at one of the nation's premier engineering, research and development centers. Sound like a future meant for you? Visit our website: www.jhuapl.edu to find out more about your career at APL.

Johns Hopkins University Applied Physics Laboratory is an equal opportunity/affirmative action employer that complies with Title IX of the Education Amendments Act of 1972, as well as other applicable laws, and values diversity in its workforce.

Learn more and apply at www.jhuapl.edu



Laurel, MD

Celebrate Tau Beta Pi Day! 3.14.17



1. Gather



.14
For Fun
& TBPI



2. Count
It



3. Eat
It

Join Us
March 14, 2017

Executive Council Nominations

The 2015 Convention approved a set of amendments which were ratified by the chapters in April 2016 which restructured the Executive Council. The new structure calls for annual elections of Executive Councillors who will serve terms of three years each. The Constitution grants the authority to the Executive Council to determine its own size as long as it meets the minimum set by the State of Tennessee (three) and does not exceed twelve members. By act of the Executive Council, the Council will increase to eight members beginning January 2017 and nine members beginning in January 2018. Elections for three openings for the 2017-19 term will be held at the 2016 Convention.

Given that ratification of the amendments did not occur until after the April 1 deadline to submit nominations, they will continue to be accepted until Friday, October 7 at Convention. However, to provide members the opportunity to express their interest and be publicized in *The Bent*, nominations were requested by August 1 for inclusion in this issue of the magazine. Five nominations were received and information about each nominee is included here.

The terms of the current Executive Councillors will be modified by the 2016 Convention to end in 2017 or 2018. Each current member will have the opportunity to run for an additional term if he or she desires.

LeVern W. Faidley, Ph.D., Iowa Alpha '67, was nominated by Iowa Alpha. He attended Iowa State University



receiving his bachelor of science in agricultural engineering in 1967. He then went to Michigan State University receiving his master's and Ph.D. in 1969 and 1974, respectively. Following graduation he was hired by the Food and Agriculture Organization of the United Nations to work at their headquarters in Rome, Italy. From 1974 to 1995, LeVern held technical positions related to

agricultural and systems engineering; efficient energy use in agricultural and rural development; new and renewable sources of energy; and research and technology development. From 1995 to 2004, he worked as a senior program and budget officer assisting in preparation and implementation of the organization's medium term plan, program of work and budget, and program implementation reports. LeVern also provided support to headquarters' departments and decentralized offices in program planning and implementation. Following retirement in 2004, he continued to undertake short-term assignments for the organization. He has been a contributing author to several publications concerned with energy in world agriculture. He is a member of the American Society of Agricultural and Biological Engineers, and the American Solar Energy Society. LeVern became an advisor to the Iowa Alpha Chapter in 2005 and Chief Advisor in 2011. Since 2012 he has also been a member of the Advisor Recruitment and Development Committee.

Wayne B. Paugh, Esq., Florida Gamma '93, was nominated by the Front Range Alumni Chapter. He received his bachelor of science in mechanical engineering and a bachelor of arts in communications with an emphasis in public speaking in 1993. He was an applications engineer in the robotics and motion control field until earning a

graduate degree in the management of technology. At this point, Wayne pursued a career change by attending



law school in the Washington, DC area and specialized in intellectual property. He spent 13 years in Washington and worked primarily in the federal government in executive and managerial roles. During this time, Wayne was appointed United States coordinator for international intellectual property enforcement by President George W. Bush. Colloquially known as the "IP Czar," he was

responsible for coordinating and leveraging resources of the U.S. Government to protect American IP at home and abroad and to promote international trade and U.S. global competitiveness. Ultimately, he relocated to the Denver area as a special assistant United States attorney in the major crimes division of the U.S. attorney's office for the district of Colorado in the U.S. Department of Justice. He also serves as an assistant chief counsel in the U.S. Department of Homeland Security in Denver. Wayne has served as an Engineering Futures Facilitator for three years and has gained a renewed dedication to the future of engineering.

Russell W. Pierce, Washington Alpha '70, was nominated by the Alaska Alpha, Tennessee Delta, and Washington Alpha Chapters. Russ has over 30 years



of hands-on experience in technical leadership and operations management, and spent 14 years working in increasingly responsible management positions for Lockheed Martin Corporation. In 2000 he returned to Washington State where he was the director, IT client services at AT&T

Fixed Wireless Services in Redmond. Prior to retir-

ing in 2006, he founded his own management consulting company, USBrit Consulting, after spending three years as a managing partner at Lively Consulting in Federal Way, WA. Russ is a United States citizen but was born in London, England and immigrated to the USA in 1961. He served four years in the United States Air Force before earning his bachelor's, cum laude, and master's in electrical engineering. Russ is also a member of Eta Kappa Nu, the electrical engineering honor society. In May 1997, he earned an M.B.A. from the Florida Institute of Technology and is a member of Delta Mu Delta, the business administration honor society. Russ became an Engineering Futures Facilitator in 1992 and served continuously for 24 years. He was a District 5 Director from 1995-99 and an Executive Councillor from 2002-06. Russ served as the Director of the Engineering Futures Program from 1999-02 and again from 2009-15. He is currently a non-faculty advisor to Washington Alpha. He lives in Puyallup, WA, with his wife, Pauli, enjoying world-travel and watching his grandson's soccer games.

George Youssef, *New Jersey Gamma '01*, was nominated by the Central Jersey Alumni Chapter. He is a graduate of the New Jersey Institute of Technology (NJIT) where he earned a bachelor of science degree in electrical engineering, cum laude, and NJIT's Albert Dorman Honors College. George joined the General Electric company field engineer program in 2002 working on gas turbines around the globe. George has served in a number of positions including field engineer, resource engineer, training manager, and senior customer service leader in areas ranging from New Jersey and Georgia, to Dubai in the United Arab Emirates. In a recent position, he was responsible for outage planning and execution, upgrades, and parts and repairs for ten nuclear power plants in PA, NJ, and CT. He currently holds a service director position supporting the boiler services business in the western part of the United States. While at NJIT, he was active in Tau Beta Pi and served as a chapter president. George was a District 2 Director from 2009-16 covering the six chapters in New Jersey. He attended Convention twice as the voting delegate and is looking forward to this year's event in San Diego which will be his eighth. He is married with one daughter and recently relocated from New Jersey to California. During his free time, George enjoys traveling and meeting new people.



Jeffrey S. Zola, *New York Delta '91*, was nominated by the Portland Alumni Chapter. Jeff, a Massachusetts native, studied applied and engineering physics at Cornell University. After receiving his bachelor of science degree in 1991 (with Distinction), he joined the IBM microelectronics academic program, returning to Cornell to earn his master's in August 1992. He worked in various roles in the semiconductor industry between 1992 and 2004, at

companies including IBM, AMD, Mattson Technology, and LSI Logic. He became a leader and subject matter expert—in not only in the plasma etch process areas of his responsibility, but also in the statistical analysis of data, statistical process control, and the design and analysis of experiments. In early 2005, he became registered to practice before the United States patent and trademark office and joined a Portland intellectual property law firm as a patent agent. Because he longed to return to the technical work that drew him to engineering, Jeff left the firm in late 2007. Over the next eight years, he developed computer code dealing in such areas as automation of data analysis. Since 2015, he has served as a software developer with the Oregon Health Authority. Jeff lives in Portland, OR, with his wife, Julie, their two sons, Matthew (17) and Samuel (14), and the family dogs Simon and Elliott. Jeff enjoys rooting for his hometown Red Sox and Patriots, gardening, and playing Texas Hold'em. He currently serves as vice president of the Portland Alumni Chapter.



SMART

SCIENCE, MATHEMATICS & RESEARCH FOR TRANSFORMATION

PART OF THE NATIONAL DEFENSE EDUCATION PROGRAM

SCHOLARSHIP FOR SERVICE PROGRAM

Undergraduate, graduate, and doctoral students pursuing degrees in Science, Technology, Engineering, & Mathematics (STEM) fields

SMART Scholars receive:

- + Full tuition and educational fees
- + Generous cash stipend
- + Employment with DoD facilities after graduation
- + Summer internships, health insurance, & miscellaneous supplies allowance

For more information and to apply, visit: <http://smart.asee.org>

In accordance with Federal education regulations, no person on the grounds of race, color, age, sex, national origin or disability shall be excluded from participating in, denied the benefits of, or be subject to discrimination under any program activity receiving financial assistance from the Department of Defense.

US CITIZENS ONLY





LETTERS

May The Force Be With You?

• I just read the comprehensive [EMF] article in the Summer 2016 issue of *The Bent*. My local newspaper had an article about a town which is deciding whether to install three or four cell phone towers IN THE TOWN, and I want to inform the reporter about this article.

It occurred to me that somebody could make millions of dollars by designing and selling a simple plastic block which could slip over a cell phone or cordless phone and keep it one inch from the ear, as recommended in many cell phone manuals. I am 88 so it won't be me.

Years ago, a woman I knew who was a teaching nurse at Roswell Park Cancer Hospital was wiped out when a colon cancer metastasized across the brain-blood barrier to form a brain tumor. The doctors hadn't even looked for a brain tumor because they didn't believe such a metastasis was possible. I think this may have spelled out what made this possible.

Joseph F. Albin, IA B '49

• I am writing to complain about the missing sheet of aluminum foil in my latest issue of *The Bent*. How am I supposed to fashion the protective headgear recommended by the article on the industry wide conspiracy to irradiate me with lethal EMF without that? I can't wait for the next issue, which I'm sure will feature an expose of the government/illuminati instituted Chemtrail menace.

Well trolled, TBPI. Please stop sending *The Bent* if this is the level the publication has sunk to. If I need conspiracy zaniness, I can get all that a person can stomach from the web. I get tinnitus and heart palpitations from reading a civil's expounding on EE topics.

Jeffery C. Gehring, IA A '92

• I read the [EMF] article in the Summer issue of *The Bent* with interest. Thank you for having it

published. While your primary focus is on protecting people, I think it should be expanded to our entire ecosystem.

Who knows what is happening to the birds, bees, and all other organisms in our ecosystem? The entire balance is important.

W. "Randy" Edwards, OH Γ '71

• I am disappointed that you published the article titled "Electromagnetic Fears" in the Summer 2016 issue.

This article presents no new findings and no definitive research on the subject but advocates several alarming strategies including turning off the circuit breakers to your bedrooms at night.

This article does not belong in *The Bent*. It is the sort of thing you read in the check out lanes at a supermarket.

Kenneth R. Velten, OH B '65

• I found a bit of questionable advice in Jeromy C. Johnson's otherwise excellent article "Wireless Wake-Up Call: A New Paradigm in EMF Science." Mr. Johnson calls for turning off bedroom circuit breakers at night to eliminate electric fields. Circuit breakers are not designed to function as on-off switches. Repeated operation will cause them to fail, leaving you without protection and an expensive repair bill.

Benjamin C. Berk, VA B '72

[Author's response: Mr. Berk brings up a very good point. While it is rare that a circuit breaker will fail and the NEC allows for such use, three alternative methods exist that are safer. First, test this concept for a couple weeks to see if it actually makes a difference in your sleep/health. If it does and you don't mind the inconvenience, you could simply keep these breakers switched off. Second, you could install "switch duty rated" breakers (SWD) that are designed to be switched on and off. Finally, you

could have an electrician install a contactor with a remote switch that you control from bed. A contactor will cut the power to multiple circuits without the need to physically turn breakers on and off. It has the added benefit of eliminating your exposure to EMI from the grid as the wires are physically disconnected (particularly if you utilize a triple pole contactor). This is the recommended option for families who want to reduce their EMF exposure at night.]

• I just finished reading a feature article in *The Bent* concerning the potential hazards of human exposure to microwave radiation.

In this era, probably we need much more research and development to discern the human health effects of exposure to microwave radiation. I believe the author should have acknowledged the catalytic effects of exposure to electromagnetic radiation from all sources.

For example, have the electromagnetic devices which have been developed to accelerate healing of injuries to the human body been considered? Similarly, if pregnant rats are injected with carcinogenic chemicals, and then exposed to electromagnetic radiation of various wavelengths, then we should expect more rapid formation of tumors in rats exposed to certain catalytic energy levels as compared to a control group which was not exposed to any electromagnetic radiation.

My point is the catalytic effects of absorption of electromagnetic radiation can be either good or bad for the human body. Good if it promotes healing. Bad if it promotes the rate of aging.

As a responsible member, I want to advocate more research and development and counsel against a panic polarization against exposure to all electromagnetic radiation.

Robert A. Hinton, KS A '61

• I do agree there may be biological

effects to non-ionizing RF radiation, but at present, the percentage of the population explicitly affected by it appears to be small. This leads to questions as to why, how are the affected different, and so on.

My father was an EE who was intimately involved in microwave radiation and radar. He died of cancer in 1977 at the tender age of 58. Over the years, I have wondered if his exposure to microwaves caused his cancer. Ditto for those working on the Manhattan Project in Los Alamos.

Also, I talked with a friend who is an anesthesiologist. He was an EE before becoming a doctor, and feels that at present there is no valid explanation for such symptoms. The CCVR study referenced in the article is an in vitro (test tube) study.

The article, while interesting, doesn't document what floor he was living on when his symptoms first occurred.

In one picture, he appears to have some kind of signal analyzer or such implying that he might be able to measure signal strength. He gives no information on such. There are computer programs such as iStumbler that will give you relative signal strength of WiFi signals.

In any case, we need to run double blind studies with electro-sensitive subjects in a windowless room to see if their sensitivity can be replicated in the presence and absence of signals.

Stephen I. Jasik, NY E'65

- I read Jeromy Johnson's alarmist article in the Summer 2016 issue of *The Bent* on the pathogenic effects of EMF pollution. I went on Google at <https://www.google.com/#q=wireless+wake+up+call> and saw a plethora of links on the subject. It has invaded the computer world, the media, the engineering world, and the medical world.

Ordinarily, medical statistical studies are made using what is known as "Factor Analysis," to gain a correlation of multiple causes and effects that try to show statistical significance. Such studies show tables and tables of statistical survey

data to come to valid conclusions. Only anecdotal evidence seems to be existing in this article. It allows only generalizations extended from specific events instead of using a well-designed experiment.

According to https://en.wikipedia.org/wiki/Factor_analysis:

"Factor analysis is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors."

In the absence of such an analysis as used in medical studies, I can only conclude that the presentations are intended to gain notoriety for him and mass hysteria for the rest of us. In addition, there are Luddite groups who have an agenda that can gain traction for their own, nefarious causes by broadcasting his material.

I find it disturbing for a prestigious engineering journal like *The Bent* to promulgate this material

without properly vetting it. As such, I think it risks casting aspersions on the Tau Beta Pi publication and on TBPi generally.

Frank M. Pelteson, OH Γ'49

- I read the article in *The Bent* on EMF related issues and found it interesting. I am an MSE and worked in telecommunications my entire career. I also own my family farm in Missouri where we are being approached by a private equity firm to build a high voltage power line near my home and within 200 to 300 feet of many homes across the state.

This company, Clean Line Energy Partners, is attempting to get utility status and eminent domain capability because Missouri landowners will not willingly let them have an easement. They are proposing the line to haul "clean energy" from wind farms in Kansas to Indiana to drop in the eastern power grid. The line will carry the highest power load in North America at +/-



CNA
ANALYSIS & SOLUTIONS

CNA is an Equal Opportunity Employer. All job applicants must have US citizenship and the ability to obtain and maintain a government issued security clearance.

www.cna.org/careers

600KV and 4 gigawatts. Although the Missouri public service commission initially rejected their proposal last year due to minimal benefits to Missouri and significant negative impacts to landowners, the company has recently reapplied with the governor's endorsement.

I have tried to do research into electric field intensity and EMF and am concerned about what is reasonable to consider as safe around this line. They are using 140 to 200 foot towers with the line getting as close as 35 feet to the ground between towers with no fencing keeping livestock or people from being directly under the lines. I have read a lot of EMF related information but I'm having trouble applying to these DC lines. One of the other big issues I had is their planned construction next to three pipeline easements also crossing my farm and the potential to induce ground currents and accelerate corrosion on the pipelines.

We helped to form the Missouri Landowners Alliance to fight them. We created a Facebook page, www.facebook.com/blockgrainbeltexpressmo, to share information. We're not against clean energy, but we do have a problem with a private company obtaining the power of eminent domain just to arbitrage the sale of power to the eastern PJM power grid—especially without taking into account possible, long term unintended consequences for landowners and homeowners.

Loren V. Sprouse, MO A '73

Membership Card, Bravo!

- The membership card, great idea and a wonderful surprise! Someone deserves a big “attaboy”/“attagirl!”

The card is so well implemented in design motif and color. It coordinates quite nicely in my billfold with my Mensa membership card of which I am equally proud!

Incidentally, throughout my engineering career, 99 percent of the time, my necktie was tethered in place by a medium-bent with push-pin mount.

To this day, I wear a mini-bent on my suit and tux lapels, at all times and all occasions. Proud to be a

member, continue the good work!

Robert C. Ferra, Ph.D., P.E.,
NY E '74

- I feel certain that you didn't expect a thank you note for the first edition Tau Beta Pi membership card, but here it is!

Good idea—for all the reasons you stated. Collateral benefits (for me, for sure) are specifics of my initiation into Tau Beta Pi, and an opportunity to review our mission statement including the wording “to foster a spirit of liberal culture in engineering colleges.” Funny—I didn't remember that from 1954. Don't misunderstand, I'm very much in favor of it—just surprised! Was it around in 1954?

Ward W. de Groot III, NY Γ '54

[Editor's Note: The language you mention was around in 1954 and, in fact, was included as a part of the TBPi Constitution of 1898.]

Something Amis?

- As a member of the class of 1955, I am naturally interested in reading about the deaths of contemporaries on a current basis. Death dates of 2010 and earlier give me no comfort that I will receive such news before my own death, which I don't think is imminent. But a six-year delay? Surely the chapter at WUSTL could furnish details of Gerald Nadler, Ph.D., *Missouri Gamma* '45, who was head of the industrial engineering department in the 1950s.

Furthermore, I noticed many members of the class of 1940, but only one prior, from 1935! That does not stand the test of reason, let alone actuarial science. Rather than my trying to guess the logic of these observations, I would like an explanation of what has gone amiss, published in the next issue of *The Bent*.

Franklin S. Sax, MO Γ '55

[Editor's Note: Tau Beta Pi publishes the information we receive about the passing of our members, but frequently we are never contacted, or not informed until months, if not years, have elapsed. Astute readers may have noticed an increase in

size of the Chapter *Eternal* section in recent issues. We contracted with a company to update our membership records and have been validating death notices and including them in *The Bent*.

We have several other methods for updating our records, but we don't include a member in Chapter *Eternal* unless we have something to substantiate the information.

Our Headquarters team keeps busy and doesn't have much extra bandwidth for actively locating our “Lost Alumni.” Chapters report new *Tau Bates* promptly as required but rarely maintain or provide updates to HQ. We are planning to renew our “Lost Alumni” program in an effort to update the 200,000 member records that are out-of-date. Check the next issue of *The Bent* for more information on this initiative.]

Digital Brain Tickling

- Just a little feedback: I really enjoy the digital delivery of *The Bent*. I can read it on my computer or my phone. I especially like having the Brain Ticklers available when I have some downtime.

Christopher S. Stewart, TX H '79

Caption Comment

- As one of the 8 percent of color blind males, I am uneasy with you selecting a caption [page 3 of the Summer 2016 issue of *The Bent*] that makes fun of this or any other condition. Surely one of the other 37 captions was not potentially offensive. The engineering honor society should have more taste and sensitivity. Please do better.

Robert C. Meyer, FL A '83

[Editor's Note: Thank you for bringing to our attention our unintentional insensitivity to those who are impacted by color blindness. We apologize to you and truly meant no disrespect. We had not considered the unintended consequences in publishing that winning caption, but we will be more careful in the future.

Thank you for being a life subscriber and also know that we value your opinion and your membership in this outstanding Association!]



The Tau Beta Pi Outstanding Advisor has been recognized every year since 1994. Selection is made by a committee of deans at engineering colleges and past award winners.

2016 OUTSTANDING ADVISOR

Sandra B. Pitzak

IN RECOGNITION OF SERVICE TO her chapter and the Association, **Sandra (Sandy) Pitzak**, Colorado Beta '00, is named the 2016 Tau Beta Pi Outstanding Advisor. She is owner and spacecraft engineer at Tomorrow's Enterprise, LLC, and Chief Advisor to the Colorado Beta Chapter.

She will be honored on October 7, 2016, at the 111th annual Convention in San Diego, California. President J.P. Blackford will present her with \$1,000 and a commemorative plaque. Another \$1,000 will be presented to the University of Colorado Boulder College of Engineering and Applied Science's discretionary fund.

Pitzak was cited in her nomination for critical contributions and vast knowledge of the workings of a collegiate chapter and promoting a professional and reputable view of the organization throughout the membership and the college. As a result of commitment to chapter and alma mater, she exemplifies what it means to be an outstanding collegiate advisor, always willing to go above and beyond.

She received her bachelor's and master's degrees in aerospace engineering from the University of Colorado Boulder (CU). Pitzak was initiated into Tau Beta Pi as an undergraduate student at CU, became president of Colorado Beta, and helped resuscitate the struggling chapter. She began serving as an advisor to the chapter in 2001 and now has 14-plus years experience in her role as Chief Advisor.

One highlight of her undergraduate time was creating and promoting the Trick-or-Can community service project which is now an annual tradition. During her time as an advisor, Pitzak has attended numerous TBPI District Conferences and Conventions. At her second Convention in 2002, Sandy helped establish the Chapter Advisors Committee as part of her successful drive to give a larger role to advisors at Convention.



Previously, Pitzak helped prepare the proposal package for the 2006 Convention in Denver, CO. She also organized a significant portion of the on-site logistics and helped coordinate the host chapter activities. Under her leadership and guidance, Colorado Beta has received three Secretary's Commendation Awards, a 2011 Membership Award, and a 2005 Project Award. More recently, she has served as the liaison between the Front Range Alumni Chapter (CO & WY) and the Colorado Beta Chapter to facilitate interaction and joint activities.

In her professional career, Pitzak worked as a mission analyst for GeoEye and was responsible for orbit maintenance and collision avoidance for the GeoEye constellation of Earth-observing satellites. She previously worked at Ball Aerospace and Technologies Corporation as a spacecraft power engineer and spacecraft systems engineer.

She is a true volunteer as she is not employed by the university, and she demonstrates a deep involvement in chapter activities. Pitzak has continued her leadership role to ensure the chapter has strong succession planning. One notable contribution is the formation of the informal "TBPI Elders' Council" made up of former chapter presidents who mentor the chapter.

In her nomination, Pitzak was recognized for "always being eager to collaborate with others and find new ways to assist her students." Accordingly, she is a great resource for advisors of other student groups because of her longevity as a chapter advisor.

In recognition of her contributions to strengthening the Association, her commitment to advising and leadership, and her years of dedicated service, TBPI recognizes Sandy Pitzak as the 2016 Tau Beta Pi Outstanding Advisor.

In recognition of her contributions to strengthening the Association, her commitment to advising and leadership, and her years of dedicated service, TBPI recognizes Sandy Pitzak as the 2016 Tau Beta Pi Outstanding Advisor.



WHO'S WHO

ASEE Fellows

The American Society for Engineering Education (ASEE) 2016 class of fellows has been announced. The 11 engineering and engineering technology educators included six Tau Bates:

Wayne T. Davis, Ph.D., *Tennessee Alpha '73*, dean, University of Tennessee college of engineering.

John K. Estell, Ph.D., *Ohio Zeta '84*, professor of computer engineering and computer science, Ohio Northern University.

Ronald E. Land, *Georgia Alpha '71*, New Kensington professor, co-director, and assistant golf coach, Penn State University.

Michael J. Prince, Ph.D., *Massachusetts Alpha '84*, professor of chemical engineering, Bucknell University.

Donna S. Reese, Ph.D., *Mississippi Alpha '79*, professor, and department head of computer science and engineering, Mississippi State University.

Catherine A.K. Skokan, Ph.D., *Colorado Alpha '70*, associate professor of engineering, Colorado School of Mines.

Linda M. Abriola, Ph.D., *Pennsylvania Zeta '76*, former engineering



dean at Tufts University, has been named a science envoy by the U.S. State Department. Her responsibility will be to forge relationships with other nations related to science and economic issues. She will focus on STEM education and engineering in the Middle East, North Africa, and South and Central Asia. Abriola has also become director of the Tufts Institute of the Environment, where she will serve to support interdisciplinary research and education.

Frances H. Arnold, Ph.D., *New Jersey Delta '79*, has been awarded the 2016 Millennium Technology Prize for her discoveries that launched the field of 'directed evolution,' which mimics natural evolution to create new and better



proteins in the laboratory. This technology is being adopted in areas like green chemistry and renewable energy. She is a professor and director at the California Institute of Technology. Arnold has been elected into all three National Academies in the United States, won a Draper Prize (2011), and received a National Medal of Technology and Innovation (2013).

David C. Munson Jr., Ph.D., *Delaware Alpha '75*, has received the 2016 Benjamin Garver Lamme Award from the American Society for Engineering Education. This came on the eve of his retirement as engineering dean



at the University of Michigan. The award is bestowed upon a distinguished engineering educator for contributions to the art of teaching, research and technical literature, and achievements that contribute to the advancement of the profession of engineering college administration.

George J. Pierson, *Pennsylvania Eta '84*, has been named as president and CEO of San Diego professional services firm Kleinfelder. He is former CEO of engineering



giant Parsons Brinckerhoff, who has headed his own management consulting firm since leaving the PB chief role in 2014. Pierson is credited with adding nearly \$1.4 billion of shareholder value during his five years as CEO.

Edward M. Walsh, Ph.D., *Iowa Alpha '63*, is the founding president of the University of Limerick, the first new university established by the Republic of Ireland, a post from which he retired in 1998, after a 28-year term. He is a graduate of



the National University of Ireland and holds an M.S. and doctorate in nuclear and electrical engineering from Iowa State University.

Michael M. Watkins, Ph.D., *Texas Alpha '83*, has been appointed director of the Jet Propulsion Laboratory (JPL) and vice president at Caltech. He had been professor of aerospace engineering and director of the center



for space research at the University of Texas at Austin since 2015. Previously Watkins spent 22 years at JPL where he held leadership roles on some of NASA's highest-profile missions. He last served at JPL as manager of the science division and chief scientist for the engineering and science directorate.

Established in 2006, the Tau Beta Pi-McDonald Mentor Award celebrates excellence in mentoring and advising among educators and engineers who have consistently supported the personal and professional development of their students and colleagues. It recognizes those who have shown true concern for individuals, supported an environment for developing talents, and earned respect and recognition for their contributions to their field and the greater community.



2016 TBPI-MCDONALD MENTOR

Antonette M. Logar, Ph.D., J.D.

fOR HER OUTSTANDING success in mentoring engineering students, **Antonette M. (Toni) Logar, Ph.D., J.D.,** *South Dakota Alpha '78*, is the

2016 TBPI-McDonald Mentor. She is a professor in the math and computer science department at the South Dakota School of Mines & Technology.

She will be honored on October 7, 2016, at the 111th annual Convention to be held in San Diego, CA. President J.P. Blackford will present her with \$1,000 and an engraved medallion and pin. Another \$1,000 grant will be presented to the South Dakota Alpha Chapter for nominating her.

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

Logar was endorsed for her outstanding support of traditional, non-traditional, and female students. She has demonstrated a commitment to mentoring undergraduates to unprecedented success in competitions and professional achievement through hard work and an inquisitive approach to teaching.

She received a B.S. in geology from Lehigh University, a B.S. in computer science from the South Dakota School of Mines & Technology (SD Mines), an M.S. in computer science from the University of Minnesota, a Ph.D. in computer science from Texas Tech University, and a J.D. (law) from the University of Louisville. She has been a member of the faculty at SD Mines since 1986.

Inducted as a TBPI eminent engineer in 2000, Logar has



been an advisor to SD A since 2005. She has also served for the past 25 years as the Association for Computing Machinery (ACM) programming team coach at SD Mines. In this role, she has guided six teams to the International Collegiate Programming Contest (ACM ICPC) World Finals (the “Olympics of computer science”).

She focuses on improving student competitors’ programming proficiency and helps them gain confidence and presentation skills. Logar is an unmatched personal and career development mentor, serving as an academic advisor to most junior and senior female computer science students. Logar excels as a strong role model in a typically male-dominated profession.

In her nomination, she was cited for writing excellent letters of recommendation, going out of her way to find contacts to secure internships, and helping students both in and out of class. Logar is also active in her community—as a curriculum coordinator for Leadership Rapid City, on the symphony board, on the Mt. Rushmore National Memorial Society board of directors, and in the community theater.

She has been recognized for her dedication to advising and teaching with the Presidential Outstanding Professor Award, the Ennenga Teaching Award, and the Boeing Outstanding Educator Award. However, helping students gives her the most satisfaction.

Other achievements include holding the title of commissioner within ABET and attaining the titles of department chair and dean of graduate education.

Logar’s dedication to the success of those around her has made her an example of the highest level of mentorship. For these contributions as an advisor and for guiding students to exceed academic and personal goals, Antonette M. Logar, Ph.D., J.D., is the 2016 Tau Beta Pi-McDonald Mentor.



2016 LAUREATES

Three Laureates have been selected in the 35th year of Tau Beta Pi's annual program to recognize gifted engineering students who have excelled in non-technical areas. Award categories include arts, athletics, diverse achievements, and service. The Laureates join 99 other outstanding Tau Bates who have been cited since the program began in 1982. The Laureates will be honored with other 2016 Association award winners on October 8 at the 111th annual Convention in San Diego, CA. Tau Beta Pi Treasurer A.J. Passman will present each with a \$2,500 cash award and a commemorative plaque.

The Laureate Program was inaugurated to further Tau Beta Pi's second basic purpose as stated in the preamble to the Constitution: "to foster a spirit of liberal culture in engineering colleges." A committee of District Directors considered 11 nominees from nine chapters.

Nathan J. Ferraro

NATHAN J. FERRARO, *Oklahoma Alpha '16*, has been named a 2016 Tau Beta Pi Laureate for his diverse achievements. He will be honored with other 2016 Association award winners on October 8 at the 111th annual Convention in San Diego, CA.

Ferraro earned bachelor's and master's degrees in civil engineering and architectural engineering, respectively, from the University of Oklahoma (OU). He is a program director of the Warrior-Scholar Project.

Prior to his collegiate academic career, Ferraro spent four years in the U.S. Navy as a nuclear communications expert aboard the E-6B Mercury aircraft. He is also active in ultra-endurance athletic competitions, including iron-distance triathlons and ultramarathons.

Ferraro is a volunteer tutor, hull design lead for OU's concrete canoe competition team, and vice president of the Architectural Engineering Institute student chapter. He also served as a student advisor to the local ASCE chapter and individually raised funds for the Action for Healthy Kids charity and the Leukemia & Lymphoma Society.

Ferraro has excelled in the "standard" realm of academia but believes that higher education is not intended to be strictly academic.



He dedicates himself daily to organizing and developing OU's Warrior-Scholar Project, a week-long academic reorientation aimed at helping veterans transition from the military to the classroom. Ferraro has made significant progress in support for military veterans by developing and executing the intensive week-long education initiative. He wants to change the Department of Education statistic that only 9.9% of veterans finish their bachelor degree programs.

Oklahoma Alpha described him as "a selfless, driven and talented engineer with distinct experiences in areas of service, leadership and athletics. Ferraro's character, keen initiative, and unwavering resolve not only foster liberal culture in the Gallogly College of Engineering, but across the university, the state, and

the country."

He has advocated for social justice, learned to speak Arabic, and become active in Middle Eastern communities on campus to help combat anti-Moslem and anti-Arab sentiments.

He has completed three iron distance triathlons, which consist of a 2.4-mile swim, a 112-mile bike ride, and then a 26.2-mile run, all completed sequentially. Ferraro has also completed ultramarathons and finished a 100-mile event after breaking a fibula at mile 84.

Angadbir S. Sabherwal

ANGADBIR S. SABHERWAL, *Iowa Alpha '16*, has been named a 2016 Tau Beta Pi Laureate for his diverse achievements. He will be honored with other 2016 Association award winners on October 8 at the 111th annual Convention in San Diego, CA.

Sabherwal is a mechanical engineering graduate of Iowa State University (ISU) and will complete his economics degree in the fall.

His motivation for pursuing these degrees is his personal recognition of the importance of technology in helping to meet basic needs and to address the challenges of climate change, and long-term preservation of the environment. Sabherwal has been environmentally conscious from an early age, starting an after-school recycling program in his youth and later receiving a Youth-Change Makers award from the United Nations.

On campus, he has provided leadership for food programs, creek cleanup, and raising money for electricity, sanitation, and education in rural India. Sabherwal is a member of Sankalp, a volunteer organization working to improve socio-economic conditions in India, and assists the International Family Project at a local church. He also served as a Minds for Tomorrow ambassador leading



outreach events to assist K-12 students with STEM related in-class and extra-curricular activities.

His research and industrial experience included co-ops, internships, and research positions. Sabherwal worked as a student engineer for the Department of Energy—Industrial Assessment Center at ISU, as a research and development intern for Compressor Controls Corp., and as a quality engineer intern at the Van Gorp Corp.

His commitment to these ideals is evident in awards such as the ISU Learning to Live a Life Award and being selected as a 2015 DiscoverE New Faces of Engineering—College Edition as one of the nation's 12 most promising engineering professionals of tomorrow.

Sabherwal has demonstrated an unprecedented breadth of involvement at Iowa State University and the Ames community. He has made substantive contributions to residence hall groups, the college of engineering and university organizations as well as national and international groups concerned with issues related to the environment, climate change, and assisting the poor in developing countries.

Kiersten K. Wang

KIERSTEN K. WANG, *Florida Alpha '16*, has been named a 2016 Tau Beta Pi Laureate for her achievements in athletics. She will be honored with other 2016 Association award winners on October 8 at the 111th annual Convention in San Diego, CA.

Wang is a graduate of the University of Florida (UF) with a degree in civil engineering focusing on water resources.

She is a three-time NCAA National Champion member of the UF gymnastics team. Personal accolades include SEC Academic Honor Roll and NACGC/W Scholastic All-America team. Her specialties are the vault and floor exercise events.

In addition to contributing to the team's performance success, Wang also contributed through service events, including promoting cancer awareness, food drives, and serving as a gymnastics camp counselor.

During five years as a civil engineering student, she maintained a high academic standard achieving a 3.82 GPA.

According to her nomination, she has also been one of the most dedicated members of the Florida Alpha Chapter. Her passion has focused on K-12 outreach through



the chapter's GatorTRAX (MindSET) program, where she served as elementary GatorTRAX coordinator.

In this role, she set up six successful sessions attended by more than 100 participants, at each event, and taught children STEM concepts from water filtration to kinetic and potential energy.

She actively participated in the chapter discussions at the officer meetings and remained involved in all aspects of the chapter!

Wang made the Dean's List at the University of Florida numerous times, in Spring 2012, Fall 2013, Fall 2014, Spring 2015, and Fall 2015. She is also a member of the National Society of Collegiate Scholars.

Her athletic achievements coupled with her ability to manage her schedule to include important service endeavors makes her a deserving recipient and unrivaled role model to others.

To use a gymnastics term, Kiersten Wang has consistently "shown off" her commitment to and excellence in athletics, academics, and altruism. Wang has provided a shining contribution to the fostering of the liberal culture at the University of Florida and is a stand-out member of Tau Beta Pi.

Distinguished Alumni are recognized for their demonstration of outstanding adherence to the ideals of Tau Beta Pi (integrity, breadth of interest, adaptability, and unselfish activity) and for fostering a spirit of liberal culture in society. Recipients exemplify excellence in both leadership and character to members of collegiate chapters. This year's TBP Distinguished Alumni will be honored on October 8, 2016, at the 111th annual Convention to be held in San Diego, CA. Tau Beta Pi President J.P. Blackford will present a commemorative plaque, and a \$2,000 scholarship will be given in the name of each alumnus to a deserving student member of Tau Beta Pi.



2016 DISTINGUISHED ALUMNI

Nancy J. Davis, Ph.D., P.E.

IN RECOGNITION of outstanding lifetime achievements, **Nancy J. (Jan) Davis, Ph.D., P.E., Alabama Alpha '77**, is recognized as a 2016 TBP Distinguished Alumna. She is vice president and deputy general manager of Jacobs Engineering and a former NASA astronaut.

Davis earned bachelor's degrees in applied biology and mechanical engineering from the Georgia Institute of Technology and Auburn University, respectively. Her master's degree and Ph.D. are in mechanical engineering from the University of Alabama in Huntsville. She is vice president and deputy general manager of Jacobs Engineering and Science Services and Skills Augmentation Group at the Marshall Space Flight Center.

Davis' career has included other roles such as team leader responsible for the structural analysis and verification of the Hubble Space Telescope, NASA astronaut (a veteran of three space flights), and director of the human exploration and development of space at NASA headquarters. She initially worked in the oil industry and then joined NASA as an aerospace engineer, showcasing



her engineering and leadership skills, and contributing to some of NASA's most important projects.

Davis was selected to join the astronaut corps. She spent over 670 hours in space as a mission specialist, orbiting the Earth 325 times, and serving as payload commander of her last mission. Before retiring from NASA in 2005, Davis served as director of the flight projects directorate and director of safety and mission assurance, helping with the successful return to flight of the Space Shuttle.

Her other passions include volunteering for mission trips (Belize and Mississippi), supporting diversity and mentoring women, speaking on NASA related topics, and the Girl Scouts. Davis received the 2016 Christine Richard Girl Scouts

Lifetime Achievement award, the Presidential Rank of Meritorious Executive, and NASA's Exceptional Service medal (twice).

In recognition of her incredible career, devotion to the space community, and work as a role model promoting STEM, Dr. Davis is the ideal example of a well-rounded engineering professional.

Eugene M. DeLoatch, Ph.D.

IN RECOGNITION of outstanding lifetime achievements, **Eugene M. DeLoatch, Ph.D.**, *District of Columbia Alpha '59*, is recognized as a 2016 TBP Distinguished Alumnus. He is founding dean of the Morgan State University school of engineering and past chairman of the department of electrical engineering at Howard University.

DeLoatch holds B.S. degrees in mathematics and electrical engineering from Tougaloo College and Lafayette College, respectively. His M.S. and Ph.D. in bioengineering were completed at the New York Polytechnic University. He will soon retire after more than 32 years as Morgan State's engineering dean.

Prior to joining MSU, he spent nearly ten years as a faculty member at Howard University, where he rose to chairman of the department of electrical engineering. Soon after joining MSU, he helped to establish Maryland Epsilon Chapter in 1998.

His contributions to engineering education and in promoting liberal culture include serving as president of the American Society for Engineering Education (2002-03).



He remains the only African American to hold this position. DeLoatch also co-founded the Black Engineer of the Year Awards Program, which started out providing opportunities to showcase and honor the achievements of minority engineers and scientists. It has grown into an annual conference and de facto cultural event for students and faculty from Historically Black Colleges and Universities.

DeLoatch has been a tireless educator, cultural icon, and leader, bringing the first engineering doctoral program to Howard. He has been awarded honorary doctorates from Lafayette College (PA) and Binghamton University (NY). A committed alumnus, he is a life member of the Tougaloo College Alumni

Association and was named 1981 Alumnus of the Year. His dedication to engineering education and graduating African American engineers is unmatched. DeLoatch truly exemplifies what it means to be a role model through his efforts to nurture and encourage liberal culture. He is a deserving recipient of this honor for his impact on the engineering community.

Michael D. Griffin, Ph.D.

IN RECOGNITION of outstanding lifetime achievements, **Michael D. Griffin, Ph.D.**, *Maryland Beta '77*, is recognized as a 2016 TBP Distinguished Alumnus. He is chairman and CEO of the Schafer Corporation and previously served as Administrator of NASA.

Griffin, a true technical expert, holds seven academic degrees, including: a B.A. in physics (Johns Hopkins); four master's of science degrees in aerospace science, electrical engineering, applied physics, and civil engineering; a Ph.D. in aerospace engineering (Univ. of Maryland); and an MBA.

His career includes academic, technical, and leadership positions culminating in his service as the 11th NASA Administrator (2005-09).

Griffin directed shuttle return-to-flight activities and developed a plan for completion of the International Space Station. He established the architecture for space shuttle replacement and human return to the Moon and initiated the first development of commercial cargo and crew service to Earth's orbit. His other projects include



acoustic propagation models for anti-submarine warfare programs and work on early Mars rovers.

Griffin is a lifelong proponent of professional societies and has been heavily involved with the American Institute of Aeronautics and Astronautics. He became a director at large and then led the institute as president (2012-14).

His depth of knowledge makes him an asset at NASA and everywhere else he has worked. This has also made him a valuable teacher, having taught courses at Johns Hopkins Univ., Univ. of Maryland, George Washington Univ., and Univ. of Alabama at Huntsville.

Griffin is also an accomplished pilot who enjoys providing lessons to young people. He works to support veterans' groups like the Veterans of Foreign Wars and the Air Force Association. He is truly a great technical mind, a leader in the field of aerospace, and a Renaissance man who excels across academic and professional disciplines in academia, government, and industry promoting a liberal culture of learning and innovation through his words and actions.

Engineering Brings Art and Architecture Together

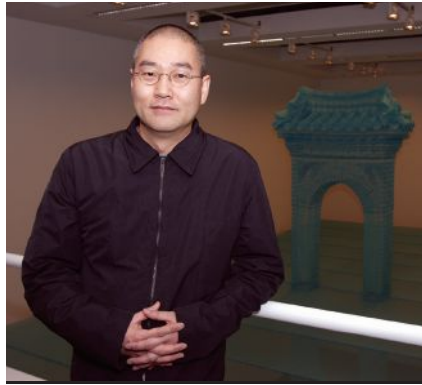
Fallen Star Lands to Find Home Atop School Building

By Jeffrey Saikali, Ohio Beta '96

Standing on the grounds of the Jacobs School of Engineering on the University of California (UC) San Diego campus, the blend of massive buildings with natural scenery of grass and trees all looks quite normal for this technology-driven portion of a major university...with one exception. Atop the roof of Jacobs Hall (formerly Engineering Building I) is a single-room, light blue cottage known as Fallen Star. Equally striking is that the house appears to be hanging precariously in a distorted orientation as if it had randomly dropped from the sky as part of a children's fable.

Yet, Fallen Star is no toy, and its position is intentional. It is a creation of Korean artist Do Ho Suh, inspired by aspects of his life when he emigrated from South Korea to the United States. Although Suh is not an engineer, engineering played a major role in bringing to life this piece that took seven years to plan.

Despite the differences between engineering and art, there are times when the two disciplines join forces. Furniture, bridges, and automobiles are examples of structures that each need to be strong, stable, and not unnecessarily weighted but also do well to have aesthetic appeal. That is, humans tend to appreciate when products are designed not purely for function but also with form in mind. Many commercial buildings are designed to accommodate function while bringing a measure of visual



Do Ho Suh

pleasure to the people who use them.

I interviewed Suh recently, during his visit to San Diego for the premiere of the documentary *Fallen Star: Finding Home*. Directed by Vera Brunner-Sung and Valerie Stadler, the film took five years to produce. It chronicles the design, development, and construction of Suh's landmark creation.

In my interview with him, Suh recounts growing up watching many different American television programs while in his native South Korea. He says this gave him a

good sense of what life in America was like. Due to that informal exposure, Suh says he did not go through the overwhelming cultural shock that he might otherwise have experienced upon relocating to the United States in 1991.

Subtle Differences

Nonetheless, Suh did face discomfort with subtle differences in spatial organization of American society compared to that of South Korea. He cites the shapes of buildings, sizes of doors, and locations of door knobs as examples. Intending to stay indefinitely in the United States, he was compelled to adjust to these dissimilarities, and they caused him to think of dimension of personal space in ways that he had not previously considered. Since Providence, Rhode Island, was his first home city in the United States, the basic look of the Fallen Star



PHOTOS: Fallen Star sits atop Jacobs Hall, right, and is seen from its home on the roof of the 6th floor, below left. Credit: Fallen Star, 2012, Do Ho Suh, Stuart Collection, UC San Diego, Philipp Scholz Rittermann

cottage is a composite of homes in that area.

Home is a recurring topic in Suh's works. He describes it as a universal theme that artists can use in communicating with the general public. When he visited the UC San Diego campus in 2006 and was contemplating what to create for the Stuart Collection, it occurred to Suh that discomfort with geographic and cultural displacement are sensations that probably most of the thousands of students at UC San Diego also go through. He notes that these feelings can be provoked even when relocating within a country, since climate, accents, culture, and architecture have regional distinctions. A measure of jitter and social awkwardness are common for students as they settle into university life away from home. Suh expresses all these sensations by Fallen Star's intentionally non-level floor and tilted walls. They subject the visitor to significant uneasiness that takes time to accept.

Common Theme

I recently visited the Museum of Contemporary Art San Diego in downtown San Diego. Consuming the relatively small museum's entire first floor for a special 15-week event were exhibits by Do Ho Suh. The many pieces on display included paintings, drawings, and sculptures. Unmistakable is that every one relates to a common theme: home. Most striking for me was Suh's piece titled *Apartment A, Unit 2, Corridor and Staircase, 348 West 22nd Street, New York, NY 10011, USA (detail)*, a life-size recreation of his former New York City apartment. Made entirely of translucent polyester fabric and stainless steel tubes, the set includes stoves, refrigerators, kitchen sinks, bathroom sinks, bathtubs, toilets, light switches, air conditioners, and fixtures, all of which are finely crafted in great detail. The circuit breaker boxes (also made of polyester and steel tubes) in "Apartment A..." include the kind of text you would expect to see in a home electrical apparatus of that kind. The many pieces on display at this exhibit confirm Suh's passion for incorporating notions of home and personal space in his artwork.

The UC San Diego main campus is the permanent home of the unique Stuart Collection, of which Fallen Star was the 18th addition. The ongoing program seeks



artists who will contribute to its mission of "...enrich[ing] the cultural, intellectual, and scholarly life of the... campus and of the San Diego community by building and maintaining a unique collection of site-specific works by leading artists of our time." This includes artists whose backgrounds do not include public works. Collection representatives approached Suh because his notion of home is a topic associated with the university experience. Per normal practice of the Stuart Collection, project manager Mathieu Gregoire says that Suh was given no direction on what to create. Once an artistic design for Suh's piece was settled on, a feasibility study was conducted, and the project was presented to the UC San Diego chancellor for approval. When Jacobs Hall was proposed as the preferred building on top of which Fallen Star would be positioned, students, faculty, staff, and administrators of



Interior of the building. Credit: Fallen Star, 2012, Do Ho Suh, Stuart Collection, UC San Diego, Philipp Scholz Rittermann

thickest.

For the house to survive being raised six stories and cantilevering substantially, its foundation had to be far more robust than usual for a hypothetical single-room house of this size. This required an extra sturdy base, and it explains why the house was constructed on a concrete slab that is far thicker, stiffer,

the Jacobs School of Engineering (named for Joan and Irwin M. Jacobs, *New York Delta '56*) were welcoming.

Don Hodges, principal of Hodges & Hodges Architects, was the licensed architect for Fallen Star. J. John Walsh, president of Walsh SE, Inc., was its licensed structural engineer. In separate interviews with Hodges and Walsh, the technical details of Fallen Star's design and final positioning were explained.

Typically, the architect is the creative person who works with the client to generate a preliminary idea and design, and who decides on such things as how the system will be waterproofed, the sizes of doors and windows, and how they will function, what colors of paint will be used, and so on. The architect also assembles the team of structural engineers and construction personnel who will turn the vision into reality. Fallen Star was different in that the idea and conceptual design model were created by artist Suh. Nonetheless, the complicated nature of this project left plenty for Hodges to do.

Concrete Flooring

The design of Fallen Star calls for it to be cantilevered from the roof of Jacobs Hall, a structure with working faculty offices and laboratories. Had the cottage been constructed on the roof of Jacobs Hall, steel beams could have served as the foundation, anchored to the roof and cantilevered into space. However, this would have necessitated iron workers hanging from the top of the building, and that would have demanded sealing off a large area on ground as a safety measure. Altogether, that approach would have disrupted the daily lives of employees in Jacobs Hall and significantly raised the cost of the project.

Instead, it was decided to construct the house on the ground-level pedestrian walkways and grassy area that face Jacobs Hall and then lift it to the top of the building. The concrete foundation of the cottage runs around its perimeter and is about 18 inches wide and 18 inches deep. That, plus the concrete flooring accounts for the building's unusually great weight of about 70,000 pounds. The floor slab varies in thickness due to the 5-degree tilt of the floor, with the foundation about 18 inches at its

stronger, and bearing a greater reinforcement than usual for a house. The frame of the cottage needed to be abnormally stout. It consists of steel tube pieces, four to six inches in width and depth that are vertical, horizontal, and diagonal in a skeletal formation. Between these tubes are light gauge metal studs, placed every 16 inches on center that form the walls. (The interior is finished in drywall.) Besides adding stiffness, this framework allows the house to be made of non-combustible materials, which was mandatory for the fire-rating of Jacobs Hall.

Jacobs Hall is in the highest class of fire rating (Type 1) available in California's Building Standards Code. Its construction is free of flammable materials, and it is highly robust with very thick cast-in-place walls, columns, and roof. The exterior of Fallen Star has fire-retardant-treated plywood to act as sheathing and a nailer for the PVC-siding. The siding and trim members (painted light blue) that look like wood are actually flame-graded PVC to resist exposure to open flame. The roof consists of composition shingles that are also fire-resistant. Inside the cottage are fire sprinklers to provide it with protection comparable to that inside Jacobs Hall.

Despite the overall sturdiness of Jacobs Hall, retrofitting was necessary. According to Walsh, the typical roof of a house or commercial building can handle loads of 20 pounds per square foot, but the roof of this building needed to manage loads of up to 100 pounds per square foot due to the tremendous weight that the cottage, its accompanying landscaping (including grass, a flower garden, and special lightweight soil), and visitors would add.

Fallen Star rests on a 6-story projection off the 7-story Jacobs Hall so that the 6th-floor projection's roof aligns with the 7th floor of the rest of the building. The roof of this projected portion was thickened by casting an 8-inch-thick slab of reinforced concrete bonded to the existing concrete. Additionally, six 1¼-inch diameter post-tension rods flank the sides of cast in-place concrete beams that are about 2 feet wide and 2 feet deep and run from side to side in Jacobs Hall. Each rod was tensioned to 60,000 pounds. Thus, each beam had an additional 120,000 pounds of compression on it, which caused the

PHOTOS: Fallen Star sits on its special base at it is readied for the crane, bottom, is lifted to the roof of the 6th floor, center, and is lowered onto its supports. Credit: Fallen Star, 2012, Do Ho Suh, Stuart Collection, UC San Diego

roof of Jacobs Hall to rise briefly while hydraulic jacks were tensioning the rods. They settled back down when the added load from the soil and cottage were put in place.

The roof was not originally intended for visitor access. Thus, a door had to be added to the 7th floor of Jacobs Hall to provide access to the open roof of the adjacent 6th-floor projection. That door opens over a 6-inch-wide seismic separation joint which needed to be waterproofed. A pliable waterproofing drain and metal drain were added to let visitors walk smoothly from the interior of the 7th floor to the exterior on the roof of the 6th floor. Since the soil in the landscape on the roof is irrigated to support plant life, another technical challenge was waterproofing. The entire roof and up the parapets had to be treated with waterproofing materials suitable for being buried. Aesthetically pleasing waterproof joints were needed. Metal sheets protect the waterproofing membrane system.

The process of retrofitting Jacobs Hall for the added load took about one year. Fortunately, ample over-design in the original building meant that no seismic retrofit of it was necessary.

Fallen Star was constructed on the grounds of UC San Diego's engineering school in 2011 over about five months. Translating the design of the cottage from a model to something the contractor could build was difficult. Hodges



created an x-y-z coordinate system with the origin at the southwest corner of the cottage's roof. From there, the contractor was given sketches showing other points of the structure in three-dimensional space including the tops of footings, bottoms of footings, roof peak-lines, and the roof peak. The contractor then had to use story poles and string to find these points in space in order to construct the framework and foundation.

On Tuesday, November 15, 2011, hundreds of spectators watched as a crane raised Fallen Star 100 feet from ground level to the roof of the 6th floor of Jacobs Hall. The lift had to work on the first attempt both due to the cost of crane rental and the potential risk of structural damage that raising any complex structure can introduce. The filmmaking team for the *Fallen Star: Finding Home* documentary were on site for the event. Numerous cameras were positioned in various places on ground and nearby structures. Remotely operated cameras inside the cottage during the lift captured close-up views of the raised cottage then being slowly lowered over approximately a dozen 1-inch diameter vertical threaded bars (on the roof and walls of Jacobs Hall) with all bars simultaneously perfectly passing through each of their complementary 3-inch diameter holes in the floor of the cottage. (Even prior to bolting those rods to the floor, the cottage was stable, says Walsh, because its center of mass lies over the main building, not empty space.) Also, on the roof of Jacobs Hall at the inner edge of the building, where the low edge of the cottage meets the roof, are steel plate embedments that were installed when the reinforced concrete topping was placed.

Securely Fastened

While the crane was still holding the cottage in place, a workman welded the plates along the exterior wall of the house on the Jacobs Hall side. The anchor rods and welded embedded plates are the two ways in which the cottage was securely fastened to the existing building. The lift of Fallen Star, positioning it on top of the building, and affixing it to the structure were all successful.

Fallen Star was designed to withstand winds of up to 100 miles per hour. Walsh says the return period for an earthquake at this site is 475 years.

The internal four walls of Fallen Star are either parallel or perpendicular to each other. That might be where its normality ends. A chandelier is the interior's only true vertical. The cottage is both rotated and tilted relative to ground, and the floor is yet at a different angle. The floor of the cottage sits at a 5-degree angle from the flat roof of Jacobs Hall, and the cottage itself is built at another 10-degree angle. The distance from underside of the peak of the roof of the corner down to the floor is different for all four corners. The low point is at the northwest corner. Albeit with some initial difficulty, visitors are able to stand and walk on the floor because it is only sloped at 5 degrees. Some pieces of furniture are not rectified and sit on the floor space; other pieces are rectified to the angle of the cottage. The latter includes a bookcase and an armoire, both of which are at walls. The bases of these are

lopped off at a skew angle. When you look around, you see two conflicting geometries. The floor is not the same level as the cottage. Then, when you look outside the windows, the whole world appears to be tilted relative to the cottage. ("Some people will have to resort to Dramamine to tolerate this kind of challenging geometry," says Hodges.) To say that it is disorienting to stand inside Fallen Star is an understatement, and yet that is the whole point of this creative work. These effects are Suh's way of using art to reflect the discomfort people feel when displaced from home.

"Life Changing Experience"

Fallen Star is decorated as a living room with sofas, a coffee table, end tables, and small desks. The décor is a mix of past and present such as books from half a century ago, a DVD player, and a flat-screen television. On the walls are amateur photographs of artist Suh, present and past deans of the Jacobs School in their childhoods, and other people affiliated with the project.

Architect Hodges calls Fallen Star, "One of the most thrilling, exciting, satisfying projects I've ever worked on and fun as well!" Engineer Walsh says, "We all knew that we were creating something special [with Fallen Star], and something that hadn't been done before...It was an exciting time in my life." Stuart Collection director Mary Beebe says, "It was an amazing and life changing experience to help Do Ho [Suh] fulfill this dream."

When asked about the idea of engineers collaborating with professionals from non-engineering disciplines, mechanical engineer and current UC San Diego dean of engineering **Albert P. Pisano, Ph.D.**, *New York Alpha '76*, said, "We actively encourage it through the interdisciplinary nature of our research and education...At the undergraduate level, we are particularly proud of our new EnVision Arts and Engineering Maker Studio. It's a joint facility we built with the Division of Arts and Humanities at UC San Diego. We've already had 400 students work there. And better, we've already had classes in which engineers and art majors work together on art/engineering pieces!"

As for the Stuart Collection of permanent outdoor art that enlivens the UC San Diego campus, chancellor and electrical and computer engineer Pradeep K. Khosla says, "These public artworks beautify our campus artistically and intellectually, and lead us to a greater understanding of our environment and humankind."

Jeffrey Saikali holds a Bachelor of Science in Mechanical Engineering from the University of Cincinnati (cum laude), a Certificate in International Engineering (focus: Japan), a Professional Practice Achievement Certificate, and a Master of Science in Mechanical Engineering (focus: rigid-body dynamics) from the University of California, Los Angeles. His past engineering work involved research into heart assist devices and later with positioning of mobile robots.





ASSOCIATION VOLUNTEERS

Tau Beta Pi is pleased to welcome the following new Association Officials:

- **Meghan C. Ferrall-Fairbanks**, *FL A '12*—D5 Director
- **Kelly J. Hammar**, *IA A '89*—D10 Director
- **Michael J. Hand III**, *MI Γ '11*—D7 Director
- **Mallory D. Ivanowsky**, *VT B '10*—D1 Director
- **Kristopher C. (Cody) Johnson**, *AR A '15*—D9 Director
- **Janette A. Keiser**, P.E., J.D., *AK A '76*—D14 Director
- **Laura M. Martin**, *KY A '14*—D6 Director
- **Crystal L. McCartney**, *AL Δ '08*—D6 Director
- **Haley H. Smestad**, *MA A '15*—D1 Director

Tau Beta Pi expresses its gratitude to the following retiring volunteers:

- **Brian R. Buisson**, P.E., *LA E '06*—D10 Director for 6 years
- **Solange C. Dao**, P.E., *FL A '95*—EF Facilitator for 19 years
- **Sharon L. DeChenne**, *WA B '12*—D14 Director for 3 years
- **Andrew J. Flowerday**, *MI I '02*—D7 Director for 9 years
- **Andrea R. Gass**, *KY A '12*—D6 Director for 3 years
- **Selden J. Houghton**, *NY Θ '00*—D1/D2 Director for 15 years
- **George J. Morales**, Ph.D., *FL E '06*—EF Facilitator for 6 years
- **Ryan C. Morrison**, *UT A '10*—EF Facilitator for 4 years
- **Matthew V. Paragano**, *NJ A '08*—D1 Director for 8 years
- **Russell W. Pierce**, *WA A '70*—EF Facilitator for 24 years
- **Alexander J. Rovnan**, *PA B '04*—D3 Director for 8 years

HEADQUARTERS VISITORS

Maj. Henry “Hank” Rosoff, *Arizona Alpha '79*, Albuquerque, NM; August 20, 2014.

Joseph P. Blackford, *District of Columbia Gamma '95*, Washington, DC; December 6, 2014.

Susan L.R. Holl, Ph.D., *California Lambda '76*, Carmichael, CA; December 6, 2014.

Alan J. Passman, *Florida Alpha '06*, Tampa, FL; December 6, 2014.

George J. Morales, Ph.D., *Florida Epsilon '06*, Phoenix, AZ; December 6, 2014.

Sherry D. Jennings-King, *Tennessee Alpha '93*, Maple Grove, MN; December 6, 2014.

Deborah L. Grubbe, P.E., *Indiana Alpha '77*, Chadds Ford, PA; April 9, 2015.

Tara L. Cavalline, *Pennsylvania Beta '98*, Charlotte, NC; May 22, 2015.

Andrew J. Flowerday, *Michigan Iota '02*, Livonia, MI; June 2, 2015.

VOLUNTEER RECOGNITION

Tau Beta Pi depends on many generous alumni to keep our programs and chapters running strong. We thank all of our volunteers for their time, energy, and commitment.

In particular, the Society recognizes three District Directors who have served the collegiate chapters for 6 years as of July 31, 2016:

- **Anthony M. Olenik**, *NY T '08*—6 years in D2
- **Matthew T. Pittard**, *UT B '01*—6 years in D12/D13
- **George Youssef**, *NJ Γ '01*—6 years in D2

Five Engineering Futures Facilitators have served the Society for 18, 12, and 6 years as of July 31, 2016:

- **Catherine G. Gorzkowski**, *PA A '00*—12 years
- **Nancy F. Gray**, *MI Γ '69*—18 years
- **Wendy A. Harper**, *WV B '00*—12 years
- **Lisa A. Matta**, *OH Z '97*—18 years
- **George J. Morales**, Ph.D., *FL E '06*—6 years

TBPI would also like to recognize the following alumni who have served the Association in a variety of capacities:

- **Ellen S. Styles**, *AL Δ '85*—30 years including time as a District Director, Engineering Futures Facilitator, and Association Vice President
- **Russell W. Pierce**, *WA A '70*—24 years including time as an EF Facilitator, D5 Director, and Executive Councillor
- **Edward J. D'Avignon**, *NY B '88*—12 years as the Director of Rituals

Robert E. Toense, *Maryland Beta '76*, Gaithersburg, MD; June 16, 2015.

Diana Locke, Visitor, Gaithersburg, MD; June 16, 2015.

Sjon-Paul L. Conyer, *Tennessee Alpha '99*, Westmoreland, TN; September 14, 2015.

Aurelious J. Ottinger III, *Tennessee Alpha '87*, Maryville, TN; November 20, 2015.

William A. Hanson, *Pennsylvania Zeta '14*, Knoxville, TN; February 10, 2016.

Robert M. Hill, *Tennessee Alpha '49*, Knoxville, TN; February 24, 2016.

Brady N. Wiesner, *South Dakota Alpha '09*, Bremerton, WA; April 1, 2016.

Katy L. Colbry, Ph.D., *Michigan Alpha '99*, Okemos, MI; May 3, 2016.

Michael A. Campana, *New York Theta '94*, Yorktown Heights, NY; May 26, 2016.

Joseph P. Blackford, *District of Columbia Gamma '95*, Washington, DC; July 13, 2016.

Profiles in Leadership #9

John Hennessy: The Godfather of Silicon Valley

John L. Hennessy III, Ph.D., Pennsylvania Theta '73, president, Stanford University, 2000-16

by Alan S. Brown

fEW UNIVERSITY presidents receive such accolades as John Hennessy when he retired from Stanford University this past August. During his 16 years as president, his school rose to become one of the world's top universities, and its undergraduate program supplanted Harvard's as the nation's most selective. Thanks to generous financial aid, most students graduate debt-free.

Equally important, Hennessy embedded Stanford—and its faculty and alumni—into the innovation economy in ways that few other schools could match. There, he worked closely with such future Silicon Valley icons as Google's Sergey Brin and Larry Page and Yahoo's Jerry Yang. Renowned venture capitalist Marc Andreessen called him “the godfather of Silicon Valley.” When President Barack Obama toured the Valley in 2011, Hennessy was the only non-industry leader to meet with him. With ties like that, no wonder Hennessy was able to double Stanford's endowment.

Perilous Test

Yet in 2008, eight years into his tenure, Hennessy faced a perilous test. In a matter of weeks, the Great Recession erased \$5 billion of Stanford's \$18 billion endowment. That left a budget gap of hundreds of millions of dollars. Hennessy had been in a similar position before. In 1984, he had co-founded MIPS Computer Systems to develop high-speed computer processors. The company attracted venture capital and grew to 120 employees. Then hard times hit.

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

“Sometimes, you have to just get up and lead,” Hennessy said. “We brought in a new CEO and we decided that we had to lay off one-third of the company to survive. After the pink slips went out, I had to get up at the local TGIF and inspire everyone that was left. We had shed some people, but not our stars. But we worried that the stars might conclude it was time

to leave ship. We didn't want to lose any of them.”

Hennessy stood up and laid out the facts. MIPS's technology outperformed conventional microprocessors. Several large companies were interested. The layoffs were painful, but they ensured MIPS would have the resources to grow. It apparently worked because MIPS thrived.

Stanford was much larger. It had a multi-billion-dollar budget, 2,000 faculty members, and more than 15,000 students. Yet Hennessy believed the same principles applied.

“If you have to go through a dark time, the faster you act, the better,” Hennessy said. “We could either cut student aid or lay off staff and faculty. We decided to do a layoff, and do it fast. This is counter-intuitive to university culture, which likes to plan for months or years. We did it in six months.”

Stanford bounced back. Its endowment has grown to more than \$22 billion and its influence is greater than ever. It was another achievement for John Hennessy, who started out as a bookish child and never thought much about leadership. “I was probably what you would call a nerd today,” he recalled. “I was a big reader and I

liked science, especially blowing things up with chemistry sets—they used to have lots of chemicals kids can't get today.”

Hennessy grew up in Huntington, a suburban Long Island town 40 miles outside New York City. His father, an engineer, worked graveyard shifts on Cold War electronics projects at Sperry Rand. His



Hennessy, center, with President Obama and Apple CEO Tim Cook at the 2015 White House Summit on Cybersecurity and Consumer Protection at Stanford.

mother, with whom he was close, instilled in him a love of reading.

Hennessey liked building things as well as blowing them up and gravitated towards engineering. In fact, he and a friend won a local science prize with a computer he built from spare relays and other parts.

“It played tic-tac-toe. If you know the game, you can never lose. So we built a machine that could play the game and it turned out to be rather successful,” Hennessey said.

He liked his first taste of computing. Since there were no computer science majors in 1969, he entered Villanova University as an electrical engineering major. The school had a good engineering program, and it also promised to provide the young Hennessey with a broader liberal arts background, something his father thought was important. Hennessey liked the campus, and its suburban Philadelphia location was just far enough for him to feel independent and still visit home easily.

Hennessey excelled in his first semester and loaded up on classes for the second semester. Then, in February, his father asked him to come home. When he arrived, his mother was on her deathbed. “I knew she had been ill, but never thought it was that serious,” he said. “Clearly, they wanted to shelter me from what was happening.”

It was a difficult time. Hennessey returned to school, but stumbled through his classes. He attended summer school to get his studies back on track. While there, he landed a job at the computer center helping students debug their programs.

Love of Teaching

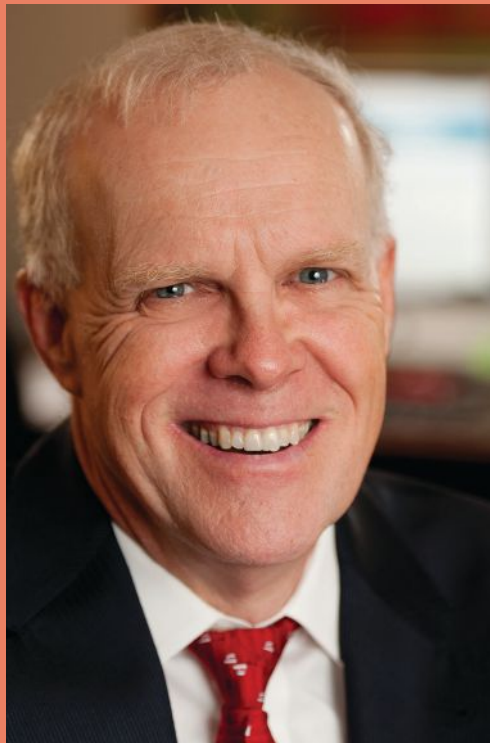
“That’s where I discovered my love of teaching. Then I got involved in a computer research project in my junior year and resolved to get my Ph.D.,” Hennessey said.

He also discovered Tau Beta Pi. “I like to be around other people who are intellectually curious and have different experiences and they can share.”

After graduating in three-and-one-half years, he applied to State University of New York, Stony Brook. It was the only graduate school that would admit him in January and provide financial aid. This allowed him to marry Andrea Berti, whom he had dated since his high school prom, even though their colleges were more than 300 miles apart.

Hennessey describes himself as “really blessed” as a graduate student: “I was handed a research topic in my first year that turned into my Ph.D. thesis—software for real-time systems. This involved creating control systems for microprocessors, which in 1974 was an area that was just exploding,” he said. Even though Stony Brook had not yet achieved a national reputation, Hennessey’s research turned heads. It earned him interviews at 16 universities when he graduated in 1977.

He chose Stanford and moved to Palo Alto just as the barest outlines of Silicon Valley were beginning to emerge. Hewlett-Packard was building minicomputers. Intel was starting to make microprocessors. Apple was just emerging. And there was little traffic.



This Leader In Brief

Full professional name: John L. Hennessey.

Most recent position: President, Stanford University, 2000-retired September 2016.

Birthplace: Huntington, NY, 1952.

Highest degree: Ph.D., Electrical Engineering, State University of New York, Stony Brook, 1977.

Major career highlights: Stanford University, rising from assistant to full professor of electrical engineering, 1977-1986, director, Computer Systems Laboratory, 1983-93; founder, MIPS Computer Systems, 1984; chair, Computer Science at Stanford, 1994-96, dean, School of Engineering, 1996-99; co-Founder and chairman, Atheros Communications, 1998-2010; provost, Stanford University, 1999-2000; president, Stanford University, 2000-16.

Board memberships: Alphabet (formerly Google, lead independent director), 2004-current; Cisco Systems, 2002-current, Daniel Pearl Foundation, 2002-current, Gordon and Betty Moore Foundation, 2012-current.

Honors: IEEE John von Neumann Medal, 2000; American Society for Engineering Education Benjamin Garver Lamme Award, 2000; Association for Computing Machinery Eckert-Mauchly Award, 2001; IEEE Seymour Cray Computer Engineering Award, 2001; NEC C&C Prize for lifetime achievement in computer science and engineering, 2004; American Academy of Arts and Sciences Founders Award, 2005; and IEEE Medal of Honor, 2012. Hennessey is a Fellow of the American Academy of Arts and Sciences, Association for Computing Machinery, and IEEE, and a member of the National Academy of Engineering and National Academy of Sciences.

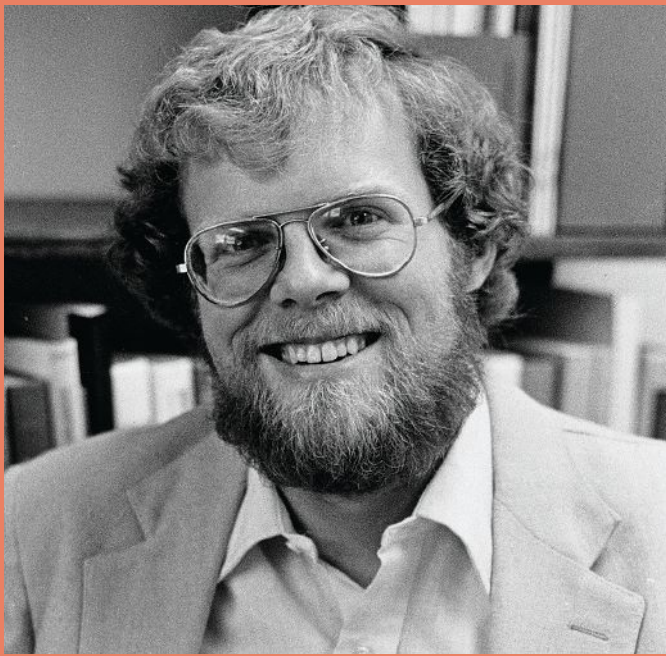
Greatest accomplishment: Making Stanford affordable to everyone, regardless of family income.

Family: Married to Andrea Berti, 1974. They have two grown sons.

Hobbies: Golf, bicycling, gardening.

Favorite books: Histories and biographies.

If you could do one thing over: I would have really liked to have created a satellite campus in New York City.

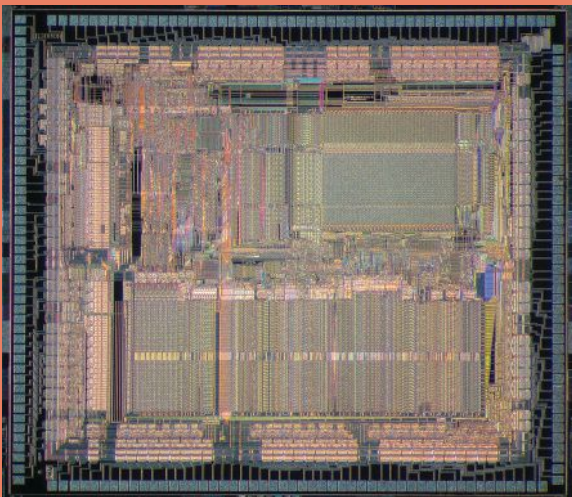
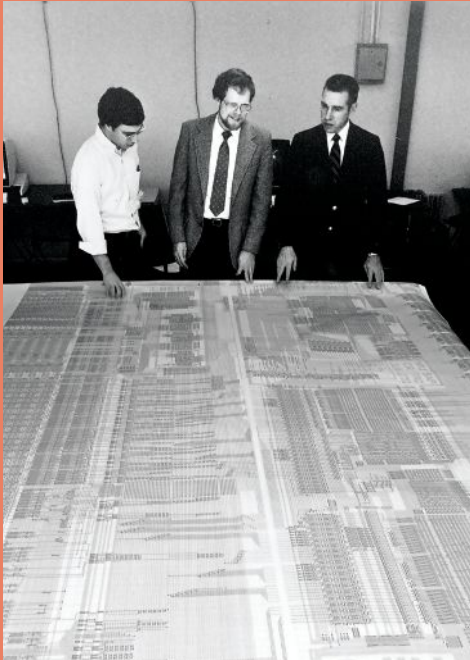


Above: Hennessey as an assistant professor of computer science in 1981.

Photo: Ed Souza/Stanford News Service.

Center: Hennessey, center, with fellow Stanford computer scientists John Shott, left, James D. Meindl, brainstorm in 1984 about the MIPS project, which simplified computer with RISC architecture. Photo: Chuck Painter/Stanford News Service.

Below: Die shot of MIPS R3000A microprocessor on a wafer. Photo: Pauli Rautakorpi/Wiki-media



Within a handful of years, that had changed. “It was driven largely by microprocessors and the miniaturization of everything, and it was faster than anyone thought it might happen,” he said.

Stanford researchers were developing larger and more powerful microprocessors. Hennessey signed on to write the software for specialized chip being developed by a colleague, Jim Clark, to process three-dimensional graphics very rapidly. The project led Hennessey to speculate about redesigning microprocessors. Was it possible to redesign both processor hardware and software to run calculations faster, he wondered.

At the time, all microprocessors used a clock to determine when to run the instructions in a software program. Think of it as a traffic light on a road filled with instructions. Some instructions might bundle two, three, four, or more commands together. Each time the clock ticked, the light turned green and the device processed one of the bundled commands. It might take several ticks for the entire instruction to move past the light.

Hennessey envisioned using simpler instructions that did only one task at a time. Every time the light turned green, a new instruction would pass through and execute. This made it much easier to break up his long line of instructions into segments and divide them among multiple traffic lights. He then built a processor that had the multiple execution units needed to do that. While his chips did not run faster than conventional chips, they could process many more instructions per second.

The result was the reduced instruction set computer (RISC). In 1984, Hennessey was ready. He took a sabbatical from Stanford and founded MIPS Computer Systems to begin commercializing RISC technology.

MIPS was an education.

“I was learning on the job. I didn’t know how to read a balance sheet or what a gross margin was,” he said.

“I learned the hardest thing for a young technology entrepreneur, which was to find the right people to lead sales and marketing. Because if they are not the best, the company was going to make a lot of mistakes.

“And I had to learn that time is money, and to get comfortable making decisions even though I didn’t have all the facts. Nothing was ever black and white,” he said.

Hennessey found technology leadership differed from other management. First, technology moved quickly. Companies had to keep reexamining their assumptions and execute before the ground changed under their feet.

Second, technology leaders required a deep knowledge of a company’s technology. “You need to understand its strengths and weaknesses and the trade-offs of each decision,” he said.

MIPS Computer Systems released its first RISC processor 30 years ago in 1986. Clark, who left Stanford to found tech giant Silicon Graphics, became Hennessey’s first customer in 1988. MIPS went public one year later, and Silicon Graphics eventually acquired the company in 1992 for \$333 million.

Having made a mark on the industry, Hennessey returned to Stanford. He rose rapidly. He led the computer

systems laboratory, a research and teaching center. He chaired the computer science department from 1994 to 1996, when he was named dean of the school of engineering. In 1999, he succeeded Condoleezza Rice as provost. One year later, Stanford chose him as president.

“When I was considering the dean of engineering job,” Hennessy said, “the current dean told me, ‘This is a service job. You’re serving the faculty and the students.’ That sunk in deeply. I’ve always felt that I’m here to help them thrive.”

One of the ways he did that was through fundraising, raising a record \$6.2 billion through the Stanford Challenge. But it was fundraising with a purpose. His own experience had taught him that Stanford faculty and students could have an impact on the world. He inspired the faculty to play a larger role in such global issues as the environment and sustainability, globalization and development, and engineering and medicine. He built new centers focused on these issues to bring together faculty from different departments and encourage multidisciplinary research.

Hennessy strengthened Stanford’s humanities, which he called “good but not great,” and built studios and performance spaces. He also continued to nurture the school’s symbiotic relationship with Silicon Valley.

He leaves behind not only one of the world’s best universities, but a wealthier campus poised to invest in the future. Yet, when asked about his proudest accomplishment, Hennessy talks about making Stanford accessible to everyone. Students from families earning \$65,000 or less receive free tuition, room, and board. Those whose families earn less than \$125,000 receive free tuition. Two out of three students receive financial aid, and most graduate debt-free.

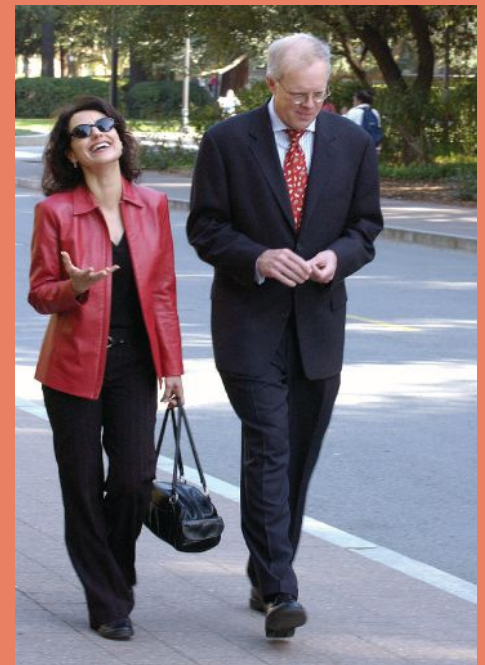
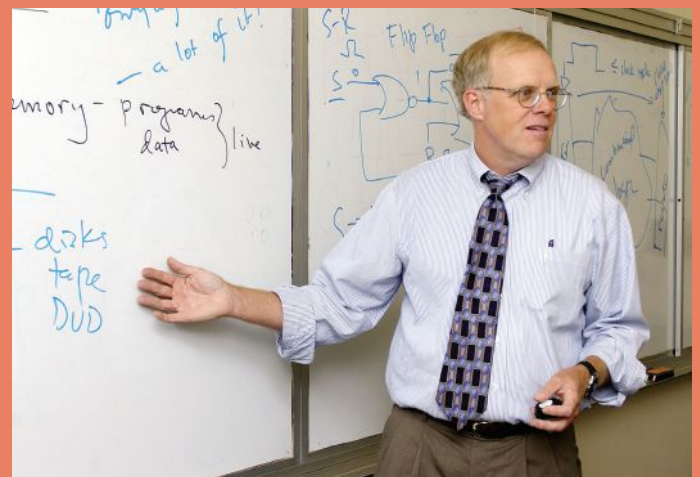
“We attract students from more modest means, and we were able to hold the course even through the recession,” Hennessy said.

At 64, John Hennessy is still young. After he leaves, he plans to spend time on Stanford’s new Knight-Hennessy Scholarships, funded by Nike founder and Stanford MBA Philip Knight, which will give 100 civic leaders from around the world a Stanford graduate education.

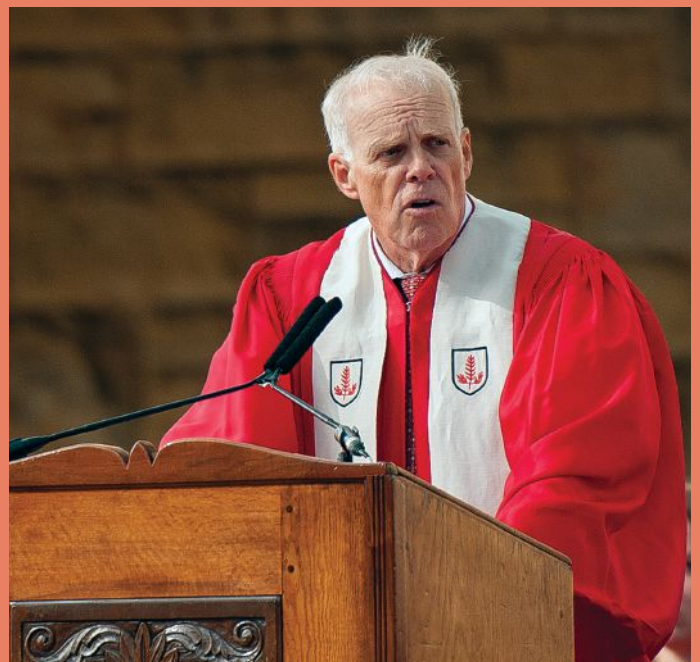
He says he misses the excitement of growing a business and may re-enter industry.

Yet there is one thing of which Hennessy is sure: “Engineering is the place to be. It gets back to the skills I brought to business and to Stanford. Engineers are using those skills to solve problems, to invent things, to change the world—and it’s intellectually exciting and challenging,” he said.

Alan S. Brown has been an editor and freelance writer for more than 30 years and lives in Dayton, NJ (insight01@verizon.net). A member of the National Association of Science Writers and former co-chair of the Science Writers in New York, he graduated magna cum laude from New College at Hofstra University in 1974. He is an associate editor of *Mechanical Engineering* and contributes to a wide range of engineering and scientific publications.



Above: President Hennessy teaches a Sophomore College seminar, “The Intellectual Excitement of Computer Science” in 2002. **Center:** Hennessy and his wife Andrea arrive at parents’ day on campus in 2006. **Below:** Hennessy speaks at the 2015 convocation.



Tau Beta Pi Names 210 Scholars for 2016-17

THE FELLOWSHIP BOARD has announced the selection of 210 Tau Beta Pi Scholars from 791 applicants for undergraduate study during the 2016-17 academic year. Most recipients will receive a cash award of \$2,000 for their senior year of engineering study, and a few will receive \$1,000 for one semester. All Scholarships are awarded on the competitive criteria of high scholarship, campus leadership and service, and promise of future contributions to the engineering profession. They are all TBPi members.

Of the recipients, 52 are studying mechanical engineering, 43 chemical, 34 biomedical, 22 electrical, 17 civil, eight aerospace, eight computer, seven computer science, five industrial engineering, three environmental, two architectural, and two petroleum. In addition, several are studying the following engineering curricula: agricultural, ceramic, general, geological, geophysical, nuclear, and ocean.

All of this year's scholarships are named for members or corporations.

The Alabama Power Foundation, Inc. made a gift in 1995, which is now sufficient to endow an **Alabama Power Scholarship**, awarded for the 13th time this year.

In 2005, Henry M. Alford, *MS A '27*, left a bequest to the Association sufficient to permanently endow the **Alford Scholarship**.

The **Althaus Scholarship** commemorates Ernest E. Althaus, *PA A '26*, who left a bequest in 2006.

The **Bloomberg Scholarship** is named for Michael R. Bloomberg, *MD A '64*, whose 2006 gift funds one award for ten years.

The Bose Foundation made a gift in 2016 to sponsor the 10th **Bose Scholarship**.

The **Brems Scholarship** is named for Marian K. and John H. Brems, *MI Γ '46*, who left a bequest to the Association in 2016.

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

Dennis E. Crouch, *MI Γ '62*, made gifts in 2014 and 2015 to fund the **Crouch Scholarship**.

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

The **Dechman Scholarship** was established in 2015 by David, *VA B '82*, Ken, and Jim Dechman, *TX A '89*, to honor their father, Don A. Dechman, *TX A '57*, on the occasion of his 80th birthday.

The **Dodson Scholarships** are sponsored by Charles R. Dodson, *MD B '30*, who made generous gifts to the Association in 1998 and 1999. Placed in the C.R. Dodson Scholarship/Fellowship Fund, its investment earnings will support the program in perpetuity.

The **Forge Scholarships** are named for Charles O. Forge, *CA Γ '56*, who left bequests to Tau Beta Pi in 2010.

Awarded for the 8th year, the **GEICO Scholarships** are sponsored by GEICO Insurance.

The 7th **Lindeburg Scholarship** is sponsored by Professional Publications, Inc., and named for its president, Michael R. Lindeburg, P.E.

The family of Eddie L. Lyons, *CA Π '76*, made a gift in 2015 to finance the **Lyons Scholarship**.

The **Nagel Scholarship** is given in honor of former Secretary-Treasurer Emeritus Robert H. Nagel, P.E., *NY Δ '39*. Named Editor of *The Bent* in 1942, he became Secretary-Treasurer and Editor in 1947 and served until October 1982.

The **Record Scholarships**, awarded for the first time in 2001, commemorates Leroy E. Record, *KS A '29*, whose generous bequest will provide earnings to support awards in perpetuity.

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

The **Scribner Scholarships** are named for A. Clayton Scribner, *NY Γ '29*, whose bequest to the Association in 2003 permanently endows the awards.

The **Sickafoose Scholarship** is named for Kathleen A. and Robert D. Sickafoose, *IL B '50*, who left a bequest to the Association in 2012.

Four **Soden Scholarships** are named for Archie D. Soden, *CA Δ '51*, who made gifts to TBPi in 2014, 2015, and 2016.

Elsa and Peter H. Soderberg, *CT A '68*, sponsor the Tau Beta Pi-**Soderberg Scholarships**, awarded for the 16th year.

The **Spirit of Apollo Scholarship** is supported by Philip H. Kitchens, *LA Γ '67*, to honor the legacy of the U.S. NASA *Apollo* program.

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

• Details of this year's scholars are at <https://www.tbp.org/memb/ScholarArchives/ScholarBios/ScholarBios16-17.pdf>

Tau Beta Pi received 791 scholarship applications. Board members Charles W. Caldwell, Solange C. Dao, Margaret M. Darrow, and Robert E. Efimba along with Director of Fellowships Sally J. Steadman made the selections.

RECIPIENT	CHAPTER	FIELD OF STUDY	SCHOLARSHIP
Shervin Abdolhamidi	NY P '17	Mechanical Engineering	Stabile No. 418
Jonathan P. Alfred	GA B '17	Electrical	Althouse No. 8
Riddhi Amin	NJ B '17	Biomedical Engineering	Record No. 1132
Yazid Amrani	WVB '17	Mechanical Engineering	Stabile No. 419
Kayla B. Andersen	OH A '17	Mechanical Engineering	Stabile No. 420
Jessica E. Anderson	KY Γ '17	Mechanical Engineering	Stabile No. 421
Emily L. Ball	SC B '17	Biomedical Engineering	Record No. 1133
Suri Bandler	MA B '17	Computer Science and Engineering	Bose No. 10
Ryan T. Beaumont	UT B '16	Civil Engineering	Record No. 1134
Rachel E. Becker	CO A '17	Geological Engineering	Record No. 1135
Katherine L. Bellino	SC A '17	Bioengineering	Record No. 1136
Michael D. Bennett	PA E '17	Civil and Environmental Engineering	Record No. 1137
Shivam Y. Bhakta	TX E '17	Chemical Engineering	Dechman No. 2
Seth L. Bishop	TN Z '18	Engineering	GEICO No. 57
Jared T. Blanchard	UT B '17	Mechanical Engineering	Stabile No. 422
James D. Braza	PA Λ '17	Mechanical Engineering	Stabile No. 423
Cody L. Brown	KS B '17	Mechanical Engineering	Stabile No. 424
Darren T. Bruner	KY B '17	Mechanical Engineering	Stabile No. 425
Ari Y. Budiono	MI Z '18	Computer Engineering	Record No. 1138
Jose A. Cabrera Rodas	WYA '17	Chemical Engineering	Dodson No. 61
Austin V. Campbell	WI Δ '17	Mechanical Engineering	Stabile No. 426
Nicholas R. Carpenter	CO Z '17	Aeronautical Engineering	Record No. 1139
Briana M. Chamberlain	CO Δ '16	Chemical & Biological Engineering	Record No. 1140
Chantel M. Charlebois	NY Π '17	Biomedical Engineering	Soderberg No. 25
Christine H. Chen	OR Γ '17	Computer Science	Forge No. 44
Agata K. Chmiel	IL Z '18	Industrial Engineering	Lindeburg No. 7
Justin Choe	CA A '17	Bioengineering	Forge No. 45
Alexander Christodoulides	FL B '17	Mechanical Engineering	Stabile No. 427
Jenalyn Clegg	UT B '18	Chemical Engineering	Sickafoose No. 4
Leon E. Collins III	NJ Z '17	Civil Engineering	Stabile No. 428
Christopher J. Como	MI Γ '17	Biomedical Engineering	Record No. 1141
Brian P. Cully	MD Γ '17	Aerospace Engineering	Record No. 1142
Dionysi Damaskopoulos	CO A '17	Electrical Engineering	Record No. 1143
Caitlin R. Darnall	MO B '16	Petroleum Engineering	Soden No. 2
Michael E. Davies	IA A '17	Computer Engineering	Record No. 1144
Emily A. Degner	AR A '17	Chemical Engineering	Nagel No. 45
Jason N. Demeter	OH Θ '18	Computer Engineering	Record No. 1145
Humberto J. Detrinidad Arguello	UT B '17	Mechanical Engineering	Stabile No. 429
Nolan L. Dickson	IA A '17	Chemical Engineering	Record No. 1146
Jimmy L. Ding	IL Γ '17	Mechanical Engineering	Stabile No. 430
Isaac C. Dippold	OH B '17	Chemical Engineering	Record No. 1147
John P. DiPrete	GA A '16	Mechanical Engineering	Stabile No. 431
Patrick C. Doherty	OR Γ '17	Mechanical Engineering	Stabile No. 432
Mikaela R. Dressendorfer	IL A '18	Chemical Engineering	Record No. 1148
Emily R. Dunn	IN E '17	Mechanical Engineering	Stabile No. 433
Benjamin M. Durette	WI B '17	Biomedical Engineering	Record No. 1149
Isabelle Erickson	TX A '17	Mechanical Engineering	Campbell No. 35
Melissa M. Fairey	GA A '17	Mechanical Engineering	Stabile No. 434
Amanda D. Farthing	SC A '17	Industrial Engineering	Record No. 1150
Vladimir Y. Feinberg	NJ Δ '17	Computer Science	Record No. 1151
Garrett A. Fisher	MI K '17	Chemical Engineering	GEICO No. 58
Eric T. Fleet	OK Γ '17	Architectural Engineering	Record No. 1152
Alexandre D. Fraga	AZ Δ '18	Aerospace Engineering	Campbell No. 36
William J. Fredebeil	TN A '17	Mechanical Engineering	Stabile No. 435
Lucas de Pinho Fuchs	MI Θ '17	Mechanical Engineering	Stabile No. 436
Mark A. Gallagher Jr.	AL A '17	Computer Engineering	Crouch No. 1
Joshua C. Gedert	OH I '17	Electrical Engineering	Record No. 1153
Ryan J. Geiser	SC B '17	Biomedical Engineering	Record No. 1154
Shohini Ghosh	MD A '17	Biomedical Engineering	Record No. 1155
Nicolette D. Gialketsis	CA Y '18	Mechanical Engineering	Forge No. 46
Kyle J. Gilman	WYA '16	Electrical Engineering	Scribner No. 34
Matthew C. Goodson	UT B '17	Mechanical Engineering	Campbell No. 37
Kehley A. Grosulak	NV A '17	Chemical Engineering	Record No. 1156
Saumya Gupta	AZ B '17	Chemical Engineering	Record No. 1157
Shambhavi Gupta	PA B '17	Computer Engineering	Record No. 1158
Namrah Habib	AZ A '17	Aerospace Engineering	Spirit of Apollo No. 4
Morgan Hammick	RI B '17	Biomedical Engineering	Record No. 1159

RECIPIENT	CHAPTER	FIELD OF STUDY	SCHOLARSHIP
Sara E. Harper	NY Γ '18	Biomedical Engineering	Soderberg No. 26
Harrison T. Hawkins	NJ E '17	Chemical Engineering	Stabile No. 437
Thomas R. Hays	NY T '17	Bioengineering	Record No. 1160
Christine M. Henry	UT A '17	Bioengineering	Record No. 1161
Dayna L. Herling	NY Γ '18	Electrical Engineering	Scribner No. 35
Kushal Herur	IL B '17	Biomedical Engineering	Record No. 1162
Patrick S. Hogan	CA N '17	Chemical Engineering	Forge No. 47
Caden J. Holzer	SD B '17	Mechanical Engineering	Stabile No. 438
Brentley C. Hovey	NC A '17	Chemical Engineering	Record No. 1163
Joey K. Hsu	VA A '17	Biomedical Engineering	Record No. 1164
Chimezirim V. Ibe-Ekeocha	TN Γ '16	Mechanical Engineering	Record No. 1165
Roger A. Iyengar	MO Γ '17	Computer Science	Record No. 1166
Hunter P. Jacobs	VA B '17	Chemical Engineering	Record No. 1167
Slater A. Jameson	OH A '16	Biomedical Engineering	Record No. 1168
Taylor G. Jones	PA Λ '17	Bioengineering	Record No. 1169
Anirudh R. Joshi	GA A '17	Biomedical Engineering	Record No. 1170
Caroline Kabus	KS Γ '17	Architectural Engineering	Record No. 1171
Shyam Kareepadath Sajeev	OK B '17	Petroleum Engineering	Dodson No. 62
Kevin S. Kauffman	NC A '18	Mechanical Engineering	Stabile No. 439
Robert W. Keim	MD Δ '17	Chemical Engineering	Dodson No. 63
Brody D. Kellish	NC Γ '17	Electrical and Computer Engineering	Record No. 1172
Michael L. Kelly	SD A '17	Mechanical Engineering	Stabile No. 440
Ji Hoon Kim	CO B '17	Electrical and Computer Engineering	Record No. 1173
Seungkyeum Kim	CA E '17	Chemical Engineering	Forge No. 48
Tae Ryung Kim	PA B '16	Chemical Engineering	Record No. 1174
Rodney K. Kipchumba	MS A '17	Biological Engineering	Alford No. 11
Rebekah R. Koehn	IN Δ '17	Mechanical Engineering	Stabile No. 441
Margarita T. Kovalchuk	CA Y '18	Civil Engineering	Forge No. 49
Joel Kraft	CO Δ '17	Electrical Engineering	GEICO No. 59
Nathaniel A. Kramer	OH Γ '17	Chemical Engineering	Record No. 1175
Kaitlyn Y. Krushinsky	OR Γ '18	Mechanical Engineering	Stabile No. 442
Trent Yu Long Lai	UT B '17	Chemical Engineering	Record No. 1176
Yu-Kuan Lai	CA E '18	Computer Science and Engineering	Forge No. 50
Nathan O. Lambert	NY Δ '17	Electrical and Computer Engineering	Record No. 1177
Caleb G. Lang	SD B '18	Agricultural Engineering	Record No. 1178
Bethany Langdon	AZ A '16	Mechanical Engineering	Record No. 1179
Moritz J. Lange	WAA '17	Bioengineering	Record No. 1180
Evan S. Larison	NJ E '17	Civil Engineering	Record No. 1181
Robert Lee	NY Δ '17	Chemical Engineering	Record No. 1182
Jessica J. Lewis	MA E '18	Industrial Engineering	Stabile No. 443
Jiahe Li	IL Γ '17	Chemical Engineering	Record No. 1183
Ramon C. Libarnes	IA B '17	Biomedical Engineering	Record No. 1184
Emily D. Lindberg	NY B '17	Mechanical Engineering	Stabile No. 444
En De Liow	VA A '17	Mechanical Engineering	Stabile No. 445
Kang Yiao Loh	MI Γ '17	Chemical Engineering	Record No. 1185
Michael E. Love	WYA '17	Mechanical Engineering	Stabile No. 446
Jarrold M. Lund	UT B '17	Mechanical Engineering	Stabile No. 447
Cameron M. Lusvardi	UT B '17	Civil Engineering	Record No. 1186
Dylan R. Madisetti	SC B '17	Mechanical Engineering	Stabile No. 448
Gregory J. Maino	PA Θ '17	Mechanical Engineering	Stabile No. 449
Madison F. Maley	NY Σ '17	Biomedical Materials Engineering	Record No. 1187
Joseph F. Mandara	NJ E '17	Mechanical Engineering	Stabile No. 450
Conor Martin	NY N '17	Aerospace Engineering	Brems No. 1
Jeffrey T. Maskalunas	WI A '17	Mechanical Engineering	Stabile No. 451
Alyssa A. Mastel	SD A '17	Mechanical Engineering	Stabile No. 452
Christopher M. Matthews	AR A '17	Electrical Engineering	Scribner No. 36
Craig W. Maughan	UT B '18	Electrical Engineering	Scribner No. 37
Robert I. McGill	SC A '16	Chemical Engineering	Record No. 1188
Travis C. McStraw	UT B '16	Civil Engineering	GEICO No. 60
Alekos J. Michael	CO Z '17	Astronautical Engineering	Record No. 1189
Marie A. Mitchell	MA E '17	Electrical Engineering	Record No. 1190
Stephanie J. Moon	CA B '17	Mechanical Engineering	Forge No. 51
Andrew S. Morgan	OH Λ '17	Electrical Engineering	Record No. 1191
Ana M. Munoz	LA E '17	Mechanical Engineering	Record No. 1192
Emily E. Newman	MA A '18	Biomedical Engineering	Record No. 1193
Chanh P. Nguyen	PA A '17	Computer Science and Business	Record No. 1194
Corey D. Nguyen	AL E '17	Chemical Engineering	Record No. 1195
Dayna G. Obenauf	CA Z '17	Mechanical Engineering	Forge No. 52
Ikenna J. Okafor	PA B '17	Computer Engineering	Record No. 1196
Neil J. Olsen	UT B '14	Mechanical Engineering	Stabile No. 453
Robert L. Olsen	UT Γ '17	Environmental Engineering	Record No. 1197
Jacob L. Orłowicz	CA Σ '17	Chemical Engineering	Forge No. 53

RECIPIENT	CHAPTER	FIELD OF STUDY	SCHOLARSHIP
Aadil A. Pappa	TX A '17	Aerospace Engineering	Record No. 1198
Chinonye D. Pat-Ekeji	DC A '17	Chemical Engineering	Record No. 1199
Michelle A. Pedrazas Hinojosa	CO A '17	Geophysical Engineering	Schwaller No. 6
Benjamin Pesante	DC B '17	Biomedical Engineering	Record No. 1200
Meghan R. Pinezich	VA A '17	Chemical Engineering	Record No. 1201
Benjamin J. Pollatz	MI I '17	Industrial and Systems Engineering	Stabile No. 454
Monica Prasad	MI E '18	Biomedical Engineering	Record No. 1202
Muhammad G. Raffique	TX Δ '17	Chemical Engineering	Record No. 1203
Danielle Richards	NM Γ '17	Chemical Engineering	Record No. 1204
Adrienne C. Richardson	NY N '17	Civil Engineering	Record No. 1205
Joanna R. Rivero	FL ⊕ '17	Mechanical Engineering	Stabile No. 455
Nathan T. Robertson Jr.	KS Γ '17	Mechanical Engineering	Stabile No. 456
Eduardo Rodriguez Macrillante	OH Z '18	Electrical Engineering	Record No. 1206
Chloe E. Roedel	UT B '17	Electrical Engineering	Record No. 1207
Jimmy A. Rojas Herrera	MA B '16	Nuclear Engineering	Record No. 1208
Caitlin M. Romanczyk	MD A '17	Biomedical Engineering	Bloomberg No. 10
Robert P. Romine	MO E '17	Mechanical Engg	Stabile No. 457
Lauren M. Santullo	NJ Z '17	Civil Engineering	Stabile No. 458
Mary B.R. Scherer	OH Γ '16	Electrical and Computer Engineering	AL Power No. 13
Matthew P. Schlegel	PA Z '17	Mechanical Engineering	Stabile No. 459
Taylor M. Schmitmeyer	OH ⊕ '16	Mechanical Engineering	Record No. 1209
Landon Schofield	UT B '18	Chemical Engineering	Soden No. 3
Nathaniel W. Schuetz	UT B '17	Chemical Engineering	Soden No. 4
Paulo R. Silva De Faria	FL Z '17	Chemical Engineering	Record No. 1210
Alison M. Simpson	UT B '16	Civil Engineering	Record No. 1211
Morgan E. Skillman	AZ A '17	Chemical Engineering	GEICO No. 61
Bakari I. Smith	NY ⊕ '17	Electrical Engineering	Record No. 1212
Dan R. Smithson	AL E '16	Electrical Engineering	Record No. 1213
Daniel R. Soderquist	UT B '17	Mechanical Engineering	Stabile No. 460
Sean M. Sonnemann	NY ⊖ '17	Civil Engineering	Record No. 1214
Breeanne Spalding	MI B '17	Biomedical Engineering	Record No. 1215
Arthur H. Spence III	LA Γ '17	Biomedical Engineering	Record No. 1216
Elizabeth N. Stafford	MS A '17	Chemical Engineering	Record No. 1217
Evan J. Stargel	MD Γ '17	Ocean Engineering	Record No. 1218
Johnie E. Sublett	MS A '17	Aerospace Engineering	Lyons No. 1
William A. Sullivan	NM Γ '16	Chemical Engineering	Record No. 1219
Tej A. Sura	MO E '17	Biomedical Engg	Stabile No. 461
Myles Joshua T. Tan	NY N '17	Biomedical Engineering	Record No. 1220
Kevin M. Tenny	KS A '17	Chemical Engineering	Record No. 1221
David Tes	MI E '18	Biomedical Engineering	Record No. 1222
Andrew D. Timmins	TX I '17	Mechanical Engineering	Stabile No. 462
Amanda D. Tong	OH A '17	Mechanical Engineering	Curtis No. 9
Alberto P. Torres	NJ Z '17	Civil Engineering	Stabile No. 463
Maria Troyer	NM Γ '17	Chemical Engineering	Record No. 1223
Ava M. Vargason	KY A '17	Chemical Engineering	Record No. 1224
Luke J. Villermin	LA Γ '17	Mechanical Engineering	Stabile No. 464
Matthew D. Vis	AZ Δ '17	Software Engg	Record No. 1225
Sara C. Vitkus	NJ A '17	Computer Engineering	Record No. 1226
Andy N. Vo	VA E '18	Biomedical Engineering	Record No. 1227
Karan Vombatkere	NY K '17	Electrical and Computer Engineering	Record No. 1228
Megan S. Voss	IN Δ '17	Civil Engineering	Record No. 1229
Lawrence M. Vulis	NY H '17	Environmental Engineering	Record No. 1230
Kyle P. Wallace	CA ⊖ '17	Civil Engineering	Forge No. 54
Mikayla G. Walters	AL E '17	Chemical Engineering	Record No. 1231
Xinyi Wang	IN Γ '17	Computer Science	Record No. 1232
Thomas R. Webber	UT B '18	Chemical Engineering	Soden No. 5
Rena D. Weis	MN A '17	Civil Engineering	GEICO No. 62
Joshua I. Weisberg	IL A '17	Industrial Engineering	Stabile No. 465
Mitchell T. Weldon	CT A '17	Environmental Engineering	Record No. 1233
Steven T. Whitaker	UT B '17	Electrical Engineering	Record No. 1234
Derek J. Wilhite	PA A '17	Mechanical Engineering	Stabile No. 466
Leanne R. Williams	MT A '17	Electrical Engineering	Record No. 1235
Makena Wong	CA Z '17	Civil Engineering	Forge No. 55
Jamie P. Wooding	NJ B '17	Ceramic and Materials Engineering	Record No. 1236
Phillip Yang	MI Γ '17	Biomedical Engineering	Record No. 1237
Sarah J. Yang	NY A '17	Chemical Engineering	Record No. 1238
Michael Youssef	NJ A '17	Mechanical Engineering	Stabile No. 467
Pak-hang Yuen	NC Γ '17	Electrical and Computer Engineering	Record No. 1239
Julia Zayan	MI B '17	Chemical Engineering	Record No. 1240
Yue Zeng	IL Γ '17	Civil Engineering	Record No. 1241
Allen D. Zhang	LA B '17	Biomedical Engineering	Record No. 1242

2016 Alumni Giving Program May-July Contributors

The names of 1,924 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 \$210,936 arrived between May 1, 2016, and July 31, 2016. Gifts received after July 31st do not appear here but will be published in the Winter 2017 issue of The Bent.

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

Recognition Club Donors are listed alphabetically within their chapters and appear in the first section below. Member-contributors appear in the 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 1,536 Tau Bates appear in this first section. They made donations to the 2016 Alumni Giving Program between May 1, 2016, and July 31, 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

CA Δ Soden, Archie Deane '51
NY E Lynnworth, Lawrence C. '58
VA A White, Dudley '76

HEIKES CLUB

CA Δ Hennis, Lee Alan '65

ALPHA CLUB

CA Δ Mleczo, Gene Leon '47
IA A Faidley, LeVern William '67
MI † Fox, Gordon Ball '53
TX † Loewenstern Jr., Walter '59

BETA CLUB

AK A Stella, Damien Francis '82
CA A Masatani, Peter James '04
CA Δ Davies III, Paul L. '83
CO B Teets, Peter Burritt '63
GA A Anonymous '61
IN † Drnevic, Ronald James '63
MD B Farmer, Nick Arthur '68
MA Δ Lee, Richard G. '51
MI † Anonymous '78
MN A Bartsch, Merton Lee '53
MS A Sinclair, William F. H. '63
OH † Mahaffey, Jack L. '54
PA H Sykes, Robert Foulkes '47
SC B Brandel Jr., Bill '52
SD A Gomulinski, Tricia Elizabeth '98
TN A Tuttersrow, Jack Norman '63
TX H Trich, John Albert '70
WI A Bolender, John William '51
WI † Cronce, Richard Gordon '77

DELTA CLUB

AL A Brackney, William Michael '58
Griffith, Gordon Harvey '57
AR A Vratsinas, Gus M. '67
CA B Marshall III, J. Howard '57
CA † Kennedy, Robert Phillip '61
CA Δ Duckworth, Jack E. '66
Fong, Franklin Moodo '69
CA Z Fisher, Dean Lawrence '75
CA A Crews, Brian '70
CA E Boyd, Robert Alan '74
CT B O'Brien, Donald Joseph '51
IL A Tracy, Mark Alfred '86
IL † Johnson, Douglas '62
IN A Neal, Stuart Marcus '56
Vosteen, Louis Frederick '52
IA A Balloun, James Stanley '60
Gardner, William Henry '55
IA B Carson, David Nethermark '54
LA † Rivers, John Vernon '63
MA Z Walker Jr., William Edward '57
MI A Colbry, Dirk Joel '06

Colbry, Katy Luchini '99
MI E Gomulinski, Curt Dennis '01
NJ A Post, Edwin Lewis '62
NY † Gorin, Ralph Edgar '70
NY Z Present, Henry '67
NY † Van Wageningen, William E. '78
NY K Muller-Girard, Otto T. '52
Anonymous '68
OH A Markuson, Donald Miner '80
OH Δ Robe, Richard '55
PA H Thompson, Robert Alan '60
PA A Anonymous '90
SC A Harman, Patrick '65
Roat, Suzanne D. '85
TN A Cook, James Michael '72
Romer, Michael Christopher '04
†Schwerin, Carl Joseph '48
TN B Anonymous '71
TX A Mickelson, Kent Burdell '77
TX † O'Dell, Stewart Conn '78
VT A Brand, Ronald Parsons '60
VA B Hogan, James Campbell '70
WAB Emery, Frederic Philip '51
WVB Teti Jr., John J. '71

ZETA CLUB

AL A Bowers, Charles Judson '69
Wilhelm, William Jean '58
AL B Mosley, Talmadge Mordant '65
CA † Fuller, Robert Osborne '51
CA E Friedmann, Norman Ernest '50
CA I Thomsen, Jonathan William '69
CA A Hall, Victoria Lee '86
CA N Lytle, Scott K. '86
CA Y Idemill, Ethan Matthew '04
Neuman, William R. '61
CO A Hickman, Richard Leo '65
DC † Cooper, Reid Franklin '77
GA A Farr, Emory W. '54
IL A Baits, Paul Gordon '79
Beernink, Kurt Patrick '82
Pfefer, Bernard Lee '47
IL B Carter, David William '68
Lewis, Ted Howard '68
IN A Henderson, James B. '46
Houze Jr., Gerald Lucian '58
McDonald, John Douglas '78
Palas, Richard Francis '65
Papanicolaos, Mitchell '65
Reitz, Richard Alan '63
Royce, Richard Sean '81
IA B Lammers, Leon '59
Schwartzing, Eugene R.
KY B †Bratcher, Dale '55
LA B Vaughan, Robin Marie '81
LA † Poole, Ronald Gene '69
LA Δ Lejeune, James J. '73

MD A Dackow, Paul N. '76
MD B Ausherman, Donald Wayne '79
MA B Bardow, Alexander K. '80
Venturini, Eugene Leo '67
MA Z Goodwin, Robert Lewis '58
Harrison, C. Brett '64
MI A Gardner, John A. '77
Sandford, Thomas Alfred '59
Smith, Harry '64
MI † Holderness, James Henry '67
Johnson, Kain Shaw '46
Liepa, Mark Albert '81
Sarns, Richard Norman '76
MI A Stanczak, John Stephen '70
Wittman, Bernard A. '64
MI E Kolodziej, David Gregory '59
Phillipart, Nancy Lynn '80
MI Z Jordan, Gary Lynn '73
MI † Pivitt, Barry Robert '88
MNA Petesch, Douglas John '84
MO † Hurwitz, Dan Norman '50
MA A Hammell, Allan Keith '51
NJ B Rodgers, Douglas Noss '67
NJ † Dehn, Rudolph Albert '41
Stadlin, Walter Olaf '52
NY B Wedlake, Raymond A. '73
NY † Gray, Robin Bryant '46
Ubel, Charles Bertram '55
NY Δ Abel, John Fredrick '63
Altschuler, Stanley Jon '63
NY E Grosso, John Joseph '69
NC A Searle, John Randolph '70
NC E Allen, James A. '88
OH A Whittington, John Thomas '93
OH B Pollock, Flavil Martin '77
Totten, James Ernest '56
OH † Bilikam Jr., Robert C. '60
Riedel, Kimberly Sue '90
OH Z Tenney, Thomas Harold '77
OH K Yamayon, Benjamin C. '05
OH M Kovacs II, William '74
OK A Love Jr., Tom Jay '47
OR A Arsenault, Paula Marie '81
Milton, Stuart W. '84
PA A Berglund, Thomas A. '82
Weber Jr., John Herbert '63
PA B Williams, John R. '60
PA A Gebhardt, Robert Charles '53
PA E Lissenden Jr., George Cyrus '58
RI B Dusablon, Louise Victoria '64
Luz, James J. '80
TN A Prados, John W. '54
TN B Casson Jr., Walter A. '56
Skoglund, Paul Albert '89
TX A Carroll, Billy Dan '64
Clark, Glyn A. '48
Finley, Mark Hanna '63

Tran, Tan Dai '87
TX B Carey, Martha Darden '80
Glenn, Stephen W. '66
TX † Dobbins, James Roy '74
TX Δ Latham, Raymond Edgar '56
Strait, William Lewis '49
VA A Wadsworth, Robert M. '82
WAA McDonald, Bruce G. '91
WAB Oakley, Fanning Tucker '53
WVA Rockenstein, Richard C. '63
WI A Yee, Paul Yuen-Po '70
WI B Whittington, Laura Lee '88
WYA Welch III, Thad Baynard '79

CHI CLUB

AL A Chanecy, Carol '96
Glover, Martin Cochran '70
Roberts, Yvonne Renee '95
Slotkin, Arthur Lewis '68
Wear, A. Wesley '92
CA B Bell III, Willis V. '78
Helms, Robert Knight '61
Hopkins III, Walter G. '64
Johnson Jr., James Hodge '59
Slaughter, Charles Jeff '82
AL † Braden, James Michael '76
AL Δ Styles, Ellen S. '85
AZ A Davis, Robert Allen '79
Redfern, Julie Jacks '83
Womack, Donald Eugene '50
AZ B Barnett, J. Matthew '90
Claspell, Ogal Emdett '66
Forster, Karl David '86
Latta, David Raymond '89
AR A Ziegler, Norval Finn '52
CA A Figueira, Michael Robert '73
Magyary, Andrew '65
May, Howard Russell '51
CA B Burke, James Donahue '45
CA † Reneau, Leon R. '58
Roodhouse, James Greenlee '59
Sutherland, Kenneth H. '78
Taniguchi, Brian Yoshito '77
Tirado, Leo A. '73
CA Δ Brandow, Gregg E. '67
Herzberg, Donald Edward '79
Zaatar, Mohammed Omar '88
CA E Anton, Philip Sean '85
Bramblett, George Clinton '59
Gress, John Ray '52
Gritton, Eugene Charles '63
Hillman, Charles Raymond '67
Hong, Phillip Robert '98
Schreiner, Sheldon L. '64
Testa, Lori Ann '01

Wenck, James Carl '77
CA Z Jacobberger, Donald Hubert '58
MacDonald, James T. '77
Perrin, Michael Elton '67
CA H Cirigliano, Richard L. J. '81
Clark, William Charles '72
CA † Bach, David P. '69
Kennedy, Joseph Albert '76
Anonymous '84
Sedlak Jr., William Lee '81
CA K Scanlan, Lawrence Allen '68
CA A Okpiz, Alexander Edward '91
Miranda-Upham, Sheila D. '83
Upham, David Bryan '83
CA M Brownell, Michael Phillip '84
Hagler, Richard Dwight '85
CA N Bohannon, James Guy '70
Vandegriff, Don G. '67
CA E Greco, Anna Maria Elvira '81
CA O Fiedler, James Michael '78
CA II Steinberg, Dennis Philip '72
CA Y Intagliata, John David '95
CA † Chiu, Corinna Jane '93
CA A Alfred Jr., Ivan D. '59
Rense, John A. L. '74
Schneider, Randolph Paul '71
Van Dinter, Jennifer Ann '97
CO B Brennand Jr., John Robert '57
Talcott Jr., Noel A. '73
Winsand, Amos O. '52
CO E Hepworth, Richard C. '63
CT B Girella, Robert Marc '85
Devin, Maurice Roger '73
Douglass, Michael R. '79
Fitton, John Joseph '70
Hudson, Jr., Frederick J. '58
Leib, David Bernard '61
Pitkin, Edward Thaddeus '52
DE A Gore, Robert Walton '59
DC B Engram, Robert Louis '69
DC A King, David Alan '68
Maggio, John Joseph '81
DC † Keene, Warren Elmer '57
Sonstebly, Ormulv '74
FL A Gore, Carl Houston '54
Burkart, Scott Lawrence '78
Flewellen Jr., William B. '50
Giolma, J. Paul '69
Gordon, Horace Cadwell '64
Walding, Joseph D. '51
FL † Emerson, Michael James '83
Houmis, Nicholas James '74
FL A Nugent, James Charles '95
GA A Kridger, G. Russell '82
DeLoach Jr., Thomas C. '69
Malone, Thomas Joseph '63
Northington, Peyton A. '78

CHI CLUB, CONTINUED

Zimmerman, Clarence D. '65
 IL A Deuchler Jr., Walter E. '51
 Kasper, Frank Stanley '52
 Schilson, Robert Earl '50
 Schuhrke, Donald Kenneth '55
 Zartman, Charles R. '59
 IL B Trytko Jr., John Edward '56
 Underlys, Algridas Antanas '78
 IL G Cohen, Sanford Charles '58
 Dietrich, George Wayne '66
 Henry, Thomas Peter '73
 Pineault, Wayne '79
 Schwartzbard, David Leigh '91
 Tempelmeyer, William C. '64
 IL Z Glait, Scott Steven '84
 IN A Davis, Duane Madison '55
 Easto, William D. '79
 Hendryx, Kevin S. '81
 Herendeen, Robert Oliver '65
 Hohn, Richard Edward '62
 Livingston, Julian R. '60
 Menke, Richard Henry '56
 Muehlbauer, James H. '63
 Novy, Robert Alan '85
 Paginey, Paul Francis '50
 Paszkiet, Christine Ann '85
 Rea, David Richard '62
 Renner, Arnold Edward '54
 Saavedra, Joaquin Antonio '52
 White, Stanley Archibald '57
 Woosnam, Thomas Jay '65
 Wright, Ronald R. '71
 IN B Friel, Leroy '57
 IN G Farrow, Michelle Dorice '83
 Hutchins, Robert Leon '62
 O'Connor, Brian Thomas '72
 Pottmyer, James Joseph '62
 IN E Tyler, Thomas Lee '54
 IA A Davenport, Delbert James '67
 Ellingrod, William Wayne '54
 Klingsporn Jr., Paul A. '43
 Slater, John B. '43
 Sutherland, Keith Allan '69
 Warner, Jean Ellen '81
 IA B Wallace, Diana Hix '73
 KS A Nahman, Norris Stanley '51
 Saller, George Edward '50
 KS G Boguski, Terrie Kay '81
 Bucher, William Alexander '76
 Erickson, Larry Eugene '60
 Larson, Reed Eugene '47
 KY A Davis Jr., Lewis Berkeley '66
 Elwood, Persis Ann '85
 Heckrotte, Rita Warren '72
 LA A Kidd, William E. '53
 LA B Klegar, David '53
 Metcalf, Richard Thomas '78
 LA G Smoak, Albert Malcolm '84
 Wyche III, James Egbert '59
 LA A Young, Ronald Dale '66
 LE A Champagne Jr., Pierre '76
 ME A Atkinson III, Lundy Guy '78
 MD A Thomas Jr., Arthur M. '54
 Tsoo, Audrey Kai '82
 MD B Roberts, Carla Field '82
 Rosen, Bill Jules '60
 MA B Grossweiler III, Philip J. '72
 Martel, Philip Omer '72
 Maskrey, Robert Harry '63
 Patterson, John Bryan '68
 Spradlin, Louis Woodson '57
 Wilson Jr., Albert Olof '38
 Wrinn, Joseph Francis '75
 MA E Engler, Harold Frank '75
 McCaechern, James F. '70
 Ridlon, Stephen Allan '66
 MA Z Kelly, Thomas W. '80
 Scott, George L. '63
 MI A Bonner, Robert Charles '60
 Buresh, Timothy B. '76
 Kupfer, Michael David '83
 MI B Dejonese, Michael Kent '65
 Hutula, David Norman '66
 MI G Bigelow, Daniel Conroy '82
 Campbell, John Alexander '62
 Connable, Tenho Sihvonen '42
 Finnegan, Patrick Marion '57
 Gibbons, Harold Marshall '50
 Griffin, William R. '77
 Holmes, John William '65
 Iler, Gerald Walter '49
 Rigge, Lawrence Allen '83
 Stuart, Glenn Allen '51
 MI A Elward, Robert M. '75
 MI E Brooks, Vern Eugene '60
 Doughty, Robert Earl '65
 MI Z Tarricone, Louis Guy '82
 MI H Czupinski, Glenn Walter '83
 Obudzinski, Gary Thomas '76
 MI O Spall, James C. '79
 MNA A Bakke, Mark Alan '88
 Loughlin, James Paul '85
 McDonald, Daniel William '82
 Polacek, James Hills '52
 MS A Black, Howard Wayne '95
 Boozer, Drayton Daniel '66
 Hibbard, Janet C. '86
 Hibbard, Michael Joseph '78
 Hodge, B. Keith '65
 Nelmis, Larry Thomas '63
 MO A Connor Jr., John Royace '67
 Hea, James P. '68
 Sprouse, Loren V. '73
 MO B Campbell, John Robert '74
 Fennewald, Gary Joseph '73
 Mahin, Clifford Alan '76
 MO G Diboll Jr., Wallace B. '44
 Salman, Naif Dibob '56
 Saufnauer III, John '61
 MT A Erickson, Peter Benjamin '56
 Johnson, Richard Merrill '56
 Nelson, Frederick Arthur '69
 Pearce, Mary Ann '76
 NE A Steube, Milan Ray '74
 NV A Wigchert, Albert Henry '74
 NV B Nietling, John J. '90
 NH A Cushing, Thomas William '49
 Kieffer, Roger Alan '61
 Littlefield, Raymond S. '73
 NJ A Allen, Samuel Miller '70
 Brechka, Thomas Michael '73
 Ghosh, Subhendu '89
 Seventko, Joseph M. '60
 NJ B Borovec, Ronald Bryan '79
 NJ G Angyal, Stephen '63
 Dvorin, Martin '58
 Mandle, John Bauer '52
 Mozda, Stanley J. M. '69
 Otterbein, Richard Charles '71
 Reder, David Philip '85
 Vandemeulebroeke, Leon C. '89
 NJ A Brown, Geoffrey Scott '83
 NMA A Harcum, Sarah W. '86
 Peace, Jeffrey Howard '76
 NMB A Donnelly, Carolyn Elaine '01
 Farber, Martin John '75
 NY A Epling Jr., William Y. '83
 Khomasaker, Vase '73
 Thomasover, William Jay '70
 NY B Baxter, Douglas Howard '83
 Bickley, Thomas Duane '78
 Landau, Louis Herbert '49
 Perkins, Richard Wilson '54
 Storrs, Edward Lee '81
 NY G Brand, Terrance Alan '90
 Buck, Frederick Alan '76
 Butler, Charles William '50
 Joyce, Michael Edward '82
 McCormick, Peter Elliott '80
 Pennisi, Joseph Michael '89
 Thal Jr., Herbert Ludwig '53
 Wadsworth Jr., Winthrop '76
 Zadoks, Abraham Louis '57
 NY A Randall, John Douglas '65
 Rises, Matthew Scott '96
 NY E Cirinthal, E. Ted '62
 Siegel, Murray Harvey '63
 Simmons Jr., Edward J. '66
 Weissman, Martin J. '58
 NY Z Labianca, Frank M. '61
 Mendel, Jerry M. L. '59
 Tartanian, Charles Noubar '58
 NY H Goodman, Alvin Solomon '44
 Kaplan, Howard Ronald '55
 Lum, Jean Ping '85
 Metsch, Stephen '68
 NY O Suran, Jerome J. '49
 Tracey, Michael Steven '89
 NY K Alyn, Elwyn George '61
 Bailey, C. David '60
 Hinshaw, David John '86
 Moore, Duncan T. '69
 NY M Montgomery, Michael Earl '75
 Willis, Michael J. '82
 NY N Little, Alfred Charles '50
 Marso, Rudolf '59
 Mendell, Todd '74
 Notaro, Frank '57
 Roach, Linda J. '82
 Stearns, Richard Earl '67
 NY O Doynow, Donald '75
 Froeschl, Gary George '71
 NC A Alexander, Ralph Bell '76
 Blair, John Ramsey '77
 Capps, Dickson M. '75
 Corder, Thomas G. '71
 Minday, Richard Michael '66
 Mitchell Jr., Glenwood '60
 Quillian, Ann Massey '85
 Shelton, Monty Lee '84
 Yohman, Donald Forest '73
 NC G Everett, Robert R. '42
 Prewatt III, Richard M. '77
 NC A Jones, Luellen Barnett '83
 Langelotti, Carolyn B. '86
 OH A Ammar, Gregory Steven '81
 Beach, Robert Chester '56
 Gorsalski, Christian Thomas '64
 Grop, William Douglas '77
 Holcomb, J. Eric '82
 OH B Hettrick, Robert Neil '53
 Robinette, Lisa Marie '03
 Thompson Jr., John Russell '60
 OH G Bouman, Robert William '60
 Cowan II, Robert Lee '66
 Deerhake, William Franklin '66
 Layman, Timothy K. '72
 Orkins, James E. '66
 Onellette, Andrew Louis '86
 Robinette Jr., William H. '88
 Shelley, William Raymond '74
 Taylor, Ashley Scott '84
 OH A Beach, Theodore Lyman '87
 Kurzen, Mark R. '71
 OH E Batten, Robert Eugene '57
 OH Z Armstrong, Chris Kent '00
 Armstrong, Ellie Rebecca '01
 Weaver, Ernest W. '43
 OH H Bloom, Richard Larry '74
 Campbell, John Joseph '76
 Schmoll, Joseph Herman '81
 Schneider, Greg Richard '80
 Stolberg, Carl Gene '57
 OH O McEldowney, Ralph A. '87
 OH K Krause, Leonard Edward '76
 OH A Krueger, Karl Hermann '73
 Tirpach, Mark Andrew '81
 OK A Blakeburn II, Dave Lowry '83
 Carnes Jr., Albert Coyner '56
 Herzmar, Ralph Albert '44
 Vondersmith Jr., William M. '68
 Elliott III, William Ernest '70

The IRA Charitable Rollover provision is an easy, tax-wise way to make a gift to TBP!

Donors aged 70½ or older may move up to \$100,000 annually from their IRAs directly to qualified charities without having to pay income taxes on it. The charitable gift amount will count against the donor's required minimum distribution (RMD).

Because the gift would be excluded from income, it may not be included as a charitable deduction on a federal tax return.

IRA custodians may send your gift to Tau Beta Pi Association, P.O. Box 2697, Knoxville, TN 37901-2697. Our federal tax ID number is 62-0479545. If you have any questions, please visit our website at <http://www.tbp.org/give/IRARollover.cfm> or call our office at 865-546-4578 and ask for Pat McDaniel or send an email to pat@tbp.org.



IRA custodians may send your gift to Tau Beta Pi Association, P.O. Box 2697, Knoxville, TN 37901-2697. Our federal tax ID number is 62-0479545. If you have any questions, please visit our website at <http://www.tbp.org/give/IRARollover.cfm> or call our office at 865-546-4578 and ask for Pat McDaniel or send an email to pat@tbp.org.

OR A Andresen, Kenneth Wayne '53
 Buxton, Charles Edward '62
 Sigworth Jr., Harrison W. '68
 Stranahan, Chapman Arthur '65
 PA A Edwards, Gilbert Spencer '67
 Galella, Nancy Marie '85
 Lasser, Howard Gilbert '50
 Leitch, Donald G. '56
 PA B Carretti, Katherine Grace '84
 Cirota, Marcie Dale '95
 Huber, Ronald K. '70
 Hummel, John Richard '73
 PA G Cavalier, Forrest Joseph '89
 Cavalier, Nina Leslie '89
 Husak, Alan David '65
 Kornuta, Nick Joseph '81
 PA A Hoffer, Norman K. A. '81
 PA E Krein, Philip T. '78
 Matsumoto, Tadashi C. '60
 Nolan, Christopher William '86
 Stratton, Carl William '81
 PA Z Kasoff, David '55
 Mergel, Joseph John '72
 PA H Ellis Jr., Ira Thomas '56
 PA O Coyle, Todd Frederick '77
 Jacobs, Walter Harry '87
 Lacz, Michael '69
 Lynch, Robert D. '53
 PA I Smith Jr., Donald Benedict '91
 PA A Kondylis, Demetre E. '82
 PR A Blasini, Francois Rene '82
 RI A Clarke, Edward Nielsen '45
 Vascellaro, Jerome Charles '74
 RI B Adamec, Zoe '84
 SC A Dalrymple, Gerald Andrew '83
 Di Lapi, Christine Marie '87
 Peters, William J. '70
 SC B Massey, Kristina L. '71
 Evans, Joseph Manly '60
 SC F Fletcher, Robert Howard '64
 Marbois, Matthew Clark '81
 Pannick, Harold Lee '58
 SD A Brass, Lorin Lee '75
 Case, Robert Howard '75
 TN A Bowers, Robert Wesley '68
 Burnett, William Allen '71
 King III, Philip Woodson '66
 Shafer, Robert W. '47
 Tomlinson, Edward Thomas '72
 Vandenburg, Charles Franz '56
 TN B Burnett Jr., Wilton Wright '67
 Hodges Jr., Willie Erwin '67
 Kepper III, James Henry '71
 Petersen, Eric Scott '84
 TN G Denny, Hugh Wayne '60
 TN A Miles, Thomas O. '81
 TX A Abad-Frutos, Carmen Beatrice '80
 Halsey, Chester Clyde '70
 Malins, Chester Joseph '76
 Moorman, Charles T. '59
 Rosales, Julian Francisco '83
 Smith, Daniel Robert '75
 TX B Berthold, Kristopher David '04
 Nall, Albert Arnold '81
 TX G Altman, Thomas Clark '70
 Capshaw, David M. '80
 Mohr, David Norman '72
 Turvey, Harry Douglas '73
 TX A Boortz, Marielle Jean '77
 Pollock, Stephen Theodore '70
 Pulley, Paul Winfred '87
 Zimmerman, Keith David '89
 TX Z Hambrick, Joanna Ruth '86
 TX H Brown, Ian William '73
 Cawoski, Victor George '74
 Totten, Dwight Lee '66
 Williams, Larry Donald '80

TX K Davis, Pamela Walker '79
 Davis, Helen Mack '80
 UT A Lamph, Jane Ann '80
 Peterson, Charles Cooper '68
 UT G Friedman, Steven Michael '91
 VT A Cimometti, William James '59
 VA A Conway Jr., George F. '70
 Donoho, Thomas English '59
 Harpel, Barbara McL. '96
 Harris, Wesley L. '64
 Hayes Jr., John Rives '75
 VA B Hydeuk, Robert Alan '74
 Marcus, Larry Allen '72
 Reading, Christopher R. '00
 Shearer, Richard L. '70
 SNIDOW III, Lyle Christian '74
 VA G Labelle Jr., William M. '89
 Mahaney, Jack Morris '82
 Richmond, Mark David '98
 VA A Payne Jr., Lewis F. '67
 WAA A Brewer, Brian J. '87
 Chandler, Alan S. '77
 Jabusch, Donald Arthur '60
 Kinell, Donald K. '64
 Matteson, James Harris '66
 Ogg, Daniel Grant '85
 Oye, Martin Yasuyuki '76
 Shanafelt, Robert Eugene '67
 Steinhauer, Loren Clifford '76
 WAB Bowers, Jack W. '80
 Ray, Edwirth Lillard '48
 Scott, Norman Ray '58
 WVA Mitchell, James Emmett '61
 WV B Payne, Michael Eugene '81
 WI A Buehring, William Arthur '67
 Fulkner, Stacey L. '96
 Guelker, Eric James '90
 Hoffman, Carl A. '85
 Shimko, Darl Vann '79
 Sticksles, Kenneth '87
 Teller, Ronald Robert '73
 Wolf, James F. '59
 Wymelenberg, Richard J. '77
 WI B Delgado, José Manuel '69
 Derra, Kenneth William '90
 Hutton, Teresa Jean '91
 Niggemann, Richard E. '60

SECOND CENTURY CLUB

AL A Anderson, Pete Lawrence '75
 Carey, George Walter '69
 Hawkins, Lawrence Allen '81
 Miller III, Edwin H. '74
 Walkley, Kenneth B. '81
 AL B Davidson, Janet Sims '78
 Mason, William Warren '89
 AZ A Leonardi, Suryanto Felix '86
 Robidoux, Phillip Henri '80
 Svensson, Arthur '66
 AZ B Gambrell Jr., Carroll Blake '49
 AR A Hegeman, Louis Edward '65
 Kooker, Stephen Lowell '63
 Moody, Charles Roger '58
 CA A Chan, Sunney Ignatius '57
 Gourdin, William H. '72
 Humphreys, George Baxter '51
 Pister, Karl Stark '45
 CA B Lalli, Stephen John '86
 CA G Grolle, Timothy Floyd '78
 Putt, Brian Hollis '72
 CA A Bovich, Emil Joseph '57
 Goodin, James Douglas '57
 Griffith, Glen Arthur '72
 Harrian, Vida '94
 Kester, Larry Arthur '78
 Moretti, Vincent C. '78

CA E Hardy, Frederick W. '65
 Jeffs, George William '45
 Lee, John Moon-Wah '77
 Vehrencamp, John Edward '50
 Walker, David Allen '78
 CA Z Blaney, Timothy John '86
 Capellina, Frank J. '59
 CA H Blythe, Kelly Richard '93
 Costa, Michael '88
 Roper, Dale Allen '83
 CA O Kolderup, Nils Petter '60
 Schuck, Charles Michael '65
 Ward, Michael Lynn '67
 CA I Bruce, Jack Edward '62
 Wrigley, Chris J. '96
 CA K Monesko, George Edward '68
 CA A Reynolds, Hugh McGinnis '69
 Smith, Robert Press '75
 Verbrugge, John Allen '77
 Wells, Russell P. '77
 CA N Darlington, William E. '66
 Robertson, Alex Ann '03
 CA E Onell, Patrick M. '82
 CA II Spinney, Van Wormer '67
 CA P Alexander, Dean Lee '80
 CA T Lotocky, Daniel A. '84
 CA AA Johnson, Kristi Lee '01
 CO B Akers, David A. '78
 Jolley, Malcolm Carter '74
 CO I Lee, Don Evar '59
 CO A Middlekauff, Stephen Allen '09
 CT A Bazuin, Bradley Jay '80
 Gerson, Gordon '58
 Lehman, Jill Fain '81
 McEligot, Donald Marinus '52
 CT B Dzielinski, Edward Casimir '66
 White, William Richard '65
 DE A Andrews, Bruce S. '74
 Bradley, Kevin Patrick '91
 Buehler, John Henry '68
 Keyser, Kevin Justin '88
 Williams, Jay James '71
 DC B Delgado, Antonio J. '93
 DC I Hill, Howard Thiebaut '62
 Potterton, Richard Lee '60
 FL A Byrum, Bruce Banks '77
 Frazier, Lori Marie '77
 Higgins, Adam Steven '03
 Ireland, Ronald Joe '61
 Jones Jr., Luther Curtis '71
 Memmes, C. Martin '68
 Mittlelo, Sam '67
 Vande Vusse Jr., Gerald '65
 Walton, Ray '77
 FL I Giovannelli, Ronald F. '76
 Johnson, William Alex '81
 Preslar, Daniel Alton '91
 FL E Grushka, Jon Lloyd '85
 Hansen, Christian Michael '88
 GA A Brush, Gary Stoddard '80
 Hicks, John Palmer '81
 Shruburt, J. Steven '75
 ID A Ahlschager, Alan Douglas '87
 IL A Davis, Stephen Robert '63
 Foshnag, Robert Austin '54
 Madson, Wayne A. '60
 Michovien, Michael Samuel '81
 Sorenson, Gregory Erik '03
 Splitt, Frank George '52
 Tonelli, A. Duane '57
 IL G Boothe, Norton '50
 Christopher, James Mosko '84
 Dorn, James David '54
 Irish, Eugene Kelley '61
 Weertman, Johannes '48
 Weertman, Julia R. '46
 Wong, Thomas T. '90
 IL E DeVantier, Bruce Allen '77
 Wasyleczak, Michael Joseph '78
 IN A Argon, Ali Sophia '52
 Bertsch, Patricia Babette '76
 Brinson Robert J. '90
 Coms, Joseph Benjamin '52
 Cross, Perry Gregory '74
 De Poy, Phil Eugene '57
 Dries, David James Anthony '76
 Gearan, William Keaveny '58
 Hockema, Richard Wayne '68
 Houchens, Albert F. '61
 Krochta, John Michael '65
 Minitti Jr., Robert Joseph '70
 Pigman, Stuart Marchant '50
 Stokes, Ronald Blaine '60
 Weaver, S. David '59
 Wolff, Jay Ralain '48
 IN A Dietrich, Jay Michael '80
 IA A Crossgrove, John D. '56
 Crowley, Paul Rodney '51
 Haack, Leland Arthur '53
 Johnson, David Arhanes '64
 Lochner, Chad Michael '96
 Morse, David Sanford '52
 Norris, David Brian '94
 Rerucha, Thomas Lee '81
 IA B Brink, Richard Edward '44
 Reimers, Robert James '84
 KS A Hayman, Layton Wayne '59
 Hinton, Robert Allan '61
 Makawski, Neal Edward '71
 Neff, Cassandra J. '82
 Vaughn, Charles Francis '77
 KS B Marks, Kevin Bruce '79
 KS I Hightower, Ray E. '64
 Traucz, Deborah S. '86
 Schwartzy, Robert J. '54
 Shelton, Glenn B. '59
 Wells, William Lochridge '62
 LA B Lisciarli, Dolleen Mary '79
 Marim, Justo Enrique '79
 LA G Hulett, Rachel Anne '07
 Randall, James Benjamin '79

SECOND CENTURY CLUB, CONTINUED

LA Δ Halkiades, George '63	NY Γ Garland, Newton C. '46	PA H Howes, Michael Lynn '75	Smith, Thomas M. '60	Wedge, Joseph R. '68
MD A Hart, Edwin Flessner '68	Krause, Alfred Frank '52	PA E Caggiano, Nicholas Joseph '78	Jendrzejek, Gary Steven '75	KY B Beavin, Rudy Cassell '61
Sutera, Salvatore Philip '54	Rillings, James Harrington '64	Grana, Peter Norman '73	Jenn, David C. '75	Sheehan, Charles Joseph '52
MD B Alexander, Dwain William '74	Schoen, Edward Alan '69	Ryan III, Arthur Peter '65	Merkel, Brian John '81	Tyler III, Wayne Paul '91
Birkmire, John Christopher '95	Wilkinson, Richard Walter '51	PA I Schoenberger, Lewis R. '84	Paczesy, Wayne J. '83	LA A Fowler, James Bradley '82
Deschere, David Stewart '82	NY Δ Frederick, Thomas Robert '87	PA K Potthoff, Robert Edward '56	Scherer, Richard Allan '74	McClatchey, Lloyd Delbert '49
Kanofsky, Hal Steven '70	Hodgson Jr., Edward W. '68	Shield, Carol K. '84	Gerloff, James Robert '00	Miller Jr., Frank C. '62
Roberts, Victor David '64	Kahn, Mindy S. '89	PA A Anselm, Gregory Alan '81	Hubmann, Martin Thomas '13	LA A Gautreaux, Craig Anthony '79
Wahl, Bill F. '82	Kuehne, Donald L. '73	Fitzpatrick, Anthony Ryan '03		Hoffman III, William Cline '84
White, Anthony Albert '95	Roseman, Ann Lynn '81	Mozolewski, Stephen F. '86		Jones, Cheryl A. '78
MD Δ Amvri, John '96	Surovy, Randall J. '78	PR A Sanchez, Hector Luis '76		MacDonald, Joseph D. '68
MA A Ianeri, Michael Francis '78	NY E Dubey, Michael Bruce '47	R A Chorney, Paul '56		Winslow, Arthur Clifford '79
Haring, Glenn E. '74	Ueber, Russell Charles '61	DiCamillo, Peter John '75		MD A Aaron, Nelson Harris '80
Petersen Jr., Donald W. '66	Wilson Jr., Ernest George '66	Townsend, James Courtland '60		Hanlein, Stuart Lamar '60
Steinka, Bradford Roland '81	NY Z Parisse, Richard F. '61	RI B James, Charles Franklin '58		Hessemer, Paul Bernhart '49
MA B Brooks, Donald Henry '47	NY H Filipek, Stephan John '82	Nardone, Steven Craig '72		Petersen, Randolph A. '77
Ciamaglia, Frederick J. '69	Kern, Frank J. '70	SC A Exley Sr., Slade Forrest '72		MD B Bement, David A. '74
Ciaramaglia, Frederick J. '69	Kleinman, Irving '49	Wayne, Hugh Swinton '49		Cascio, Horace E. '84
Denhard, William G. '42	Kushel, Glenn Elliot '68	SC B Wilson, Samuel Scott '91		Mitchell, Reginald Henry '72
Kruee, Gilbert Koreh '44	Prager, Jay Martin '68	SC F Bolden, Michael Vincent '97		Pendorf, Paul Wadsworth '62
Manganaro, James L. '61	NY Θ Campana, Michael Albert '94	Kelly, Robert T. '86		MA A Brown, Mark William '82
Midney, John Henry '47	Donaher, Thomas Patrick '56	Wysoczek, Thomas John '53		Goodhue, William Donald '71
Morin, Gene Douglas '58	Hamm, Jeffrey H. '74	SD A Beck, Carl William '83		MA B Adcock, Thomas Garth '63
Niessen, Charles William '62	NY I Berger, Jack Solomon '61	Eisenbraun, Daniel D. '75		Bulzacehelli, John Francis '88
Peak, John C. '62	Boehml, Robert A. '79	Jenkins, Creties David '81		Chang, Nancy Tien-Tien '87
MA Δ Benedict, Kurt Gottfried '59	Cassella, Judith DeVincent '71	Johnson, Dean Hilbert '83		Crawford, Charles Kimball '59
Cashman, William Francis '64	R. Roos, Gregory Joseph '79	Lundquist, Charles A. '49		Danielson, Scott Lee '82
Coppeta, David Anthony '91	NY A Braun, Bernard '95	Liaz, Amy A. '96		Honigsberg, Charles Alan '52
Savage, Paul David '77	NY M Check, Frank Thomas '66	Driskell, Verita Leigh '88		Loutrel, Stephen Parker '65
Simon, Henry John '60	Salmon, Roger O. '66	Ely, Robert Stewart '73		Shepperd, Stan Wayne '70
White, Edward A. '47	NY N Buran, Frank '87	Harper, James Robert '63		Snider, Steven Jay '82
MA E Fernald, Wayne Douglas '70	Deckro, Richard Floyd '72	Heathington, Kenneth W. '61		MA A Serencha, Mark John '93
Sciartelli, Anthony Paul '86	Feeney, Daniel James '69	Hunt, Roy Joe '67		MA E Bauer, Bruce Graham '67
Soulis, Wilbur Taggart '72	Kosmerl, Richard David '72	Kee, Bennie F. '71		Devney, Peter '89
MA Z Beliveau, Thomas J. '69	Lauermann, Mark Edwin '92	Peugeot, Richard Scott '60		Duston Jr., Donald Roy '79
Miller Jr., Melton M. '55	Riebling, Robert W. '60	Scates, Stanley Nelson '80		Hamel, Mark David '77
Vivaldi, Isadore Louis '52	Tabaczynski, Rodney John '66	Sheffey, David Wells '66		MA Z Dance, Fran John '76
MA Θ Chapman, David Mason '83	Tuminello, Paul Arthur '85	Wheatley, Hubert Carl '70		MA Θ Paul, David Dickson '92
Gregg, John Edward '84	Uhl, Thomas John '84	TN B Casson, Leonard Walter '81		MA I Masi, James V. '60
MI A Bayer, Dorothea A. R. '83	NY E Desmarais, John M. '85	Marshall, Donald Raymond '57		Schreiner, Steven '86
Beimers, Charles John '69	Raczko, Robert F. '79	Petersen, Stephanie Otis '84		MI A Guidry, Kevin J. '78
Deleuw, Samuel Leonard '56	Tamaro, George John '59	Vaughn, Bruce Kevin '88		Herrick, Robert James '68
Fike, Jay Edward '96	Taylor, Maryanne B. '80	Zabriske, Kenneth Andrew '80		Wang, Peggy P. C. '77
Lowry, Peter Alexander '60	NY O Lumish, Stan '78	TN F Crawford Jr., Walter Keith '62		MI B Pirk, John Francis '62
Wasko, Andrew M. '73	NY H Brosch, David A. '85	Fulkerson, Suzanne M. O. '86		MI F Galen, Clifford Wilfred '60
Watanabe, George Torad '72	NY P Lubrano, Michael '80	Howey, James Edwin '68		Hansen, Kirk Samuel '71
MI B Edquist, Carl F. '77	NY T Olenik, Anthony Michael '08	TN Δ Peterson, Ralph C. '51		Jackson, Richard Homer '64
MI F Baehre, Eric Earl '82	NC A Allen, William David '88	TX A Andrew, Stephen '82		MacDermott, William Neil '49
Davis, Robert Allan '81	Franko, Deborah A. L. '85	Chiang, Raymond W. '86		Mitchell Jr., Frank John '60
De Boo, Robert John '72	Karesh, Lewis James '81	Dolezalek, Donald Robert '65		Schmuser, David William '80
Eichhorn, Jacob '46	Wicker, Robert Ellis '74	Floyd, F. Mike '63		Stoughton, Herbert Warren '73
Fertel, Howard Kevin '79	NC Γ Flowers III, George Horace '65	Glynya, Earnest Frederick '46		MI A Marion, Joseph L. '70
Gerdes, Walter '58	Maher, Steven Thomas '80	Schrade, James Lee '85		MI E Olex, Michael Bernard '74
Lambert, Thomas Joffre '77	NC Δ Hunecht, Horace Glenn '82	TX B Atwood, Martin Price '76		MI E Cleary, Gary Kenneth '71
Leeds, Thomas Murray '85	ND A Engbrecht, James Richard '59	Fulton, William David '80		MI Z On, Joan-Sup '73
Rollinger, Martin Gerard '82	Lopez, Angel '65	TX F Fisher, John David '70		MI Z Sitko, James R. '70
MI Δ Kanelis, Pranciskus S. '69	Schmidtke, Ben Elwin '77	Flatt, Robert Neal '69		MI I Haupt, Eric Keith '84
Zack, Chester Virgil '50	OH A Bacevice Jr., Anthony E. '70	Poppewell, Thomas R. '74		Haupt, Shelby Elaine '84
MI E Hill-Stramsak, Colleen Lynn '00	Drier, Delmar Waldemar '52	Sick Jr., William N. '58		Kantrow, Maryann '88
Paulson, James Marvin '47	Ehlert, Donald Arthur '84	X A Chevalier, Mark Timothy '91		Casey, Edward M. '85
MI Z Harrison, Patrick Joseph '69	Hazen, Ramon B. '60	Davison, James Lloyd '54		Casey, Gary Elden '64
MI H Polkinghorne, Bruce R. '50	Holloway, Walter Marion '67	Fowler, Joe Robert '68		Beard, John Vincent '71
Stramsak, Steven A. '61	Koch, Carl Conrad '59	Gray, Foster Lee '53		Brabston Jr., Bryan Willis '59
MI I Curry, Crystal Rae '83	MOorhead, Kenneth Wayne '50	Murphy, Prashad N. '92		Bradshaw, Cyrus Joe '53
MN A Carlson, Philip Jay '68	Whitney, Gina M. '80	Vaden III, Frank S. '56		Douglas, Thomas Eugene '58
Tran, Binh Van '89	OH B Hahn, Robert Simpson '40	TX E Ford, Samuel '64		Warren, James T. '70
MS A Bowers, Emile Jackson '57	Henderson, H. Thurman '58	Palavan, Jim Ali '82		MO B Carter, Mark Dwan '80
Carman Jr., Jack Baker '62	Hersman, Jill Ann '52	Ryan III, James Joseph '70		Cline, David William '87
Freeman, L. Michael '71	Hufstetler, Andrea Kay '97	TX Z Rolen, Thomas Joel '70		Coffman, James Dean '60
Hotard, Daniel Gerard '76	Mayer, Robert Lawrence '69	TX H Collins, Clyde Williams '69		Hendrickson, Richard C. '53
Miller, Elton Ray '70	McCarthy, Martin David '70	Godwin, Albert Eugene '84		Talbot, Nicole L. M. '77
Reynolds, Billy L. '58	McCune, Larry Clinton '63	Schaeper, Wilfred H. '76		Weese, John R. '74
Wilson, Robert Reed '77	Triplet, William James '76	Triplet, John C. '82		MO Γ Bell, Joseph Harold '51
MO A Fink, Earl R. '56	Wood, Ronald Eugene '89	TX Θ Garcia, Robert L. '79		Kessell, Martin James '85
Gardner, Roger William '63	OH Γ Del Tosto Jr., Joseph J. '87	Klancher, Michael James '80		Payne, Bradley A. '87
Kuehnel, Charles G. '62	Del Tosto, Judith M. '87	TX I Carter, Sherry Jeanette '86		Winsky, Don Wiltshire '50
MO B Bigas, Jessica D. '00	Risch, Gary Allan '76	TX K Umrigar, Dara Nariman '88		MT A Roberts, Wallace M. '60
Duderstadt, Edward C. '58	Vermillion, Thomas Ryan '80	TX A Garcia, Danny '85		NE B Scott, Stanley S. '53
Ferrell, C. Stuart '64	Verner, William J. '68	UT B Bingham, Kevin Duane '84		NV B Vozdraka Sr., Walter C. '55
Friedman, Marc Andrew '00	Zupanic, Michael Alan '87	Paxton, Thornton Shirlord '63		NJ A Gleske, Indulis Uldis '70
Kottmann Jr., Richard A. '82	OH A Anker, Linda S. '79	VA A Barrrell, Charles Davidson '70		NH A Dudis, Joseph '64
McDaniels, John Louis '60	OH E Diem, Francis S. '83	Osby, James Gordon '61		Gertz, Alan S. '79
Stevens, Robert E. '85	Henfing, Richard Norbert '84	Jacobs, Susan '85		Holwitz, Eric A. '70
MT A Brin, Beth Leann '79	Pryatel, Thomas Richard '88	Langford Jr., Stanard F. '55		NJ B Keller, Lara Alice '93
Delaney, Robert Charles '87	Ross Sr., David Edward '73	Mac Glashan, Donald W. '57		NJ F Bornako, Gregory Louis '70
MT B Erickson, Elizabeth Jeffery '98	OH H Rice Jr., John Warren '75	Nickell, Ronald Templeton '47		Bryant, Robert Warren '70
Jackson, Darron Boyd '86	OH Θ Kramer, Lawrence J. '62	Reeside, William O. '77		Morgan, Dennis Ross '68
Montgomery, Wayne '83	OH I Musko, Terry E. '67	Roesch III, Maurice Albert '78		NJ A Kovatch, George '55
NE A Claar, Stephen Beryl '78	OH K Carver, Robert Michael '87	Shirley, David Eugene '65		NMB Hilland, David Howard '83
Cowling, Edgar Charles '75	Herbert, Mark Wayne '79	Stickle, Robert Lewis '54		Olson, Eric Edward '88
Hazzard, Russell Lynn '83	OK A Brown, Leslie Wroy '70	VA B Boward, Jill Kathleen '87		NY A Mulervy, John '00
McMeen, Timothy Michael '88	Dunn Jr., Robert O. '82	Thomas, Pomez '79		NY B Buschlin, Bernard B. '52
Moore, Thomas Paul '78	Ellis, George O. '50	Detterman, Robert Linwood '53		Holman, Roland Hanford '85
NV A Davis, Adriane Marie '98	OK B Stratton, Robert Dean '58	Grubb, John W. '69		Placentra, Nicholas Joseph '79
Van Horn, Michael David '76	OK Γ Dean, Philip M. '74	Parker Jr., Mcivor Lemuel '56		NY Γ Chow, Francis M. '96
NH A Davis, Paul Fraser '76	Krause, Lester Eugene '56	Ray II, Robert E. L. '74		Levy, Michael David '89
Zecchini, Charles Robert '50	Mason, John Andrew '02	Rorer, William R. '71		NY Δ Brown, Matthew Alan '85
NJ A Barrese, Anthony Louis '70	OR A Miller, Mark Wade '89	Sockell, Edward J. '78		Degan, P. Michael '76
Carow, Walter Marvin '50	PA A Arrowsmith, Donald L. '65	Brenner, Joseph R. '55		Kahle Jr., Loren F. '51
Lapico, Jeffrey Allen '77	Flurock, Robert Charles '57	Bunch Jr., Jennings '50		Malarky, Jonathan B. '91
Osborne, Scott Reynard '70	Dudrecht, Robert E. '68	Hammersley, Fred George '49		NY E Lokenbery, John A. '69
Tirado, Daphne Christine '82	Hais, Randall Matthew '80	McNeess, Jackson Lovry '68		Torigian, Andrew '60
NJ B Bond, Charles Bradley '80	Jones, Donald Paul '65	Perrault, William Richard '59		NY H Atzenbeck, Charles Richard '60
Colarusso Jr., Remo John '83	Phelps, David Reeves '62	Rasmussen, Vernon Harry '70		Marino, Anthony Louis '77
NJ Γ Cordes, Robert Gerhard '48	PA B Anderson, Ray Edwin '50	Rising, Jerry Joseph '61		Sosinsky, Emanuel '59
Di Domenico, Michael J. '65	Ferenci, Jack Edward '75	Schwartz, Rick Allen '70		NY Θ Adair, James Leonard '83
Jacobsen, Peter Christian '69	Hertneky, John A. '79	WAB Aaserud, Robert Gerald '84		NY I Alia, Bruno Luigi '71
Praschak, Joseph John '73	Holt, H. Robb '51	Myers, Richard Manu '80		Brand, Alfred H. '67
Youssef, George '01	Smith, Charles Joseph '42	Small, James McCarthy '52		Le Mee, Jean '59
NJ A Gross, Gary Robert '80	PA Γ Bolser, William Charles '69	WAA Yamaye, Zia Ahmad '72		Shevchuk, George John '77
Nisonger, Thomas Mitchell '78	Kuhr, Tina Michelle '81	WAL Allman, Robert Linn '59		NY K Martens, Hinrich Robert '51
Stern, Hal Lawrence '84	Marietta, William Grey '68	Antolvich, Stephen Dale '62		NY A Novakoff, Alan K. '74
NMB Tills, Jack Lee '78	Sack, John Stuart '75	Berndt, Martin M. '56		NY M Charlton, John William '62
NMI Bakkom, Erik Iver '97	PA E Boyles, Bruce William '76	Chapman, David M. '59		Griggs, Francis E. '56
NY A Bucknor, Norman Kenneth '84	Dadey, Kathleen Ann '81	Senty, James Anton '60		NY N Chen, Gordon Kowa-Cheng '81
Croll, John W. '12	Schroeder, Karl Richard '49	Williams, Lynn Edward '67		Irwin, Christopher Joseph '92
NY B Papay, Bill '75	Browne, Joseph Dominic '60	Fedler, Richard E. '65		Cole, Randolph Paul '83
Dyde, Eddie Leonard '51	Citron, Paul '69	Jaye, Deborah Ann '83		Crist, Edward L. '99
Ragoneso, Louis John '56	Hodson, William Rieckly '67	Jilek, Carol Marie '84		Mohan, Marguerite Anne '04
Tobin, Michael R. '87	Patti, Francis John '50	McMorrow, Daniel Patrick '98		NY O Korpi, Emery Henry '76
	Wagner, William Andrew '89	Simon, James Bernard '65		NY II Betcher Jr., Carl William '73

FOUNDERS CLUB, CONTINUED

NY P Likourezos, George '92	Silkowski, Eric '90	PA H Cooper, Robert Hewitt '53	TX A Boyle, Bruce William '79	Wallenborn, R. Wheat '55
NC A Baker, Fred Eugene '60	OH I Hurlig, Michael Lee '91	SEferian, Karnik Michael '79	Damek, Herman Andrew '97	VA B Blanton, John C. '76
Baldwin, Bruce Richard '92	OH M Huff, Richard Keith '94	PA Ø Ballay, Stephen Joseph '64	Dechman, Don Arthur '57	Howell, Paul Vernon '89
Fox, Bruce Martin '76	OK A Swihart Jr., John Donald '59	Hinkle, John Lawrence '60	Felton, Charles Ronald '73	VA I Fries, Bradley Fuller '87
Norville, John Albert '58	OR A M'offette, Thomas Robert '52	Spurgeon, William F. '83	Mendias, Mary Kathryn '80	Pronko, Mark Steven '81
Puruit, Cecil Mehmet '81	O'Brien, Robert Merle '56	PA I Geveke, Dave J. '80	Persyn, Steve Gus '71	WAB Stacy, L. Eric '77
Scullin, Ronald Lee '72	PA A Kirkpatrick, David Hope '72	Martelli, Phil Joseph '85	Sener, Ilhan '87	WA B Anson, Jon Crawford '77
Thompson, Roger Clinton '77	Kuebler, Gerard Philip '59	PA A Hays, James C. '73	TX B Neill, John Michael '74	Galligan, William L. '52
NC I Duncan, Matthew Albert '07	Lewanda, David Benjamin '03	PR A Acevedo-Santiago, Ramon '96	Reinking, Greg Franklin '84	Gimera, Michael '89
NC A Holshouser, Thomas E. '86	Megerle, William G. '86	Bird, Hector M. '79	TX I Kligore, J.H. Harlow C. '62	Turi, Michael Allen '07
ND A Schout, Peter A. '85	Stanley, Richard Alan '63	Montanez-Lopez, Ramon E. '94	Scheevel, Mark Robert '78	WVA Means, Kenneth Harvey '63
ND B Burchill, Melissa Jane '02	Weiss, David Steven '65	SC A McMullan, Richard Jeffrey '91	Wolfman Jr., William Robert '68	WI A Cress, David R. '63
OH A Meissner, Robert Paul '53	PA B Fetchen, John H. '69	SC F Lesto, Kenneth R. '58	Halbower Jr., Ralph David '48	Horn, Robert W. '68
Poggianti, Christine Hanzel '78	Mathason, Brian Keith '92	SC I Almes, Richard Gerson '61	Hartman, Daniel Bruce '78	Johnson, Brian Keith '87
Thompson, Thomas William '58	Naffin, Richard Keith '06	SD A Grunig, Donald Gene '84	Keelan, Dare Kendall '51	Suess, Manfred Edward '64
OH B Meredith Jr., Robert W. '68	Okrent, Scott '00	Kerk, Carter J. '81	Ramby, Kenneth Wayne '59	Wiedman, Ronald E. '52
OH I Gemmill, Robert Stinson '56	Steiner, Donald Francis '73	SD B Hanson, John Melvin '53	Sherrill, Guy Jackson '64	Wilcox, Ross Phillips '67
Howe, James Gavin '87	Strickler, Daniel Brubaker '57	TN A Fugatt, Ronald Newman '65	TX E Casamayor, Joaquin E. '82	WI B Black, Jennifer A. '01
Marsolo, Keith Allen '02	Tomasso, Kenneth John '89	Rochat, Raymond A. '57	Nieto, Shayler '63	Garnier, John Edward '70
Stanforth, Michael Trent '79	PA I Costanza, Charles Peter '63	Scott, Bobby G. '59	TX Z Hamilton, William Larry '69	Hauser, Eric Donald '77
Swanson, Robert Jon '61	Gordon, Robert Wayne '60	Shaw, Charles J. '80	TX Ø Sirmon, Jacqueline Theobald '90	Menning, Timothy Louis '63
Weber, Robert Fredrick '61	PA E Ott, Timothy Ray '86	Valk, Anthony '86	TX I Smith, Jason Andrew '10	Wielebski, Rachel Ann '93
OH A Essman, Joseph Edward '57	Stuibitz, Mark Carl '87	White, Robert S. '48	UT A Forbes, Charles Robins '49	WI I Figurski, Mark Anthony '83
Leonard, James Albert '56	Zetterberg, Dennis Ivan '82	AY A Aya, Luis G. '69	Kelley, Brenton Collier '89	Kestner, Wayne A. '74
Miller, Rodger Kimear '65	PA Z Cohen, Samuel Morton '78	Parker, Frank L. '48	Liu, Kevin K. '80	WI E Eichman, Donald Gerald '06
OH Z Enderlen, Jeffrey Robert '80	Cohen, Michael Patrick '97	Spurgeon, Susan Prozelius '65	Milligan, Thomas Allen '95	
Hiller, John Jarvis '59	Markan, David B. '84	Ø Gillespie, Clarence E. '65	VA A Berry, Pamela Elizabeth '80	
OH H Hiller, Lonnie '07	Michel, Joseph Stephen '03	TN Z McGlumphy, Jonathan D. '02	Kolovich, Paul Kevin '10	
Hahn, Danny A. '83		Pyle, Angela Diana '91	Loucks, Steven J. '64	

In Grateful Appreciation of Member-Contributors

AL A Jones, Edwin Eugene '75	Carroll, Matthew Charles '86	Single, Charles Hollister '49	Wissick, William Paul '59	Purdy III, Herbert W. '59
Robison Rivera, Eddie D. '15	Gaugel, Karl Rudolf '90	Wight, James K. '69	NY A Dumouchel, Matthew Paul '08	PA Z Stevenson, Stanley John '80
Sublett, John W. '49	Gronewold, David Allen '70	MI B Amayo, Alejandro '71	Gourgey, William E. S. '85	Wagman, Sander R. '61
AL B King, Timothy Van '85	Kuo, Franklin '56	Brandt, C. Andrew '81	Morse, Michael David '01	PA H Cook, David Michael '04
Lamar, John Everett '62	Rudolph, James Gregory '55	Lamping, Gerald Arthur '67	Zimmons, Paul Michael '98	PA Ø Abbasi, Saeed '93
Leon III, Tofey J. '80	Schunemann, Robert Franck '52	Schmitz, Eugene Joseph '52	NY E Brolin, Stephen J. '57	Curran Jr., Thomas A. '62
Pierce, Marlean P. '93	Wenzel, Kevin Wayne '84	Thompson, Patricia Anne '15	NY Z Suhocki, Vincent Paul '67	Salvo, John P. '56
AL A Palma, Giulia Eleonora '15	Yun, James K. '89	Vredeveld, Donald Richard '53	NY H Agureyev, Vladislav V. '95	PA I McClellan, Karl R. '80
Sharp, Gary Allen '93	IL B Papas, Petros N. '55	MI I Bonevich, John E. '86	Boland, Peter Lewis '63	PA A Loehlein, Werner Conrad '74
AL E Calametti, Vince Edward '82	IL F Hill, Deborah Kay '80	Fancher, Paul Strimple '53	Demarinis, Bernard Daniel '68	Leech, Kim LaScola '84
Harrison, Keith '77	Mapp, James Hartwell '61	Funkhouser, Chloe Marie '05	Ross, Leonard L. '66	Tomko, Leonard Michael '80
Robertson, Bryan Rhett '03	Barnes, William Gerard '00	Geek, Paul Emil '67	Kossilomo, Alexander '62	PR A Muniz-Alfonso, Michael '02
AZ A Pratt, Roger Dawson '87	Roth, Christopher Alan '86	Gelinas, Robert Joseph '60	Teitelbaum, Jack M. '57	SC A Brown, Kenny Robert '15
AZ B Ivan, William Thomas '92	Amburay, Keshav '15	MI A Lott, Adriano P. '93	NY Ø Berry, Erman Earl '50	SC I Varner Jr., Royal W. '56
Yoo, Ju Hui '15	Ellis, Richard Maryon '53	MI E Law, Michael James '81	Ferris, Erman Earl '50	SD A Brick, Todd A. '86
AR A Price, Ralph David '83	Hamilton, Robert J. '58	Sanders, John Eaton '54	NY Wilkowski, Stephen Joseph '80	Case, Laura Marie '15
CA A Florez, Valerie Province '99	Handa, Vandna '04	Stapleton, Steven York '15	NY K Millward, Stephen Keith '85	Gerdes, Karl Frederick '71
Paoli, Richard J. '62	Hendrich, William R. '62	MI Z Schickler, John Francis '65	Schwartz, Brian Lloyd '12	SD B Amert, Timothy Todd '83
CA B Almassy, William Thomas '71	Heyer, Harold William '55	MN A Dreyer, Wesley Melvin '69	NY M Bresney, Scott Michael '05	Gamble, Bruce Gordon '53
Chavakula, Vamsidhar '08	Lee, Joseph K. '92	MO A Gyu, Quanju '15	Panik, Jennifer Elizabeth '04	Oster, Zachary James '07
CA F Cady, Sam Jackson '15	McKinney, Leon Ellington '82	Lefebvre, Molly Ann '11	NY N Dressing, Thomas George '90	TN A Cofer Jr., Joseph A. '63
CA D Fujihara, Glenn Yoshihiro '74	Mendelson, Robert M. '47	MS A Brasher, Cecil Keith '59	Guildford, Harry J. '52	Stantill, Ira Colon '61
Langford, Donald J. '79	Milliken, Don Brant '52	MC Kay, Walter Jasper '65	McHale, Brian Christopher '02	TN E Merrill Jr., Bergen S. '43
Peacock, Marcus C. '82	Porter, James C. '59	Sterken, Adolphe Francis '50	Pawlik, Peter S. '65	TN Z Fisher, Benjamin Daniel '03
CA E Balewicz, Jonathan C. '15	Smith, Richard Pierce '60	MS B Sims, Thomas Randall '79	NY O Leu, Derek Hue-Keng '06	TX A Harmon, Keith Hanna '74
Liska, David Paul '65	Tengdin, John T. '49	MO A Bales, John R. W. '78	Shearn, Donna C. '04	Sommer Jr., Walter Frank '65
CA Z Frederiksen, Ben Joseph '11	Trickle, Chris Michael '13	Carlock, Jon Marion '71	NY II Vandewark, Jason Stewart '93	Stapper, William Randolph '65
CA H Alam, Shaylea '02	Wagner, Steven John '88	Hippe, Thomas Gillman '75	Chern, Rey Torn '83	TX B Hansen, Gracie Arlene '04
Cox, Michael James '12	Yeats, Steven A. '75	Youmker, Ronald L. '71	Fales Jr., Carl Lynnwood '61	Moore, Clarence A. '54
CA Ø Boyd, Duane '72	IN B King, Fred Stuart '71	MO B Dille, Eldon R. '59	Hine, David Eugene '80	WI A Wideman, Charles Richard '70
Kontoby, Rafi Abdulla '15	IN F Lesch, Norman Alfred '85	GRECO, David Edward '73	Perry, Matthew Howard '80	TX I Collins, Howard William '37
Ta, Kevin K. '19	IN I Abot, Rosary C. T. '11	Gredell, Thomas Richard '79	Levin, Sarah Elizabeth '88	TX H South, Hugh Miles '71
CA K Mineo, Nicholas Joseph '10	Doty, Michael J. '96	Gruber, Myron E. '64	NC I Levin, Sarah Elizabeth '88	WI B Weber, C. Alan '74
CA A Grathwell, Travis Jacob '06	IN A Abraham, Edward Ernest '63	Kuhn, Carol Elizabeth '62	TX D Russell Jr., Parvin Masters '57	Gibson, Gayle June '83
CA M Mirogliou, Joel Eric '83	IN Z Khakpour, Zahra '15	Olson, John Henry '43	NC A Porter, Joseph Steven '79	Langford, Thomas Ray '81
Riddiough, Todd Nathan '96	IA A Bradwick, William Allen '60	Schmidt, Richard L. '64	ND B Christianson, Eric Lloyd '79	Melver, Jes David '51
CA E Anderson, John Edward '78	Ledin, Jim Alan '83	Sides, Andrew '15	OH A Ontko, Robert Joseph '11	Newsome Sr., Robert Reese '90
Tabor, Chelsea Jeanne '09	Little, John Alexander '07	MO F Bornholdt, James Michael '79	Rush, David Harry '51	Patton Jr., Robert Lyle '57
CA S Bennett, Sidney Russell '82	Sessler Jr., Albert L. '50	MO H Moerner, William Esco '75	Soula, Donald Frank '48	Pensock Jr., Edward Peter '83
CA X Han, Thomas '15	KS A Cronemeyer, Donald C. '45	Schroeder, Nathan E. '82	OH B Hoff Jr., Russell Stratton '51	Richards, Tameila Lynn '81
CA Y Radhakrishna, Shyamprasad '15	Everoski, Ryan Edward '03	KY I Altammar, Hussain Ahmed '12	Schaefer, William '67	Woodall, Harold Wayne '71
CA Ø Vickland, Zach Scott '15	LA A Comardelle, Jeremy Noel '01	LA A Hicks, Richard W. '62	OH I Crawshaw, James Robert '54	TX E Arab, Razi L. '15
CO B Eberhart, Lonnie Bruce '59	Hutchinson, Jeffrey Thomas '68	Hickson, Jeffrey Thomas '68	PA Papeleonardos, Alexi D. '01	TX Z Acosta, Ritchie Anthony '10
Emigh, Charles Robert '42	Shoemaker, Harry L. '69	MT A Johnson, Andrew E. '50	Strang, David Arthur '51	TX H Hartwig, Roger Earl '78
Fett, Darrell Leroy '57	Sylvester, Christopher B. '15	MO E Lyons, Frank T. '59	OH A Pflaumer, Robert Glen '67	TX K Sowell, Dale Anthony '76
Kraft, Virgil Don '55	LA A Dupuis, Miles Bradford '72	MT B Rainey, Laura Dian '86	Shoup, Jerry Franklin '60	UT B Alley, Lynn David '81
Malcolm, John Arden '82	LA E Dilberto, Marcella Dianne '03	NE A Farag, John Samaan '15	Eberlin, Fred E. '57	Bracken, Allen T. '78
Schliak, Gerard A. '62	ME A Dimarzio, Charles A. '69	Haffke, Nicole Annette '99	OH H Breaux, Patrick Regis '97	VT A Foster, Wayne Lynford '61
Strain, Robert Castle '50	Goodell, Trenor Franklin '91	Jones, Jeffrey Lee '81	Denny, Eric James '05	White, Janine L. '03
CO I Fjeldheim, Steinar '68	MD A Dorsey, Herb Warfield '62	Peterson, Brian Kent '66	Ethridge, Ronald Alan '78	VT B Van Domelen, John Francis '64
CO E Hildebrand, Diane Marie '12	O'Donnell, Neil Phillip '12	NH A Malkauskas, Walter P. '83	OH Ø De Jaco, Norbert Francis '62	VA A Kennedy, Michael Francis '72
CO Z Schwemmer, Joseph R. '15	MD B Dorenfeld, Alan S. '67	JA A Brown, Jerome William '99	De Glasco, Brock Philip '10	Myers, Griffin Kyle '00
CT A Degani, Nicholas Anthony '03	Gagnon, Robert Michael '90	NJ B Covell, Daniela Maria Ana '90	Hartings, James Wilfred '71	Shaw, Patrick Jonathan '93
Sheffield, George Vernon '62	Popenoe, Charles Holcomb '57	Holls, Robert Emil '62	OH I Hurlig, Juliet K. '91	Warehall, Julian Alexander '13
CT I Allen, Elizabeth Anne '01	MD I Scioili, Blaise E. '84	Ortiz, Mary T. '81	OH K Crow, John Francis '85	Whaley, Carlos C. '88
VA B Hipped Jr., Richard O. '61	MD A Battaglia Jr., Michael A. '07	Renkart, Brandon M. '08	OH H Schwendeman, John L. '88	Jenkins, Leonard Eugene '98
Jenkins, Leonard Eugene '98	MA A Levesque, Allen Henry '59	NY F Eranazhathu Shanmugam, A. '15	OK A Green, Jack Harlan '50	Rettew, Louisa '86
Retzew, Louisa '86	MA B Belinsky, Mary McNally '78	Fratinni, Bert J. '72	OR A Jennemam, Jeffrey H. '08	WA A Doneen, Patrick Michael '84
DA A Ray, Paul Eugene '62	Cano Ruiz, Alejandro '91	Gallagher, Thomas P. '90	OK I Carter, Nicole Denaee '15	Evans, Michael Lesdon '77
Trotman, John Alfred '73	Dessner, Herbert '52	Gomez Jr., Ernest '71	OR A Choy, Nainoa '15	WA A Daquisto, John Fred '65
DC B Gillis, Hannah Ryan '15	Fraize, Willard Everett '59	NJ A Fisch, Adam Joshua '15	Franklin, Tyler Alexander '15	WVA Hilton, Ernest W. '78
FL A Eadens, Matthew James '99	Fynsk, Arthur William '50	NJ E Bazzan, Mehrrad D. '15	Gaskill, Steven Gary '06	WI A Anderson, Douglas Andreas '59
Fox, John Robert '15	Moyer, Ian E. '08	NJ E Eaton, Edwin A. '39	Lindahl Jr., Ernest R. '73	Anderson, Eric Scott '77
Geiger, John Robert '77	Parente, Robert Bruce '58	NY B Bazzan, Mehrrad D. '15	Bachman, Dale F. '56	Chesner, Ramon '58
Lyons, Leonard J. '62	Torrielli, Luisa Kathleen '98	Ogle, Sean O'Malley '97	Corbett III, Stanley Wells '55	Milns, Adam Donald '02
FL I Gilsdorf, Maryann '74	MA E Craig, Randall Covell '64	NY A Engelbrecht, William Shaw '97	Dorkin, Henry Lawrence '60	WI B Holtermann, Theodore J. '54
Levins, Jess W. '74	MA Z Eck, Calvert Franklyn '60	Mucci, Thomas '84	Granata, Dianne Marie '82	Quinn, Robert J. '74
FL A Hanson, Roselle Burton '86	Levinger, David Delbridge '85	NY B Burtle, Aaron Lee Lind '15	Kobilsek, Peter Paul '79	Rupert, Jack R. '92
FL Z Crowe, Jeremy McCandless '07	MA H George, Keith Mathew '15	Cooper, Edward T. '69	PA B Benson, Walter '70	Schmitz, Jeffrey Allen '77
GA A Hecht, Robert Gustav '48	MA I Allard, Timothy Ryan '08	Hunte, Brian F. '09	Bonney, Stephen R. '65	Barnes, Matthew John '01
Parker, Elton L. '47	MI A Cameron, John Howard '68	NY F Bassett Jr., Preston Rogers '51	Coyne Jr., Harold J. '73	WY A Schneider, Keith Lee '13
GA B Cunard, Kala Cartwright '05	Cheney, John O. '54	Cargill, Bob Stedman '89	Frick, T. Scott '93	
Palmer, Jennifer W. '07	Gidner, Richard V. '53	Furman, Bill Nelson '82	Satrom, Steven Bruce '69	
Vazquez, Edwin Daniel '15	Glover-Cutter, Kira Marina '01	Gross, Philip Murray '62	PA I Dellon, Brian Todd '05	
ID A Wiegiers, Brandy Sue '02	Gorman, Kurt D. '76	Martin, E. Dale '57	Kunze, Jay Frederick '54	
IL A Bajt, Ronald Michael '66	Kent, Brian M. '80	Reigles, Damon Gary '99	PA A Fling, Richard T. '54	
Benhabib, Jose '81	Lapekas, Sean Philip '96	Von Anterried, Ronald M. '80	PA E Lehr, Harry James '58	
			Barlow, Tom '13	

Special Gift

A special gift was received in memory of Colleen Dale Bratcher, KY B '55, from Mrs. Alice Ramer Rice Bratcher.

258 Companies Match Gifts to Tau Beta Pi!

The following 258 companies and foundations match gifts made by their employees to Tau Beta Pi. Their support is gratefully acknowledged by the Association. All matching gifts are allocated to the Tau Beta Pi Fellowship and Scholarship Programs to provide stipends for engineering undergraduate and graduate students. We welcome 8 new firms (*).

3Com Corporation	Citigroup Foundation	Intel*	Potash
A. Foster Higgins & Co. Inc.	Clark Construction	Integrity Applications Incorporated	Power & Telephone Supply Co.
Abell-Hanger Foundation	The Clorox Company	The J.P. Morgan Chase Foundation	Progress Energy Inc.
Adobe Systems Incorporated	The Coca-Cola Company	The James River Corp. Foundation	PSEG
Aetna Foundation Inc.	Cognis Corporation	Jim Beam Brands Co.	QUALCOMM
AIG	Computer Associates Internatl. Inc.	John Deere Foundation	Quantum Chemical Corporation
Air Products & Chemicals Inc.	ConocoPhillips	Johnson Controls Foundation	R.J. Reynolds Tobacco Co. Foundation
AK Steel Foundation	Control Components Inc.	Kellogg Brown & Root	Red Hat Matching Gifts Program
Albemarle Corporation	Cordant Technologies Inc.	Kellwood Company	RELTEC Corporation
Allegheny Technologies	Countrywide	Kennedy/Jenks Consultants	Rexnord Foundation
Allegro Microsystems Inc.	Covidien	Kimberly-Clark Foundation Inc.	Reynolds American Foundation
Alliant Energy Foundation Inc.	Cray Research Foundation	Kraft Foods	Rockefeller Family & Associates
Alliant Techsystems Inc.	CSG Systems Inc.	Lennox International Inc.	Rockefeller Financial Services Inc.
Allo Source	Cytec Industries Inc.	Lenovo*	Rogers Corporation
Alloy Product Development	David L. Babson & Company Inc.	Leo Burnett Company Inc.	Rohm Corporation
Altria Group Inc.	Dell	Loiederman Soltesz Associates Inc.	SPX Foundation
Amax Foundation Inc.	Dignus, LLC	The Lubrizol Foundation	Saint-Gobain Corporation Foundation
AMD Foundation	DirectTV	LyondellBasell	Schneider Electric/Square D Foundation
American Petroleum Institute	Dominion Foundation	M.W. Kellogg Company	Sempra Energy
American Ref-Fuel Company	Duke Energy Foundation	M/A Com Inc.	Shell Oil Company
American Transmission Co. LLC	Duracell USA	Macy's Foundation	Silicon Laboratories Inc.
Amgen Foundation	Dynegy*	Markman Inc.	Southern California Gas Company
Amsted Industries Foundation	Eaton*	Massachusetts Financial Services Co.	Southwest Power Pool
Analog Devices	Ecolab Foundation	Massachusetts Mutual Life Insurance Co.	St. Jude Medical
Anchor QEA	EG & G Chandler Engineering	McDonald's Corporation	Stanley Black & Decker
Apache Corporation	El Paso Energy	McGraw-Edison Company	The Sun Microsystems Found. Inc.
Apple Inc.	Elsevier Science	McGraw Hill Financial	TCF Foundation
Applera Corporation	Emerson Electric Company	Mead Johnson Foundation	T-Mobile
Armstrong Foundation	Engineering Design & Testing Corp.	Meadwestvaco Foundation	Tellabs Operations Inc.
ARS Products LLC	Enterprise Products Company	Medtronic	Tesoro Corporation*
ASARCO Foundation	EOG Resources Inc.	Merck Foundation	Texas Instruments Foundation
ASC Geosciences Inc.	Equistar Chemicals, LP	Metso Automation	Thomson Reuters
Ashland Inc.	Eriasson Inc.	Microsoft Corporation	The Toro Company Giving Program
Atlantic Richfield Foundation	Erie Manufacturing Company	MidAmerican Energy Company	Toyota Technical Center, USA Inc.
Atmos Energy	Esterline Technologies	The Millipore Foundation	Transamerica Corporation
AT&T Foundation	Eversource Energy Foundation	Mizuho	TransCanada PipeLines
Avago Technologies Inc.	Exelon	Mobil (Retirees)	Tribune Company
BAE Systems	Expedia Inc.	Mondelez International Foundation	Turner Industries, Ltd.
Ball Corporation	Exxon Mobil Foundaton	Motorola Foundation	Tyco
Battelle	Fair, Isaac and Company Inc.	Motorola Mobility	TyCom (U.S.) Inc.
Bay Networks Inc.	Fannie Mae Foundation	National Instruments	UFE Inc.
Bemis Company Foundation	FleetBoston Financial Corporation	NEPERA Inc.	Unilever U.S. Foundation Inc.
BHP Billiton	Fluke Networks Inc.	Network Associates	Union Pacific Corporation
The Blount Foundation	FM Global Foundation	Newmont Mining Corporation	United Technologies
BNY Mellon*	Freeport McMoRan Foundation	Nissan North America Inc.	The UPS Foundation
The BOC Group Inc.	The Gap Inc.	Nokia Inc.	Verizon Foundation
The Boeing Company	Gartner Group	Nordson*	Virginia Power/North Carolina Power
Boston Scientific Corporation	GE Foundation	Northrop Grumman Foundation	W.K. Kellogg Foundation
BP Foundation Inc.	General Atomics*	NOVARTIS	Wachovia Foundation
Bristol-Meyers Squibb Foundation	Genentech	NRG Energy Inc.	Washington Mutual
Buckeye Pipe Line Co.	General Reinsurance Corporation	Nuevo Energy Company	Waste Management Inc.
C.I.T. Financial Corporation	General Signal	Occidental Petroleum Corp.	We Energies Foundation
Callaway Golf Company	GenRad Foundation	Owens-Illinois	Wheelabrator Air Pollution Control Inc.
Carolina Power & Light Co.	Goodrich Foundation	Pacific Enterprises	Williams
Centerpulse Orthopedics Inc.	Google	Pathfinder Global Group Inc.	Wisconsin Energy Corp. Found. Inc.
CertainTeed Corporation Fdtn.	Guidant Foundation	Pella Rolscreen Foundation	Workday, Inc.
Champion International Corp.	Harcourt General Inc.	Penguin Random House, LLC	WPX Energy
Charles S. Mott Foundation	Hewlett Packard	The PepsiCo Foundation	WRC Inc.
Chemical Bank	Illinois Tool Works Foundation	Petrotech Inc.	Xeel Energy Foundation
Chevron	IMCERA Group Inc.	The Pew Charitable Trusts	XE Corporation
Ciba Corning Diagnostics Corp.	IMO Industries Inc.	Pfizer Inc.	Xilinx
CIENA Communications Inc.	ING Foundation	PG&E Corporation Foundation	Yarway Corporation
Cingular	Ingersoll-Rand Company	Phillips 66	Zeon Chemicals L.P.
Cisco Systems Inc.	Ingredion, Inc.	Pitney Bowes	
CITGO Petroleum Corporation	Instron Corporation	Polaroid Foundation Inc.	

Executive Director's Report

By: Curtis D. Gomulinski, Michigan Epsilon '01

OVERALL, the year 2015-16 exceeded expectations in nearly every respect. The major downside for the year was a \$1.4 million unrealized loss in our trust investments which required a scaling back of the number of scholarships and fellowships and temporary reductions in program activity. Support by alumni through volunteer efforts and annual contributions was excellent, while corporate and university financial support of the Convention and *The Bent* remained high. The 3rd annual Tau Beta Pi Day was held on March 14. Over 100 collegiate and alumni chapters held events in conjunction with the celebration. Nearly 5,800 members have opted to receive *The Bent* electronically which represents a 600 percent increase over last year. Interest in maintaining a relationship or reconnecting with the Association continued to be strong with hundreds of members attending conferences and alumni events.

CHAPTERS

The 2015 Convention granted a charter to East Carolina University, formally installed as North Carolina Zeta on March 19, 2016. An article about the installation was published in the Summer 2016 issue of *The Bent*.

An inspection committee visited Brigham Young University-Idaho in February, and a petition from this school will be considered by the 2016 Convention. No additional petitions for new chapters were received.

One alumni chapter was chartered: Indianapolis (IN). No chapters were reactivated. The Southern Tier (Binghamton, NY), Philadelphia (PA), and Central Florida (Orlando) Chapters went inactive; 40 of 73 alumni chapters are active.

A total of 224 collegiate chapters (229 in 2015) completed annual surveys that listed approximately 1,704 projects. A report on the contents of the survey will be published in the November 2016 issue of *The Bulletin*.

MEMBERSHIP

The chapters initiated 9,861 members in 2015-16, down 3.0%, but still the



Graduates of the Indiana Gamma Chapter at the University of Notre Dame gather in front of their Bent monument outside Cushing Hall.

third highest in the past 25 years. This included 9,377 undergraduates, 356 graduate students, 50 alumni, and 78 eminent engineers. Tau Beta Pi's initiated membership on July 31, 2016, was 574,058, and an estimated 64,000 are deceased.

During the year, about 46,000 engineering students in the 245 TBPI chapter schools were scholastically eligible for membership in the top fifth of their senior or the top eighth of their junior classes. About 33.2% of these were members of TBPI at the close of the year—the same as last year. About 3.4% were not initiated, chiefly because of their chapters' failure to hold spring ceremonies. The remaining 66% indicated a lack of interest in membership, up from 59% last year.

Tau Beta Pi chapter schools graduate about 92% of all B.S. engineers at 421 schools with ABET EAC-accredited programs and four schools without accreditation. Thirty-four chapters held only one election and initiation of new members, one school did not conduct an initiation, and all others held two or more. Five chapters held an initiation without approval. No members resigned during the year, and none were expelled.

CONVENTION

The 110th Convention was held October 29-31, 2015, in Providence with Massachusetts Alpha, Delta, and Epsilon and Rhode Island Alpha and Beta Chapters as hosts. The meeting was fully reported in the Winter 2016

issue of *The Bent* and the November 2015 issue of *The Bulletin*. The 2016 Convention will be hosted by the California Xi, Psi, Alpha Epsilon, and Greater San Diego Alumni Chapter in San Diego. The 2017 Convention will be hosted by Michigan Gamma in Ann Arbor and Dearborn.

The 2015 Convention: approved one package of amendments to the Constitution and Bylaws of the Association to restructure the Executive Council, which was ratified by the chapters and reported in the Winter 2016 issue of *The Bent*; kept the reimbursement rates for 2016 at the levels set for the 2015 Convention except for automobile mileage which was set at \$0.30 per mile plus an additional \$0.05 for each additional passenger member; adjusted the Convention site bidding process for future Conventions; raised the annual alumni chapter dues from \$25 to \$50 per chapter; requested that a committee on alumni chapters be chartered for the 2016 Convention; raised the initiation fee from \$45 to \$55 effective August 1, 2016; granted two curriculum appeals; reviewed the status report regarding the general revision to the Constitution and Bylaws; and made several recommendations to the Executive Council for further study.

OFFICIALS

The TBPI Executive Council, elected for the 2014-18 term, includes President J.P. Blackford, Vice President N. Pih, Secretary G.J. Morales, Treasurer A.J. Passman, and Councillor S.L.R. Holl. Council meetings were held on Aug. 7,

Sep. 23 & 29, Oct. 8 & 28, Nov. 18, and Dec. 4-5, 2015, and Jan. 30, Feb. 18, Mar. 21, Apr. 23-24, May 26, June 10-11, and July 21, 2016. Tau Beta Pi has four appointed directors with responsibilities in major areas of its interest: K.L. Colby as Director of Engineering Futures, E.J. D'Avignon as Director of Rituals, T.E. Gomulinski as Director of Alumni Affairs, and S.J. Steadman as Director of Fellowships. Members of the Fellowship Board include C.W. Caldwell, M.M. Darrow, S.C. Dao, and R.E. Efimba. The Trust Advisory Committee, which directs investment activities of the corporate trustee, includes R.F. Smith (chair), H.W. Lange, and J.W. Johnson Jr.

District Directors on July 31 were:

- District 1 Mallory D. Ivanowsky
Haley H. Smestad
Lauren J. Swett
- District 2 Anthony M. Olenik
Thomas A. Pinkham IV
Jason Rogan
George Youssef
- District 3 Christopher C. McComb
- District 4 Jacob W. Chesna
Edward P. Gorzkowski III
Melissa L. Morris
Russell L. Werneth
- District 5 Josuan Hilerio-Sanchez
Rebecca A. Lewis
Meghan C. Ferrall-
Fairbanks
- District 6 Laura M. Martin
Crystal L. McCartney
Ellen S. Styles
- District 7 Timothy D. Anderson
Brien C. Dux
Michael J. Hand III
Warren C. Roos
- District 8 Bruce A. DeVantier
Stacey L. Forkner
Thomas F. Schaub Jr.
- District 9 Cody Johnson
Brenda A. Kramer
Will D. Lindquist
- District 10 Kelly J. Hammar
Madison R. Herman
- District 11 Christina M. Harrison
James C. Hill
- District 12 George K. Miyata
Gregory M. Newcomb
Matthew T. Pittard
- District 13 Jeffrey G. Dabling
C. Christopher Stemple
- District 14 Ian J. Frank
Janette A. Keiser
- District 15 Aaron R. Alpert
Scott E. Fable
Daniel T. Kruusmagi
- District 16 Neal T. Bussett
Sam Rokni
Stacey H. Ross



TBPI members assist students at the USA Science & Engineering Festival.

The International Headquarters staff, which is located on the Knoxville campus of the University of Tennessee, includes members Executive Director C.D. Gomulinski, Assistant Secretary-Treasurer R.E. Hawks, Major Gifts Officer S.D. Jennings-King, and eleven additional employees (see *tbp.org*).

AWARDS

Tau Beta Pi's top chapter prize, the R.C. Matthews Outstanding Chapter Award, was given to Alabama Epsilon for the excellence of its total program in 2014-15. An honorable mention went to Ohio Iota. The R.H. Nagel Most Improved Chapter Award went to Alabama Delta; an honorable mention was given to Indiana Beta. The J.D. Froula Most Improved Membership Award went to Arizona Beta; honorable mentions went to California Eta and Texas Mu.

The Headquarters staff gave 32 Secretary's Commendations to chapters for the perfection of their reports to TBPI in 2014-15, 31 Chapter Project Awards for ingenuity and creativity in activities, and 82 Membership Awards for increasing the number of students initiated into TBPI.

MEMBER AWARDS

The 2016 Outstanding Advisor was selected by a committee of engineering deans and a past winner: S. Schreiner, Ph.D., P.E. (chair); W.T. Davis, Ph.D., and E.A. Stephan, Ph.D. The recipient of a \$1,000 cash award and an equal sum to be presented to her dean's discretionary fund is Sandra B. Pitzak, Ph.D., *CO B '00*, Colorado Beta Chief Advisor. [See page 11.]

The alumnus recognition selection committee consists of three District Directors: L.J. Swett, P.E. (chair), G.K. Miyata, and R.A. Lewis. They were charged with selecting

the recipients of the TBPI-McDonald Mentor Award and the Distinguished Alumnus Award. The 2016 Distinguished Alumnus Awards will be presented to Nancy J. "Jan" Davis, Ph.D., P.E., *AL A '77*; Eugene M. DeLoatch, Ph.D., *DC A '59*; and Michael D. Griffin, Ph.D., *MD B '77*. The 2016 TBPI-McDonald Mentor will be presented to Antonette M. "Toni" Logar, Ph.D., *SD A '78*. [See pages 13, 16-17.]

The 2016 Laureates were selected by a committee of three District Directors: S.H. Ross (chair), A.M. Olenik, and K.J. Hammar. They chose three Laureates from 11 nominees made by 9 chapters. The 2016 Laureates are Nathan J. Ferraro, *OK A '16*; Angadbir S. Sabherwal, *IA A '16*; and Kiersten K. Wang, *FL A '16*. [See pages 14-15]

During the year, the Executive Council gave 39 Resolutions of Appreciation, and 3 Distinguished Service Awards to collegiate chapter advisors, Association Officials, and staff members for service to TBPI.

PROGRAMS

Sixteen districts held at least one conference last year and conducted meetings during the 2015 Convention, and directors visited many chapters during the year. The Directors and the Council cancelled the normal June 2016 meeting to reduce expenses.

ENGINEERING FUTURES

The Engineering Futures Program presented a total of 248 training sessions to 97 chapters by 38 volunteer facilitators to develop the leadership skills of student members during 2015-16. This award-winning program helps prepare engineering students for their careers by enhancing their overall personal effectiveness through interpersonal-skills and teamwork-development seminars.

FELLOWSHIPS

The 83rd fellowship group, comprising 24 students, 19 with stipend, will do graduate work in 2016-17 and was announced in the Summer 2016 *Bent*. Fellows with stipends are paid cash grants of \$10,000 each.

GRANTS

No proposals were received for either a Greater Interest in Government (GIG) grant or a Student Assistance grant.

MINDSET PROGRAM

The MindSET program continues to connect K-12 students to members of the collegiate and alumni chapters. Over 30 TBPI chapters hosted hands-on activity sessions with local schools. At the close of the fiscal year, more than 6,000 elementary, middle, and high school students had participated in MindSET activity sessions. In 2015-16, 18 grants totaling \$2,100 were issued to 9 chapters for MindSET projects.

SCHOLARSHIPS

The 18th group of 210 TBPI Scholars, who will complete their undergraduate engineering studies in 2016-17, are announced in this issue. [See page 28.] All Scholars receive a cash grant of \$1,000 or \$2,000 for their senior academic year. Since the program began in 1999, Tau Beta Pi has given and committed \$4,403,000 to 2,239 students.

In the TBPI Chapter Performance Scholarship Program, \$9,500 in scholarships were available to students selected by 19 chapters.

Six \$1,000 scholarships were funded by the Society (for a 18-year total of 113) in 2016-17 for incoming freshman engineering students through the national program conducted by the Society of Automotive Engineers (SAE).

OTHER ACTIVITIES

Tau Beta Pi has maintained its affiliations with the American Association for the Advancement of Science and the Association of College Honor Societies and its association membership in the American Society for Engineering Education. The Executive Director is Tau Beta Pi's official representative to these organizations.

Tau Beta Pi partners with JobTarget to offer a web-based job board—The Best People—and maintains other valuable benefits for members. Over 4,100 jobs were available on July 31.

The Association was a contributing society to DiscoverE 2016 (formerly National Engineers Week).

Tau Beta Pi was a titanium sponsor and hosted a booth at the 2016 USA Science & Engineering Festival in Washington, DC. Approximately 365,000 people attended the April 15-17 event which celebrates and promotes the STEM disciplines. The Association's booth featured an adap-

tation of an egg-drop activity.

Members of the Executive Council, Executive Director Gomulinski, and other Association Officials met with alumni at receptions and gatherings at 16 District Conferences and 9 other events held across the country.

Tau Beta Pi has maintained its classification under Section 501(c)(3) of the U.S. Internal Revenue Code as a tax-exempt, charitable and educational, non-private organization and is exempt from sales tax in 16 states. Collegiate chapters are separately classified under Section 501(c)(7) of the code, except Michigan Gamma, which is classified under Section 501(c)(4).

FINANCES

The financial condition of TBPI at the close of the fiscal year was weakened by substantial capital losses in the trust, but giving by alumni remained strong. Excess expense over revenue was \$834,000. Assets declined in 2014-15 by \$978,000 to a total of \$25,035,000.

FINANCIAL POSITION STATEMENT

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

Investment earnings of the funds, less trustee fees and including capital gains, are used for the purposes indicated by the fund titles: paying fellowship and scholarship stipends, paying for *Bent* magazines delivered to life subscribers, paying project grants to chapters in the MindSET and Greater Interest in Government Programs, supporting the Convention, and financing many useful activities of the collegiate chapters. Overall, net earnings of the investments, including security sales and market gains, were -5.9%; the previous year's figure was 3%. Paid investment earnings were \$1,104,000; net investment market losses were \$1,416,000.

Securities held by the trustee on July 31, 2016, are carried at market value of \$23,039,000, a decrease of 4.8% from the previous year, and comprise holdings in 15 non-overlapping, no-load mutual funds. Equity securities constituted 90% of the total trust funds.

The current liability in fellowships

and scholarships is for those stipends committed in 2015-16 for payment in 2016-17 to student recipients. The 2016 Convention liability includes the assessments paid by new initiates during the year and \$27,000 in gifts from corporate and university sponsors. The deferred *Bent* subscription liability is for both annual subscriptions and the four-year subscriptions for new members included in the Association's initiation fee. The liability for delivering future magazines under four-year subscriptions is entered on the books at the time of initiation.

The decrease in *Bent* life subscription liability was countered by the 84 new life subscribers. Life subscription fees are recorded as a liability because of the commitment against the annual earnings of those fees to pay for copies of *The Bent* to be delivered. This liability represents the total value of all life subscriptions in force on July 31, 2016, at their enrollment-fee prices, less an actuarial proportion of \$1,282,000 recognized as revenue since 2004. Upon the death of a life subscriber, their paid fees are transferred on the books to the Fellowship Fund and are reported as revenue.

The net assets of the Association decreased by \$978,000 mainly due to the loss of value in the trust of \$1,150,000. A subsidiary report details the changes during the year in individual funds, which posted mixed results due to market volatility.

STATEMENT OF ACTIVITIES

Chapter and initiation fees (shown less *The Bent* subscription and Convention support) decreased by \$8,700 primarily due to the decrease of 309 new members over last year.

Convention revenue consists of assessments for the 2015 Convention, \$63,000 in gifts, and \$100,000 from alternate delegates and visitors.

Bent publication revenue rose by \$5,000 due to the increased 4-year subscription price which offset decreased recruitment advertising; expenses fell by \$16,000 due to more members switching to electronic delivery and lower advertising costs. Total investment earnings and market gain on the Life Subscription Fund decreased by \$282,000. In 2015-16, the invested fund lost \$0.14 per life copy delivered, compared with the previous year's gain of \$0.35. Expenses per life copy exceeded

THE TAU BETA PI ASSOCIATION
STATEMENT OF FINANCIAL POSITION
 On July 31, 2015 and 2016

ASSETS

<i>Current Assets</i>	<i>2016</i>	<i>2015</i>
Cash and cash equivalents	\$ 665,426	\$ 550,067
Accounts receivable		
Chapters	91,523	61,088
Student loans	25,528	21,582
<i>Bent</i> life subscription installments	2,130	3,620
Pledges	152,336	151,721
Trust contributions	0	0
Other	21,220	8,065
<i>Total Receivables</i>	<u>292,737</u>	<u>246,076</u>
Inventory	43,518	44,364
Split-interest agreements, cur. portion	80,928	83,085
Prepaid expenses	76,190	37,193
<i>Total Current Assets</i>	<u>1,158,799</u>	<u>960,785</u>
<i>Depreciable: Furniture and equipment</i>	124,603	127,277
Less accumulated depreciation	<u>(111,790)</u>	<u>(108,474)</u>
<i>Total Depreciable</i>	12,813	18,803
<i>Other Assets</i>		
Investments	23,062,159	24,210,806
Split-interest agreement, net of cur. portion	801,684	823,061
	<u>\$23,863,843</u>	<u>\$25,033,867</u>
TOTAL ASSETS	\$25,035,456	\$26,013,455

LIABILITIES AND NET ASSETS

<i>Current Liabilities</i>	<i>2016</i>	<i>2015</i>
Accounts payable		
Chapters	\$ 1,815	\$ 1,815
Laureate awards	7,500	12,500
Fellowships/Scholarships	637,000	827,500
Other	72,863	10,960
Accrued expenses	58,405	56,682
Deferred Convention revenue	126,010	128,940
Deferred <i>Bent</i> revenue, current	105,294	85,048
Annuities payable, current portion	19,037	19,037
<i>Total Current Liabilities</i>	<u>1,027,923</u>	<u>1,142,482</u>
Deferred <i>Bent</i> subscription revenue	114,029	118,975
<i>The Bent</i> life subscriptions	1,159,991	1,179,373
Annuities payable, net of cur. portion	89,735	95,126
<i>Total Long-term Liabilities</i>	<u>1,363,755</u>	<u>1,393,474</u>
TOTAL LIABILITIES	2,391,678	2,535,955
<i>Net Assets</i>		
Unrestricted:		
Undesignated	471,820	687,206
Designated	7,388,759	8,175,039
Temporarily restricted	7,764,728	8,241,209
Permanently restricted	7,018,471	6,374,046
TOTAL NET ASSETS	22,643,778	23,477,500
TOTAL LIABILITIES & NET ASSETS	\$25,035,456	\$26,013,455

Financial statements have been audited.

earnings by \$1.14, versus last years' earnings of \$0.69 per copy.

The total of interest and dividends in 2015-16 decreased by \$45,067. The net loss on investments was \$1,415,132 reflecting reported changes in market value.

The 11 major chapter programs (denoted with a (C) in front of their name under Expense) usually reflect an operating loss. Convention expenses fell by \$37,300 and include the cost of attendance by one student delegate from each collegiate chapter, alternate delegates, alumnus delegates, chapter advisors, and visitors—but not by Association Officials. Part of the decrease reflects changes to reduce on-site expenses.

Expenses for fellowships and scholarships fell by \$213,000 because fewer scholarships and fellowships were given. Revenue for these awards includes matching gifts from corporations, alumni contributions specifically earmarked by donors, and trust earnings. Fellowships and scholarships comprise the major philanthropic program of the Society—made possible by gifts from alumni, friends, and participating industrial firms.

CONTRIBUTIONS FROM ALUMNI

Total contributions and bequests decreased by \$394,000 during the fiscal year. A reduced number of designated gifts for scholarships, fellowships, and the Chapter Endowment Initiative represent most of this decrease. Tau Beta Pi's Annual Giving Campaign brought in gifts of \$987,000 (down 9.6%) from 9,962 donors (down 4.3%), including 230 new donors (up 10.6%). Their names were published in each issue of *The Bent*. Included in the total is \$48,300 allocated to the Fellowship and Scholarship Programs from 251 companies that match gifts from employees.

The Society was included as an eligible organization in the 2016 national Combined Federal Campaign which brought in \$5,700 in gifts.

INITIATION FEES

Tau Beta Pi's low Association initiation fee covers the cost of the official badge, membership certificate, copies of the *Constitution and Bylaws* and *Information Book*, and a four-year subscription to *The Bent*. The initiation fee has been \$45 since August 1, 2014, and includes \$10 that is used for partial support of the annual Convention.

STUDENT LOANS

Only five new loans were made to members in 2015-16 for a total of \$12,500. None was for the initiation fee. Five loans were repaid, none were written off during the year, leaving 15 outstanding on July 31, 2016, with a principal balance of \$26,000. Since inauguration in 1932 of the program, 1,802 loans have been made to student members for a total of \$898,000.

PUBLICATIONS

During 2015-16, the four issues of *The Bent* contained a total of 216 pages, and 398,000 copies were delivered to paid subscribers. This represents no change in paid copies above the previous year's circulation total. Engineering and graduate-school recruitment advertising for the year totaled 13.5 pages, an 8% decrease from the previous year. Total production cost of the magazine per paid copy was \$1.00, down from \$1.04 the preceding year.

New *Bent* life subscribers numbered 84 (up from 83), bringing total life subscriptions to 80,329. Of all the life subscribers enrolled since 1929 when the plan was instituted, 13,200 are deceased, and their fees totaling

THE TAU BETA PI ASSOCIATION

STATEMENT OF ACTIVITIES

For the years ended July 31, 2015 and 2016

REVENUE	Unrestricted	Temporarily	Permanently	2016	2015
		Restricted	Restricted		
Initiation and chapter fees and fines	\$ 229,698			229,698	238,350
Chapter and individual sales	196,495			196,495	183,035
Contributions and bequests	1,100,197	76,881	669,959	1,847,037	2,240,918
Convention	265,026			265,026	223,227
<i>Bent</i> publication	201,334			201,334	196,663
Net life subscription fee transfer	23,895			23,895	28,670
Student loan interest	1,306			1,306	2,510
Miscellaneous/ Net gain on equipment sales	12,282	1,000		13,882	9,621
Interest and dividends	485,613	661,082		1,146,695	1,191,762
Net gain (loss) on investments	(620,700)	(794,432)		(1,415,132)	(333,974)
Change in value of split-interest agreements			(23,354)	(23,354)	17,633
Net assets released from restrictions	415,371	(415,371)	-	0	0
TOTAL REVENUE	2,311,117	(470,841)	646,425	2,486,702	3,998,463
EXPENSE					
Program services					
(C) Advisor Program	24,939			24,939	25,001
Alumni Program	70,028			70,028	86,048
<i>Bent</i> publication	398,879			398,879	414,922
(C) <i>Bulletin</i> production	20,323			20,323	20,468
(C) Chapter and initiate supplies	328,084			328,084	313,687
(C) Convention	628,955			628,955	666,261
(C) Cost of chapter and individual sales	158,887			158,887	169,577
(C) District Program	238,606			238,606	227,036
(C) Engineering Futures Program	156,647			156,647	165,493
Fellowship & Scholarship Program	695,134			695,134	907,800
(C) Greater Interest in Government Program	5,101			5,101	5,007
(C) K-12 MindSET Program	35,285			35,285	35,540
(C) Laureate Program	14,787			14,787	17,955
McDonald Mentor Program	6,260			6,260	5,134
(C) Student Assistance Program	2,161			2,161	2,151
Student Loan Program	6,131			6,131	6,183
<i>Total program services</i>	2,790,206			2,790,206	3,068,264
General and administrative	267,938			267,938	284,025
Alumni Giving Program	262,279	0	0	262,279	300,400
TOTAL EXPENSE	3,320,423			3,320,423	3,652,688
CHANGE IN NET ASSETS	(1,109,306)	(470,841)	646,425	(833,722)	345,775
Net assets, beginning of year	8,862,245	8,241,209	6,374,046	23,477,500	21,131,725
Net assets, end of year	\$7,852,939	7,770,368	7,020,741	22,643,778	23,477,500

Financial statements have been audited.

\$390,000 have been transferred to the Fellowship Fund in accord with the Constitutional requirement.

An average of 57 copies per issue in 2015-16 was delivered to annual renewal subscribers, 37,623 copies to original four-year subscribers, and 61,664 copies to life subscribers, for a total of 99,344 paid copies per issue. The total number of paid copies for the Summer 2016 magazine was 100,103.

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

Dechman this coming year.

THE BULLETIN

During 2015-16, the four issues contained a total of 42 pages, and no copies were printed. All issues are available on the website. Published chiefly for sharing information with student members, officers, and advisors of the collegiate chapters, the newsletter is a valuable means of exchanging project ideas and distributing advice and guidelines related to chapter operations.

OTHER COMMUNICATIONS

New editions of the *Constitution and Bylaws and Eligibility Code* and the

Information Book were printed in August and September 2015, respectively. Other brochures and materials were updated and reprinted throughout the year.

Tau Beta Pi's presence on social media continued to increase. Over 23,300 members are part of our LinkedIn group, 3,900 people "like" Tau Beta Pi on Facebook, 722 people follow @taubetapi on Twitter, and over 5,000 people read our blog with daily news 7,300 times last year. The website has received over 29.7 million visits since its creation and contains a wealth of operational and historical information about the Society. Visit tbp.org to find the latest TBI news!



IN THE COLLEGES

SPOTLIGHT

Ladies First!

Dartmouth College announced it had more women graduates than men from its engineering courses this year.

ScienceAlert website said that while more and more women have been enrolling in engineering courses over the past decade, this is reportedly the first time graduating women have outweighed males—suggesting that we might finally be approaching the tipping point for the male domination of the field.

On average, only 19.9% of undergraduate engineering degrees in the U.S. are awarded to women, and just 10 years ago, only a quarter of Dartmouth's engineering graduates were females. This year, the college handed out 54% of its engineering degrees to females.

STEM Trend

It seems more of the future STEM workforce may be coming from overseas, in spite of all the resources being thrown into luring more Americans toward science, technology, engineering and math.

U.S. News reported that the number of U.S. citizens and permanent residents earning graduate degrees in science and engineering fell 5% in 2014 from its peak in 2008.

At the same time, the number of students on temporary visas earning the same degrees soared by 35%, according to survey data collected by the National Science Foundation and National Institutes of Health.

"It's a big concern: We bring a lot of students here, we train them, and then they leave," says Vince Bertram, president and CEO of Project Lead the Way, which provides STEM coursework and programs.

PEOPLE

Stephanie G. Adams, Ph.D., Nebraska Alpha '89, has been selected as the seventh dean of Old Dominion University's college of engineering and technology. She was professor and engineering education department head at



Virginia Tech since 2010. She is the first female engineering dean at Old Dominion. Adams received a 2003 CAREER award from the NSF and was named as their 2008 educator of the year by the National Society of Black Engineers.

Ronald J. Brachman, Ph.D., New Jersey Delta '71, is the new director of the Joan and Irwin Jacobs Technion-Cornell Institute. He is a computer scientist and artificial intelligence authority, who previously was Yahoo's chief scientist and head of Yahoo Labs.



He was also director of information processing technology at DARPA, and established the Cognitive Systems initiative, which developed technology that led to Siri. The institute is a partnership between Cornell University and the Technion Israel-Institute of Technology. It was created by a \$131 million gift from **Irwin M. Jacobs, Sc.D., New York Delta '56**, founding chairman and CEO emeritus of Qualcomm, and his wife Joan.

Stephen P. DeWeerth, Ph.D., Georgia Alpha '85, has become dean of Lehigh University's college of engineering and applied science. He was associate dean for research & innovation and professor of engi-



neering at Georgia Institute of Technology's college of engineering, where he served as an Advisor to Georgia Alpha. Previously, he was founding chair of the department of biomedical engineering at the Khalifa University of Science, Technology and Research in Abu Dhabi, UAE.

Christine Hailey, Ph.D., P.E., Oklahoma Alpha '81, is now dean of the college of science and engineering at Texas State University in San Marcos. She was dean of Utah State University's college of engineering. Previously,



she worked as an engineer at Sandia National Laboratories and began teaching engineering at Utah State in 1994.

Wendi R. Heinzelman, Ph.D., New York Delta '95, is the new dean of the University of Rochester's school of engineering and applied sciences. She was dean of graduate studies and a professor of electrical and computer engineering



at Rochester. Heinzelman's research focuses on wireless communication, networking, mobile computing, and multimedia communication. She is also an advisor to New York Kappa.

Craig J. Hoff, Ph.D., Michigan Gamma '90, has been named founding dean of the college of engineering at Kettering University. He has been a faculty member there since 1999 and was a professor and department head in mechani-



cal engineering. Previously, Hoff taught and served in administrative roles at Lawrence Technological University. His expertise is in energy systems and automotive powertrains.

Pramod P. Khargonekar, Ph.D., *Florida Alpha '81*, has been appointed vice chancellor for research at the University of California, Irvine. He previously served as assistant director for engineering at the National Science Foundation, where he headed the directorate for engineering, which invests in frontier research and education. He was also a professor of electrical and computer engineering at the University of Florida.



Justin W. Kile, Ph.D., *New York Pi '98*, is founding dean of the school of engineering at Connecticut's Quinnipiac University, where he has been on the faculty since 2012, and for the last four years, engineering courses have been offered by the school of business and engineering. The program will offer bachelor degrees, with Kile leading the new school as it seeks approval through the Accreditation Board for Engineering and Technology.

Jayathi Y. Murthy, Ph.D., *California Epsilon '79*, has become dean of the University of California, Los Angeles, school of engineering and applied science, and been initiated into TBP as an Eminent Engineer. She was previously chair of the department of mechani-



cal engineering at the University of Texas at Austin, and held the Ernest Cockrell Jr. Memorial chair in engineering.

John W. Nicklow, Ph.D., P.E., *Illinois Epsilon '93*, is the new president of the University of New Orleans. A longtime academic administrator, he had been provost and vice president of academic affairs of UNO since July.



Before that, he spent four years as provost and vice chancellor for academic affairs at Southern Illinois University. Earlier, Nicklow was an environmental engineer with the U.S. Public Health Service, responsible for design and construction of water supply and waste facilities for American Indian communities.

Terry E. Parker, Ph.D., *California Gamma '76*, has been appointed as provost of Florida Poly. He will oversee the academic experience there, from recruiting students and steering curriculum, to hiring professors and securing research grants. Parker was provost, executive vice president, and a professor at the Colorado School of Mines. His research includes exploring novel optical systems to measure high-temperature and high-pressure ignition systems for power plants.



Neville G. Pinto, Ph.D., *Ohio Beta '80*, has been named as permanent provost of the University of Louisville. He was dean of the engineering school there before becoming interim provost last year. Pinto joined U of L in 2011 after serving as vice provost and dean of the graduate school at University of Cincinnati.



John Y. Walz Jr., Ph.D., *Louisiana Beta '82*, has become president of the Milwaukee School of Engineering. He was dean of the college of engineering at University of Kentucky and previously served as professor and head of the department of chemical engineering at Virginia Tech. Walz earlier worked as an engineer for Shell Oil Company.



FACILITIES

Texas A&M University and Houston Methodist hospital have announced a partnership to train students in the new engineering and medicine program to become inventors and entrepreneurs. The *Houston Chronicle* said students are being trained as physicians and engineers and expected to produce a "transformational" invention by graduation. They will receive degrees in medicine and engineering. The school will focus on commercialization of ideas. A&M plans to begin enrolling students for fall 2017. The school will add 25 faculty and assign 75,000sq. ft. of instructional and research space in the Texas Medical Center.

- Texas A&M is building a new research and development campus at a former military base in Bryan, TX, reports the *Dallas Morning News*. The \$150 million facility will serve as both a development hub for private companies and an institution that offers four-year degrees, continuing education and short courses.

University of Kentucky college of engineering has received a \$7 million donation from Joani and **F. Joseph Halcomb III, M.D.,** *Kentucky Alpha '74*, to endow a chair and fellowships. The department of biomedical engineering will be renamed for Halcomb, a former vice president at therapeutics company Amgen.



CHAPTER ETERNAL

The condensed style of these notices of death is made necessary by Tau Beta Pi's large membership and space limitations in The Bent. You may email or write the Editor for additional facts (if available) concerning the following deceased members. The assistance of all is earnestly sought in reporting the deaths of Association members, with appropriate details, including date of death and full name. You may report the death of a member by sending an email to chapter.eternal@tbp.org.

- AL A '49 **Caldwell, Austin A.**; March 23, 2013.
- '49 **Cox, William Biggs**; May 11, 2015.
- '49 **Hill, Elmer Carlton**; April 6, 2016.
- '83 **Thompson, Brian Glenn**; April 8, 2014.
- AL B '40 **Prater, Peter Gunter**; July 20, 2012.
- '41 **Bunce, Frank Edgar**; June 10, 2015.
- '42 **Pickens, Cecil Roberson**; June 26, 2015.
- '49 **Broskie, Thomas Gregory**; November 28, 1985.
- '50 **Creswell, Willie Glenn**; February 21, 2014.
- '50 **Vickers, Dallas Neal**; August 29, 2012.
- '57 **Snow, John Howard**; June 26, 2013.
- '62 **Guthrie, Stanley Morris**; December 30, 2012.
- '62 **Hiett, William Eugene**; August 26, 2013.
- '62 **Long, John Whit**; March 7, 2013.
- '64 **Boyd, James Steven**; May 15, 2015.
- AL Δ '85 **Green, Sarah Lilian**; June 6, 2015.
- AK A '95 **Hodges, Diane Michelle**; April 21, 2014.
- AZ A '55 **Anderson, Ronald Colbert**; April 24, 2015.
- '57 **Nabours, Robert Eugene**; August 24, 2012.
- '70 **Mears, Connally Eudell**; January 8, 2015.
- AZ B '69 **Mack, James Thomas**; December 10, 2015.
- AR A '55 **Lyle, Michael Charles**; April 10, 2016.
- '56 **Caple, Joe Alan**; April 22, 2014.
- '57 **Mixon, William Richard**; January 22, 2015.
- '59 **Combs, George Donald**; June 9, 2014.
- '60 **Cooper, Thomas Towell**; October 23, 2014.
- '88 **Bennett, Gary Don**; July 14, 2012.
- CA A '41 **Balsley, Ray Charlton**; April 27, 2010.
- '49 **Magid, Milton**; January 29, 2013.
- '50 **McKillop, Allan Archibald**; October 15, 2014.
- '52 **Tsao, Carson Kuo-Hsiang**; March 13, 2014.
- '54 **Froid, James Carl**; July 15, 2012.
- '59 **Sheridan, Earl Allison**; February 3, 2016.
- CA Γ '44 **Manning, Laurence Albert**; February 9, 2015.
- '50 **Geyling, Franz Thomas**; February 17, 2014.
- '51 **Stewart, Leland Taylor**; October 26, 2014.
- '54 **Markey, Michael Jean**; March 2, 2013.
- '55 **Young, Frank Sharp**; February 22, 2016.
- '57 **Ebersten, Kenneth Harold**; January 20, 2013.
- '63 **Ferguson, John Franklin**; March 29, 2013.
- '75 **Lapen, Robert Joseph**; April 13, 2013.
- CA Δ '57 **Phillips, Donald Charles**; January 16, 2015.
- '61 **Friedman, Bernard Leon**; January 6, 2016.
- '81 **Daida, Jason M.**; January 9, 2013.
- CA E '54 **Spradley, Joseph Leonard**; March 29, 2016.
- '59 **Goldstein, Allen Emanuel**; October 21, 2014.
- '60 **Kato, G. John**; January 19, 2015.
- '69 **Chellman, David James**; July 15, 2013.
- CA I '44 **Kett, Irving**; December 30, 2013.
- CA Σ '85 **Spaulding, Gregg Everett**; April 5, 2014.
- CO A '48 **Zohn, Bernard**; July 14, 2013.
- '50 **Driear, Joseph Raymond**; July 31, 2012.
- '50 **Dronen, Warren Sanford**; March 5, 2013.
- '59 **Faulkner, Larry Reid**; June 17, 2013.
- '66 **Cruzan, Robert Neil**; September 11, 2014.
- '70 **Mullen, Henry Andrew**; June 11, 2012.
- '93 **Banuelos, Scott Joseph**; August 29, 2013.
- CO B '48 **Clapham, Joseph Charles**; June 11, 2015.
- '50 **Brumitt, William Alonzo**; October 7, 2015.
- '51 **Sheppard, Norman Rex**; May 12, 2014.
- '52 **Clark Jr., Albert Farnhom**; June 3, 2013.
- '54 **Iverson, William Carl**; May 25, 2013.
- '56 **Camack, Walter Gene**; May 4, 2011.
- '56 **Schroth, Albert Lee**; October 14, 2012.
- '57 **Moody, Martin L.**; September 30, 2013.
- '58 **Graham, William Frank**; September 14, 2014.
- '59 **Killham, Darrel Eugene**; September 15, 2014.
- '60 **Pousma, John Grannum**; November 18, 2012.
- '61 **Sander, Harold Eugene**; June 4, 2012.
- '62 **Latta, Robert Allen**; March 16, 2015.
- '62 **Stahl, David Whittingham**; May 6, 2013.
- '63 **Maxwell, Eugene Lawrence**; January 25, 2014.
- '71 **Carlston, Lawrence Dale**; February 19, 2013.
- '71 **Eichman, Robert Gene**; October 12, 2013.
- '73 **Blickhahn, Charles Edward**; November 5, 2012.
- '78 **Sharpe, Joseph Hiserodt**; 2015.
- CO Γ '73 **Welch, Albert Clark**; April 1, 2016.
- CO Δ '82 **Jones, Michael Falcon**; January 28, 2014.
- CO E '88 **Budlong, Allan Arthur**; no details.
- '89 **Mantilla, Jay**; September 16, 2013.
- '95 **Ballou, Michael John**; July 23, 2014.
- CT A '45 **Dorfman, John Charles**; March 1, 2015.
- '46 **Fazia, Arnold**; April 11, 2014.
- '49 **Nelson, William Frederick**; February 17, 2013.
- '50 **Austin Jr., John Hogg**; March 5, 2015.
- '50 **Simpson, Gloria Elaine**; November 16, 2007.
- '52 **Foote, William Beckham**; April 28, 2016.
- CT B '52 **Baxter, Milton Carl**; April 25, 2013.
- '59 **Gugliotti, Louis Martin**; August 4, 2013.
- '60 **Chiarella Sr., John G.**; February 21, 2015.
- '66 **Smith, Walter Herbert**; November 6, 2014.
- CT Γ '41 **Chin, Charles L.D.**; October 28, 2010.
- DE A '60 **Lacourse, Cynthia A.**; June 7, 2013.
- '77 **Lueth, Fritz Heinrich**; August 8, 2005.
- DC A '94 **De Vane, Deirdre Dominique**; January 23, 2013.
- DC B '65 **Giacofci, Thomas Andrew**; June 12, 2012.
- DC Γ '66 **Hicks, Horace Edward**; July 16, 2012.
- '71 **McGee, Lawrence John**; November 13, 2014.
- FL A '54 **Kent, Richard Burris**; April 12, 2016.
- '64 **Schroeder, James Edward**; August 11, 2013.
- '75 **Bauer, Christian Schmid**; April 6, 2016.
- FL B '54 **Dadras, Aly S.**; May 4, 2013.
- '82 **Tiranasar, Choompote James**; May 26, 2012.
- '93 **Beigelman, Samuel Nathan**; May 13, 2014.
- FL Γ '67 **Boatwright, Kerry S.**; March 12, 2015.
- '77 **Grierson, Malcolm**; December 2, 2015.
- '88 **Young, Douglas**; November 11, 2013.
- FL Δ '61 **Murphy, Walter T.**; May 25, 2013.
- GA A '43 **McIntosh, Claude Howard**; July 30, 2012.
- '47 **Donald Sr., Douglas Alan**; April 5, 2016.
- '47 **Spitzer, Murray**; October 11, 2012.
- '49 **Brock, Buford Leroy**; August 24, 2013.
- '49 **Martin, James Hagood**; December 9, 2013.
- '49 **Painter, James Marshall**; November 25, 2012.
- '49 **Smith Jr., Marvin Henry**; July 9, 2013.
- '50 **Krescanko, Joseph Nicholas**; March 5, 2015.
- '50 **Smith, Rollie Bittick**; March 16, 2013.
- '50 **Talley Jr., Philip Edgerton**; April 1, 2016.
- '50 **Watkins, Elmer Nathaniel**; October 21, 2012.
- '51 **Davis, David Charles**; June 24, 2012.

- '52 **Gambill, Wallace R.**; January 25, 2014.
 '52 **Patton, Thomas O'Brien**; August 13, 2013.
 '52 **Sharp, James Kelly**; February 20, 2015.
 '53 **Dinnat, Robert M.**; April 7, 2014.
 '53 **Dowdy, William Wills**; May 23, 2013.
 '54 **Dunlap, Julian Lee**; April 9, 2016.
 '54 **Hettich, John Joseph**; May 19, 2014.
 '54 **Mappin, Frederick Hoyt**; January 30, 2013.
 '56 **May, George Dismukes**; June 18, 2012.
 '62 **Myers, Michael Roy**; March 26, 2014.
 '64 **Ewell, George Watkins**; September 12, 2012.
 '69 **Bahler, Joseph Carl**; August 4, 2015.
 '72 **Bohn, Mark Stephen**; March 28, 2014.
 IL A '42 **Duboff, Jack Irving**; September 1, 2012.
 '42 **Mrazek, James Anton**; September 6, 1995.
 '43 **Epstein, Sidney**; February 3, 2016.
 '46 **Pedersen, Harry**; August 16, 2013.
 '48 **Caputo, Roger William**; December 15, 2013.
 '49 **Weissman, Ira**; February 15, 2015.
 '50 **Bretz, Martin Frederick**; March 21, 2013.
 '50 **Goodwin, Keith Freeman**; November 26, 2012.
 '51 **Smith, Donald Webb**; June 6, 2012.
 '51 **Smith, Garland Young**; June 17, 2014.
 '53 **Aagaard, Eric Edwin**; 2014.
 '53 **Anderson, Robert Harold**; December 15, 2013.
 '54 **Kuo, Benjamin Chung-i**; June 12, 2012.
 '55 **McDonough, Charles Leo**; January 6, 2013.
 '57 **Tobin, Henry George**; 2016.
 '60 **Harrison, Roger Lyle**; September 19, 2012.
 '62 **Schroder, Kenneth Svane**; June 27, 2013.
 '80 **Cruz, Rene Leonardo**; June 29, 2013.
 IL B '37 **Goldsmith, Arthur**; December 23, 2014.
 '50 **Richter, Robert William**; September 28, 2012.
 '58 **Friedlander, Alan Lee**; August 16, 2012.
 '85 **Kariya, Timmy T.**; October 21, 2012.
 '87 **Slovick, Patrick Richard**; February 27, 2014.
 IL Γ '43 **Dierdorff Jr., Lee Henry**; November 14, 2015.
 '45 **Kerwin, Daniel**; November 22, 2012.
 '49 **Cook, Stanton R.**; September 3, 2015.
 '49 **Matson, Gordon Nyvall**; April 25, 2014.
 '49 **Weaver, Kenneth Eugene**; June 18, 2013.
 '53 **Thomas, David Ray**; May 12, 2016.
 '56 **Seidensticker, John F.**; August 27, 2015.
 '58 **Mertes, Frank Peter**; July 19, 2015.
 IL Δ '74 **Harchut, John Felix**; February 28, 2013.
 IL Z '86 **Dickerman, Mary Ellen**; December 29, 2012.
 '95 **Beatty, Kimberly Ann**; September 14, 2012.
 '95 **Moore, Mark William**; January 2, 2013.
 IN A '41 **Cartwright, Kenneth Orlando**; May 14, 2011.
 '42 **Kolb, Roger Stackton**; October 4, 2015.
 '42 **Visin, Robert James**; August 21, 2012.
 '43 **Sacks, Max**; January 12, 2013.
 '44 **Lamprecht, John Wilbur**; April 3, 2016.
 '45 **Hard, Robert Amos**; September 30, 2013.
 '45 **Schipferling, Leonard Henry**; December 9, 2012.
 '46 **White, Paul Jerome**; November 27, 2014.
 '47 **Dickey, Bartlett Coulter**; April 20, 2013.
 '48 **Brown, Arthur Edmands**; August 6, 2015.
 '49 **Carter, Keith Eyre**; May 3, 2013.
 '49 **Glaser, Lowell Everett**; July 15, 2015.
 '49 **Nasser, John**; May 8, 2013.
 '49 **Shank, Robert Eugene**; January 22, 2015.
 '50 **Ficke, Calvin Clarence**; September 10, 2012.
 '50 **Williams, Ralph Edward**; May 15, 2014.
 '53 **Gardner, Willis Warren**; November 19, 2013.
 '53 **Jenkins, Walter Samuel**; February 7, 2014.
 '53 **Sellers Jr., Robert Carey**; June 19, 2013.
 '54 **Bollard, Richard John Holden**; June 28, 2014.
 '55 **Stephenson, David Skeen**; August 8, 2012.
 '57 **Clingan, William Waid**; June 13, 2013.
 '58 **Zollinger, Robert W.**; October 21, 2013.
 '60 **Sherman, William Leonard**; November 19, 2011.
 '61 **Jones, Larry Keith**; October 2, 2013.
 '61 **Perry, Lonnie James**; February 6, 2015.
 '61 **Ross, Robert William**; June 20, 2012.
 '64 **Depken, Craig Alan**; July 19, 2015.
 '64 **Grzesiek, Louis Emil**; June 28, 2015.
 '65 **Gerhold, Toby Carl**; October 28, 2014.
 '66 **Blough, David Neil**; April 27, 2014.
 '66 **Smith, Clifford Charles**; October 31, 2013.
 '72 **Crawford, Robert Owen**; May 14, 2016.
 '72 **Foster, Daniel Kent**; August 6, 2012.
 '74 **Sesny, Paul Andrew**; February 4, 2013.
 '00 **Blodget, Chad Jeffery**; March 17, 2014.
 IN B '57 **Morin, Donald Gerard**; May 14, 2013.
 '66 **Wattleworth, Robert Eugene**; September 8, 2014.
 '69 **Rennels, Larry Wayne**; June 25, 2015.
 '81 **Miller, Rodney Lee**; April 14, 2015.
 IN Γ '62 **Houck, Carl Phillip**; March 13, 2014.
 '63 **Harron, Michael O.**; September 21, 2012.
 IN Δ '67 **Koschmann, John Eldred**; November 10, 2013.
 IA A '44 **Morgan, Paul Emerson**; August 30, 2013.
 '46 **Perkins, Donald William**; January 30, 2015.
 '48 **Decker, George Albert**; December 7, 2013.
 '49 **Bell, John Curtis**; September 22, 2014.
 '49 **Gildermaster, Eugene F.**; November 7, 2006.
 '51 **Shepard, Clayton Van Horn**; October 4, 2015.
 '52 **Johnson, Ronald Lee**; February 22, 2013.
 '53 **Barg, Gordon Craig**; May 26, 2015.
 '54 **Hurd, Marvin Lester**; January 16, 2015.
 '54 **Jensen, Richard Dee**; June 9, 2015.
 '55 **Schlueter, Raymond Dale**; January 26, 2013.
 '56 **Polhemus, John Thomas**; May 21, 2013.
 '57 **Bower, Lee Fraser**; November 28, 2014.
 '57 **Hill, Robert Tyler**; January 22, 2014.
 '57 **Peterson, James August**; September 27, 2012.
 '58 **Barsness, Eugene John**; October 28, 2012.
 '58 **Ewoldt, Howard James**; October 21, 2012.
 '59 **Ellerman, Gaylord M.**; September 24, 2014.
 '64 **Carter, Neal Edward**; July 30, 2014.
 '74 **Cröse, Bryan Roger**; February 22, 2014.
 '74 **Nesbit, Larry A.**; September 19, 2012.
 IA B '43 **Putzrath, Franz L.**; November 16, 2012.
 '50 **Jackson, Ralph LeRoy**; August 30, 2013..
 '56 **Anderson, Edwin Lee**; no details.
 '58 **Brechler, Ronald Clancy**; March 26, 2016.
 '58 **Brieske, Marvin Lyle**; February 2, 2013.
 KS A '43 **Hodges, Richard Howard**; August 12, 2012.
 '48 **Harris, Robert Hall**; October 28, 2013.
 '49 **Blincoe, Edward Irvine**; December 17, 2013.
 '51 **Anderson, Eugene Carl**; September 6, 2014.
 '51 **Carey, Kenneth Brandon**; October 8, 2012.
 '53 **Hartell, William Keith**; June 22, 2013.
 '55 **Evans, George Klea**; September 13, 2014.
 '60 **Shutler, Norman Dale**; January 25, 2014.
 '64 **Watkins, Terry Gordon**; October 16, 2004.
 '65 **Null, Robert Bruce**; February 8, 2015.
 '74 **Economides, Michael John**; 2013.
 KS B '48 **Keller, Robert B.**; August 5, 2012.
 KS Γ '74 **Duncan, James Michael**; May 28, 2012.
 '75 **Michal Jr., Norman Richard**; May 5, 2015.
 KY A '56 **Puckett, Russell Elwood**; February 26, 2014.
 '57 **Hallett, Paul Clifton**; March 3, 2015.
 '57 **Regan, Terry Malcolm**; October 1, 2015.
 KY B '41 **Altman, George Gustave**; November 28, 2014.
 '48 **Krebs, Robert James**; July 26, 2014.
 LA A '49 **Phillips, Sam Anderson**; August 13, 2012.
 '64 **Reagan, Ronald Steven**; July 15, 2014.

- LA B '43 **Hamm, Norman Gerald**; November 11, 2013.
'46 **Davey, Jack**; October 26, 2014.
'50 **Blust, Henry Leo**; May 3, 2016.
'52 **Conway, William B.**; no details.
- LA Γ '44 **Wilson, Joe Robert**; June 22, 2013.
'50 **Apps, Edward William**; April 27, 2014.
'65 **Elkins, John Carroll**; February 14, 2015.
- ME A '47 **Eugley, Jenness Pearl**; April 13, 2013.
'48 **Bibber, John Paul**; March 16, 2015.
'49 **Dearborn, Vance Edward**; April 29, 2016.
'50 **Grimes, Leonard Reynolds**; August 22, 2014.
'50 **Otis Jr., William Bryant**; March 23, 2016.
'51 **Boothby, Robert Coolidge**; March 26, 2014.
- MD A '42 **Friel, Daniel Denwood**; September 21, 2012.
'49 **Houston, James Albert**; August 15, 2013.
'49 **Neu, John Charles**; February 4, 2013.
'50 **Barrack, Carroll Marlin**; April 1, 2015.
'50 **Walter, George Martin**; December 30, 2014.
'51 **Athas, Michael**; July 8, 2013.
'53 **Rodowski, John Charles**; February 24, 2015.
'53 **Skrivan, Joseph Francis**; January 26, 2013.
'64 **Schwartz, Homer Randolph**; December 16, 2012.
'71 **Tracy, James Kenneth**; December 13, 2013.
'78 **Pupek, Anthony Michael**; July 1, 2015.
'84 **Sanstrom, Neal William**; October 8, 2015.
- MD B '44 **Boroson, Harold Robert**; November 6, 2014.
'51 **Dubendorf, Wentworth H.**; June 30, 2013.
'56 **Hartsing, Tyler Frank**; July 29, 2013.
'57 **Bowen, Galt Suter**; January 15, 2006.
'59 **Cromer, Oscar Mays**; July 26, 2012.
'59 **Varley Sr., Thomas H.**; May 20, 2016.
'70 **Deterding, Howard Franklin**; July 18, 2014.
- MA A '49 **Fish, Leonard William**; May 29, 2015.
'49 **Vigneault, Harvey Edward**; October 20, 2014.
'51 **Lewis, Donald Cullen**; July 9, 2012.
'54 **Byrnes, Walter Richard**; no details.
'74 **Demers, David Philip**; August 19, 2012.
'78 **Mikolinnas, Thomas A.**; July 6, 2014.
'87 **Sarr, Timothy**; November 8, 2013.
- MA B '41 **Bohr, Kenneth Alden**; October 2, 2012.
'42 **Gander, Frederick William**; September 23, 2015.
'42 **Jacobson, Robert Irwin**; May 29, 2014.
'45 **Drumheller, Kirk**; March 12, 2015.
'45 **Goldie, Charles Hunter**; February 1, 2014.
'45 **Maglathlin, Robert N.**; February 12, 2014.
'46 **Goodnow, Weston Whitney**; May 28, 2013.
'46 **Gunnarson, John Allan**; April 24, 2013.
'47 **Brenner, Claude Walter**; March 7, 2015.
'48 **Diquilio, Mario Sabatino**; February 26, 2015.
'49 **Somma, Edward Henry**; September 22, 2012.
'50 **Honkalehto, Oswald A.**; December 29, 2013.
'50 **Wolf, Robert Byron**; July 18, 2012.
'51 **Kopple, Kenneth David**; June 30, 2013.
'52 **Neumann Jr., Edward William**; January 24, 2013.
'53 **Wysocki, Joseph John**; November 22, 2014.
'54 **Leonard, Laurence**; June 2, 2014.
'54 **Richardson, David Larrick**; August 3, 2013.
'54 **Weatherill, Warren Hall**; February 18, 2014.
'56 **Ackerberg, Robert Cyril**; January 27, 2014.
'56 **Luthringer, George Francis**; November 13, 2015.
'57 **Simmonds, James Gordon**; 2015.
'58 **Tufts, Donald W.**; August 9, 2012.
'60 **Hart, Timothy Paul**; January 20, 2014.
'60 **Reed, Milton Day**; July 7, 2015.
'61 **Coburn Jr., Joseph Leo**; March 20, 2016.
'62 **Clemens, Jon Kaufmann**; January 7, 2015.
'62 **Dietz, Warren Carlton**; August 3, 2014.
'64 **Hirsch, Michael Seth**; June 13, 2013.
'69 **Madera, Gregory Alan**; March 22, 2014.
'74 **Lebne-Dengel, Zemen**; February 19, 2013.
- MA Δ '41 **Peterson, Stuart Campbell**; August 11, 2012.
'42 **Axelrod, Maynard Joseph**; May 3, 2013.
'45 **Preston, David Bemis**; November 7, 2013.
'45 **Raimondi, Albert Anthony**; May 19, 2015.
'48 **Henchy, William Christopher**; January 20, 2015.
'49 **Sheehan, John F.**; May 23, 2013.
'60 **Blomster, Paul Roger**; May 12, 2016.
'62 **Sierakowski, Joseph John**; January 19, 2014.
- MA E '41 **Bonanno, Joseph Walter**; May 15, 2006.
'50 **Resnick, Bernard**; January 12, 2013.
'52 **Schmidt, Carl Gustav**; December 4, 2014.
'64 **Weinberger, Jay William**; September 21, 2013.
'69 **Butterworth, Charles Edward**; March 31, 2015.
- MA Z '50 **Higgins, William Francis**; December 11, 2013.
'59 **Sullivan, Stephen Joseph**; June 18, 2015.
'61 **Folstad, Sigurd Henry**; July 16, 2014.
'67 **Peterson, Jack Joseph**; August 6, 2015.
'70 **Yaney, John Christopher**; July 4, 2012.
'86 **Deweese, James A.**; December 14, 2013.
- MA H '70 **Dippolito, Paul W.**; August 8, 2012.
- MI A '43 **Bunt, Wallace Roy**; April 8, 2016.
'43 **Liebig, Preston Dean**; December 18, 2014.
'49 **MacCreery, William James**; April 3, 2015.
'50 **Pulkownik, Lawrence Edward**; February 18, 2015.
'51 **Carlson, Roland Henry**; May 18, 2014.
'51 **Hyslop, Frederick W.**; March 26, 2013.
'53 **Mysing, John Oliver**; September 8, 2014.
'57 **Alger, Donald Lavern**; November 25, 2014.
'57 **Ruta, John George**; October 7, 2013.
'57 **Saunders, Neal Thomas**; January 22, 2014.
'65 **Bullock, David Carl**; April 30, 2014.
'67 **Heppenheimer, Thomas A.**; September 9, 2015.
'69 **Robinson, Kenneth E.**; June 20, 2014. [Cent. 99]
'71 **Gilson, Thomas R.**; August 26, 2013.
'77 **Anderson, Dennis Ray**; November 3, 2014.
'78 **Hunkus, Stephen F.**; August 19, 2013.
'78 **Parker, James Eric**; no details.
'93 **Day, Brian Alan**; May 21, 2014.
- MI B '49 **Hollister, Robert J.**; October 18, 2012.
'49 **Mansfield, Elmer Wayne**; October 6, 2012.
'51 **Treviranus, Richard Fowler**; June 9, 2012.
'53 **Laity, Ronald Leonard**; January 25, 2016.
'56 **Autio, George B.**; March 25, 2013.
'61 **Svenson, Raynold Allen**; September 17, 2015.
'64 **Mattson, Bruce Harold**; May 15, 2016.
'82 **Ruska, David Wayne**; June 5, 2013.
- MI Γ '40 **Benford, Harry Bell**; June 6, 2015.
'42 **Ipsen, David Carl**; no details.
'43 **Sessions, Louis William**; May 13, 2016.
'44 **Hasel, Lowell Edward**; May 1, 2014.
'45 **Smith, Emmons Edwin**; August 6, 2014.
'46 **Curtis, Robert Stanley**; January 8, 2014.
'47 **Lamont, Gene Donald**; January 26, 2013.
'48 **Hesse, John Richard**; April 3, 2016.
'49 **Fox, John Arthur**; September 24, 2013.
'49 **Price, Erwin Richard**; March 20, 2014.
'49 **Shurts, Edward Lytle**; January 13, 2013.
'50 **Fredlund, Keith Everett**; October 11, 2012.
'50 **Hannahs, Eugene Ward**; April 17, 2013.
'50 **Kelly, William Harold**; January 14, 2013.
'50 **Rowley, John C.**; October 24, 2013.
'51 **Bergin, Raymond Joseph**; August 30, 2012.
'51 **Fromm, Paul Arthur**; October 23, 2010.
'51 **Victor, Paul Clarence**; October 31, 2014.
'55 **Waltz, Thomas Malcolm**; no details.
'56 **Small, George Edward**; April 7, 2013.
'59 **Fitzjohn, John Leonard**; May 15, 2013.
'62 **Birch, Philip Leonard**; January 31, 2013.
'68 **Abend, William Kent**; September 21, 2013.
'68 **Jenkins Jr., John Curtis**; February 24, 2015.

- '69 **Allen, Glenn Lyle**; June 2, 2014.
 '74 **Plonka, Francis E.**; October 29, 2014.
 '86 **Wu, Bruce Yeung**; October 23, 2012.
 MI Δ '55 **Macy, John Gilbert**; November 18, 2012.
 '61 **Reilly, James Patrick**; July 25, 2012.
 '67 **Mueller, Karl Joseph**; October 13, 2012.
 '67 **Rosauer, Robert Joseph**; September 3, 2015.
 MI E '41 **Walker, James R.**; October 5, 2014.
 '49 **Craig, Harrison Ingersoll**; August 20, 2014.
 '49 **Day, Maurice Norman**; January 20, 2015.
 '58 **Sbroglia, Rudolph A.**; September 16, 2012.
 '76 **Weishaupt, Ronald Alban**; 2015.
 MI Z '47 **Martel, Phillip Armand**; May 2, 2014.
 '48 **Route, William D.**; May 27, 2015.
 MI H '80 **Borys, Matthew John**; September 18, 2012.
 '84 **Marquis, Robert Bruce**; February 12, 2014.
 '87 **Bolton, John Michael**; 2014.
 MI Θ '53 **Witt, Howard Russell**; October 18, 2015.
 MI I '04 **Almas, Keith Leon**; February 17, 2015.
 MN A '38 **Dunning, Kenneth L.**; July 7, 2011
 '41 **Boyum, Burton Hill**; March 17, 2005.
 '46 **Collins, Robert J.**; July 17, 2014.
 '47 **Craig, Lawrence Edgar**; April 9, 2015.
 '47 **Englund, Robert Woodrow**; June 2, 2012.
 '50 **Dean, Lyle Raymond**; no details.
 '50 **Delong, Vincent Richard**; March 30, 2013.
 '50 **Frohbach, Louis Arthur**; April 15, 2013.
 '68 **Crum, Randell Edwin**; September 3, 2012.
 '68 **Seck, James Scott**; June 11, 2014.
 '76 **Romine, Thomas Steven**; April 26, 2014.
 MS A '53 **Bailey, Clentis William**; March 31, 2016.
 '57 **Gassaway, James David**; 2015.
 '60 **Caldwell, Charlie Henderson**; April 29, 2015.
 '70 **Lindamood, Lapsley Stuart**; February 2, 2014.
 MS B '99 **Brinkley, Polly Anne**; October 20, 2013.
 MO A '47 **McKiernan, John William**; April 7, 2016.
 '56 **Kahle, Glenn Willard**; October 19, 2014.
 MO B '43 **Krill, Francis Marion**; November 1, 2014.
 '47 **Dunham, Roy Henry**; May 4, 2016.
 '49 **Bullock, Rupert Eugene**; January 6, 2015.
 '49 **Foster, Jack Dolph**; March 31, 2015.
 '51 **King, Melvin Eugene**; May 24, 2003.
 '51 **Kline, Raymond Milton**; May 31, 2015.
 '52 **Fish, George E.**; July 25, 2014.
 '52 **Hausmann, Paul Lindbergh**; November 29, 2014.
 '53 **Kruger Sr., Rayford Stanley**; May 23, 2014.
 '55 **Best, John Lindon**; October 6, 2015.
 '56 **Altheide, Charles Richard**; January 24, 2015.
 '56 **Brown, Donald Dean Bachelor**; October 5, 2015.
 '58 **Harris, Dale Wesley**; April 25, 2013.
 '61 **Lawler, Willis Dean**; January 7, 2013.
 '62 **Bales, Wayne Ovell**; October 28, 2012.
 '62 **Schild, Roger Allen**; June 20, 2012.
 '67 **Hallett, Michael Dean**; February 1, 2013.
 '72 **Wallace, William Neil**; October 28, 2013.
 '76 **Foster, Carol Lee Edith**; December 23, 2013.
 '80 **Struempff, Dennis Joseph**; December 4, 2013.
 MO Γ '47 **Bell, Arthur Raymond**; September 2, 2014.
 '50 **Berra, John Pacifico**; March 20, 2014.
 '50 **Miller, Owen Winston**; November 26, 2014.
 '51 **Niehaus Jr., Paul Elger**; December 13, 2014.
 '57 **Pearson, Allen Lee**; September 23, 2012.
 '99 **Sonnenfeld, Alan Micah**; February 21, 2015.
 MT A '54 **Holecek, Russell James**; December 14, 2013.
 MT B '85 **Walsh, Kenneth Dale**; June 15, 2013.
 '94 **Koch, Barry Steven**; May 31, 2014.
 '10 **Stavinoha, Joe Neal**; October 16, 2014.
 NE A '93 **Morris, Matthew Thomas**; September 13, 2015.
 NH A '48 **Brown, William T.**; December 19, 2014.
 '48 **Fisher, Leonard Albert**; February 27, 2013.
 '49 **Bonin, Richard Edmond**; January 16, 2013.
 '49 **Cushing, Thomas William**; June 18, 2014.
 '49 **Williams, Earle**; October 17, 2015.
 '53 **Johnson Jr., Carl Edwin**; August 29, 2012.
 '83 **Furber, Mark Edmund**; April 30, 2016.
 NJ A '48 **Ellison, William**; October 26, 2012.
 '49 **Walker, Stuart Douglas**; December 12, 2014.
 '50 **Hildebrandt, William John**; July 18, 2013.
 '50 **McCloughan, Donald Apgar**; March 1, 2015.
 '71 **Barker, Robert James**; no details.
 '72 **Marks, Thomas Alan**; April 1, 2013.
 '72 **Schuckman, Bruce Edward**; January 17, 2014.
 '94 **Hamilton, Christopher Wayne**; August 4, 2014.
 NJ B '56 **Wasielewski, Stanley**; October 21, 2012.
 NJ Γ '49 **Schneider, Frederick William**; January 7, 2016.
 '55 **Zahner, Charles Frederick**; February 15, 2014.
 '57 **Lewis, Roger Kenneth**; October 31, 2012.
 '59 **Butenkoff, George G.**; April 27, 2013.
 '62 **Bednarik, Richard**; June 15, 2014.
 '70 **Mauro, Ralph Joseph**; October 5, 2015.
 '73 **Clark, Charles Warren**; September 29, 2013.
 NM B '05 **Reed, Laura Jean Fischer**; July 20, 2015.
 NY A '48 **Margoshes, Herbert Marvin**; no details.
 '49 **Lustig, Howard Eric**; June 8, 2015.
 '62 **Affinito, Frank Joseph**; June 2, 2012.
 NY B '41 **Saxton, Arthur Leonard**; May 31, 2012.
 '49 **Botsford, Richard Adelbert**; June 16, 2015.
 '49 **Liptak, Leonard Conrad**; September 19, 2015.
 '49 **Schick, Donald Edward**; April 7, 2016.
 '50 **Stickney, Maynard Francis**; October 26, 2014.
 '57 **Cole, Bruce Hubbard**; March 6, 2014.
 '69 **Schrumm, Eric Wenkert**; September 7, 2012.
 NY Γ '43 **Renson, James Eugene**; October 8, 2012.
 '50 **Cleland, Robert Randall**; June 6, 2013.
 '50 **Kiesshauer, Waldon Erwin**; August 16, 2012.
 '53 **Brock, John Phillip**; November 11, 2014.
 '53 **Falk, Theodore John**; May 28, 2013.
 '53 **Susen, Charles Pinckney**; January 26, 2015.
 '53 **Woods, Kenneth Gordon**; April 7, 2013.
 '54 **Young, Ben Wiley**; April 26, 2015.
 '56 **Zipp, Eugene George**; March 15, 2014.
 '57 **Reeves, William Brett**; November 24, 2013.
 '72 **Mounce, William Seibel**; October 29, 2014.
 '81 **Petzold, Jeffrey Scott**; July 23, 2015.
 '82 **Antal, Steven Peter**; November 5, 2013.
 NY Δ '45 **Miller, Herbert E.**; January 25, 2013.
 '50 **Fabbioli, Leon Frank**; June 3, 2013.
 '50 **Gosnell, John Gude**; December 12, 2014.
 '66 **Hugger, Michael Richard**; February 13, 2016.
 NY E '50 **Hermes, Walter Ludwig**; January 25, 2014.
 '52 **Friedman, Eugene Harold**; February 10, 2014.
 NY Z '49 **Klueger, Max**; November 17, 2014.
 '66 **McFeeley, John Jay**; February 5, 2015.
 NY H '41 **Jen, Norman C.**; May 19, 2013.
 '42 **MacKlin, Leo**; January 16, 2013.
 '50 **Gerberg, Bernard**; December 21, 2013.
 '64 **Kircher, Walter Louis**; July 27, 2013.
 NY Θ '50 **Darin, Robert Valentino**; November 7, 2013.
 '52 **German, Glenn Edwin**; January 13, 2016.
 '76 **Greiner, William Emerson**; May 4, 2013.
 '79 **McGlynn, Thomas J.**; August 22, 2012.
 NY I '49 **Weiss, Morris**; November 10, 2013.
 '69 **Gilligan, Leo Edmond**; August 2, 2012.
 NY Λ '42 **Clarke, Daniel Matthew**; December 6, 2012.
 '43 **Schroeder, Kenneth Harry**; April 14, 2016.
 '50 **Pryor, William John**; February 9, 2014.
 NY N '58 **Ruda, Ernest Valentine**; November 16, 2014.
 '91 **Bonafede, Richard Arlen**; October 6, 2015.
 NY Ξ '95 **Kleinsmith Jr., Gene Everett**; May 26, 2014.
 NY O '57 **Gambino, Richard J.**; August 3, 2014.

- NC A '45 **Rhodes, Donald Robert**; September 10, 2014.
 '50 **Osborne, Thomas Zack**; December 1, 1991.
 '56 **Grigsby, Robert Brian**; March 7, 2014.
 '57 **Roberts Jr., Gratz Linwood**; October 3, 2015.
 '58 **Teasley Sr., Ralph Currin**; March 4, 2015.
 '59 **Garren, Donald Lee**; May 2, 2015.
 '61 **Blackwood, Samuel Joyner**; December 23, 2013.
 '61 **Eskridge, Harold Eugene**; April 2, 2015.
 '62 **Steljes, Robert Carlton**; May 11, 2014.
 '62 **Windley, William Thomas**; April 30, 2013.
 '64 **Pittard, James Donald**; June 30, 2013.
 '67 **Ellington, Frederick Horton**; February 6, 2013.
 '82 **Parker, Ronnie Elton**; February 15, 2015.
 '87 **Haas, Lee Clyde**; December 13, 2013.
- NC Γ '48 **Edwards, John Wiley**; May 30, 2012.
 '48 **Gautier Jr., Elmer Henry**; November 28, 2013.
 '50 **Hooven III, Wilbur Thomas**; June 24, 2013.
 '50 **McLean, Howard Jones**; August 25, 2014.
 '56 **Player Jr., Richard Lewis**; March 24, 2015.
 '57 **Arcocha, Humberto Lazaro**; May 3, 2013.
- ND A '49 **Melanson, Laurence Leroy**; May 16, 2016.
 '49 **Wold, John Paul**; March 20, 2014.
 '51 **Myrdal, Robert Wayne**; May 8, 2016.
 '58 **Hoefs, Kenneth William**; 2015.
- OH A '45 **Prince, Fred Joseph**; August 3, 2012.
 '48 **Kaercher, Ralph William**; November 21, 2012.
 '48 **Rondeau, Herbert Frank**; January 29, 2013.
 '51 **Bondor, Frank Samuel**; October 20, 2013.
 '51 **Eppele, Kenneth Ray**; April 9, 2013.
 '51 **Rouse, Carl Albert**; no details.
 '53 **Berg, Norman A.**; March 8, 2016.
 '55 **Hain, Robert Carl**; July 25, 2013.
 '61 **Sokalski, Ronald B.**; January 9, 2015.
 '77 **Feldman, Neil Brian**; July 30, 2015.
- OH B '48 **Hauenstein, Henry William**; April 16, 2016.
 '48 **Lemlich, Robert**; May 12, 2016.
 '51 **Cunningham, Dennis Michael**; no details.
- OH Γ '47 **Cowan, Richard James**; December 9, 2014.
 '48 **Crowley, Thomas H.**; September 25, 2014.
 '48 **Johnson, William Howard**; March 20, 2014.
 '51 **Buehrer, Huber Harry**; August 10, 2014.
 '60 **Merva, George Ellis**; October 13, 2013.
 '60 **Moody, John Arbuckle**; June 8, 2015.
 '61 **Bowers, James Waugh**; July 20, 2013.
 '74 **Deeds, G. James**; no details.
 '77 **Cheney, Thomas Keith**; October 7, 2012.
- OH Δ '50 **Hatschek, Robert L.**; October 13, 2012.
 '69 **Franks, Larry William**; July 20, 2015.
- OH E '50 **Martin, Thomas Addenbrook**; April 23, 2011.
 '81 **Cepulo, Andrew John**; October 8, 2012.
 '85 **Northrup, Virginia Marie**; February 25, 2015.
- OH Z '89 **Hartford, Harry Richard**; December 28, 2012.
- OH H '57 **Robertson, Robert Edward**; July 9, 2015.
 '73 **Graves, Timothy James**; December 8, 2015.
- OH Λ '60 **Wortman, James L.**; October 13, 2014.
 '80 **Barnett, Kenneth Gene**; May 30, 2013.
- OH M '70 **Bullock, Ronald D.**; June 8, 2016.
- OK A '43 **Kauffmann Jr., Howard C.**; May 3, 2016.
 '51 **Osborne, Roger Donald**; October 28, 2003.
 '62 **Bates, William Ellison**; January 17, 2013.
 '69 **Baudo, Paul**; September 16, 2014.
- OR A '50 **Olson, Adrian Duane**; October 23, 2015.
 '51 **Pappas, John William**; October 4, 2014.
 '58 **Van Nortwick, Kenton Gale**; October 13, 2013.
 '65 **Sisson, Richard Mark**; December 25, 2012.
- PA A '42 **Clark, John Fulmer**; November 18, 2012.
 '46 **Seasholtz, Elwood Franklin**; September 22, 2015.
 '49 **Rubenstein, Albert Harold**; April 13, 2013.
 '51 **Manley, Francis McVeigh**; October 13, 2012.
 '52 **Fisher, Neil Allan**; March 31, 2014.
- '55 **Scavuzzo Jr., Rudolph Joseph**; April 24, 2016.
 '56 **Macri, Frank Joseph**; November 5, 2013.
 '58 **Steward, George Synder**; June 14, 2014.
 '59 **Umbach, Paul Ernest**; July 15, 2013.
 '60 **Hoffman, Richard Bruce**; December 30, 2013.
 '67 **Gower, Ronald Charles**; December 26, 2013.
 '74 **Hobert, Ward Thomas**; May 27, 2013.
 '83 **Malkemes Jr., Kenneth Lee**; April 14, 2016.
- PA B '45 **Thompson, Arthur Totten**; May 9, 2015.
 '47 **Long, Judson Hubbard**; February 20, 2015.
 '55 **Miller, Donald Ray**; August 26, 2013.
 '60 **Warren, James Alexander**; September 13, 2013.
 '66 **Unger, James Louis**; December 12, 2012.
 '95 **Maund, Brion Richard**; January 31, 2013.
- PA Γ '48 **Moore, Stewart Fawcett**; June 22, 2014.
 '48 **Pollock, John Sardis**; December 4, 2013.
 '52 **Lechner, Robert Joseph**; September 16, 2014.
 '64 **Kownacki, Joseph Walter**; January 11, 2013.
- PA Δ '60 **Kapadia, Bipin Raghavgi**; January 27, 2014.
- PA E '42 **Herbert, Robert Williams**; March 6, 2004.
 '60 **Kopes, Edward Stephen**; August 14, 2014.
 '62 **Ealer, George Edward**; August 17, 2013.
 '69 **Kerecz, Joseph Stephen**; April 5, 2013.
 '75 **Miller, Charles Raymond**; August 20, 2012.
 '81 **Ney, William Alan**; October 10, 2012.
- PA Z '43 **Cowell, Allan Tyler**; December 6, 2014.
 '44 **Steinberger, Earl Nathan**; September 15, 2012.
 '47 **Biberman, David Marcus**; September 13, 2015.
 '47 **Hough, Robert R.**; February 26, 2014.
 '47 **Hutchinson, James Oliver**; February 14, 2014.
 '49 **Goetze, Alfred John**; December 9, 2014.
 '52 **Cochrane, Gordon Schaefer**; January 23, 2015.
 '52 **Fees, Charles Edward**; January 17, 2015.
 '52 **Girvin, Edward Thomas**; July 3, 2014.
 '54 **Coren, Richard L.**; June 16, 2014.
 '54 **Koros, Peter Joseph Michael**; January 13, 2013.
 '57 **Winterbottom, Walter Leon**; December 9, 2013.
 '59 **Stein, Charles Richard**; September 27, 2012.
 '65 **Kline, Laurence Earl**; April 17, 2014.
 '67 **Jeryan, Richard Ara**; June 25, 2015.
 '70 **Conway, Dennis John**; January 11, 2013.
 '70 **Welsch, Frank Anthony**; August 8, 2015.
- PA H '49 **Lipman, Robert Gerson**; January 4, 2013.
 '49 **Reed, Benjamin Daniel**; June 20, 2013.
 '56 **Holmes, Donald Maurice**; April 10, 2015.
- PA Θ '55 **Burke, Richard Daniel**; February 13, 2013.
 '65 **Strong, Robert Michael**; July 7, 2015.
 '70 **Kempf, Frank Joseph**; November 12, 2013.
 '84 **Hallahan, Richard Warren**; October 19, 2013.
- PA I '50 **Van Der Ploeg, George W.**; November 26, 2012.
 '74 **Grigg, William Clyde**; August 2, 2012.
 '86 **Mele, Peter Paul**; April 3, 2014.
 '91 **McKeon, Jeffrey D.**; November 20, 2013.
- PA K '46 **Jacobs, H. Warren**; June 15, 2012.
- PA Λ '75 **Loscar, James H.**; May 10, 2013.
 '78 **Larouere, Patricia Anne**; July 26, 2013.
 '84 **Young, Raymond Alan**; April 29, 2013.
 '96 **Beisheim Jr., Richard Frank**; October 28, 2013.
- RI A '46 **Lee, Frederick Nelson**; August 3, 2012.
 '49 **Wetzel, Lewis Bernard**; no details.
 '50 **Torberg, Herbert Einar**; June 15, 2014.
 '54 **Bartlett Jr., Norman Davison**; March 3, 2015.
 '66 **Ross, Bruce Brian**; August 8, 2012.
- RI B '49 **Ferrante, William Robert**; June 14, 2014.
 '50 **Demarco, Michael**; December 27, 2014.
 '59 **Cooney, Richard Thomas**; November 27, 2014.
 '60 **Rogers, David Herbert**; July 27, 2013.
 '63 **Antinucci, Joseph Domenic**; February 21, 2013.
 '69 **Conte, James Albert**; February 25, 2015.
 '71 **Gadoury, Paul James**; August 15, 2014.

- '80 **Dobson, Gary A.**; February 28, 2015.
 '88 **Seigny, David A.**; November 17, 2014.
 '97 **Laperche, Allan Lucien**; January 12, 2015.
 SC A '40 **Bradbury, Douglas Wilson**; August 11, 2012.
 '82 **Vandeven, James A.**; no details.
 '07 **Anderson, Patrick Keith**; August 15, 2014.
 SC B '49 **Crewz, John Morton**; August 18, 2012.
 '73 **Babcock, Mark Richard**; July 4, 2015.
 SC Γ '41 **Mayes, Whitefield W.**; April 12, 2013.
 '53 **Burch, Cecil Arthur**; February 6, 2013.
 TN A '43 **Frassrand, Michael Aloysius**; August 14, 2014.
 '47 **Kahn, Jack Henry**; May 24, 2014.
 '48 **Barnhart, Philip William**; March 31, 2016.
 '48 **Gallaher Sr., Richard Ballou**; May 25, 2016.
 '48 **Schwerin, Carl Joseph**; May 31, 2016.
 '49 **Haynes Jr., Wesley Mann**; November 22, 2013.
 '50 **Fincannon, Al George**; February 16, 2014.
 '53 **Blakely, Charles Edward**; no details.
 '53 **Watkins, Joseph Douglas**; July 19, 2007.
 '54 **Lee, Ying C.**; March 30, 2016.
 '56 **Keen, Edward Shain**; June 5, 2016.
 '57 **Couts, Dixie Wayne**; October 23, 2014.
 '58 **Lavin, William Peter**; December 5, 2013.
 '64 **Irwin, Sibley Ronald**; May 8, 2016.
 TN Γ '58 **Thompson, William James**; June 15, 2015.
 TN E '50 **Shockley Jr., Thomas D.**; May 28, 2015.
 '76 **Beach, Kerry Bruce**; no details.
 TX A '48 **Porcher, Calvin Etheridge**; March 25, 2016.
 '50 **Peterson, Francis Dale**; January 31, 2013.
 '56 **Fick Jr., William George**; September 24, 2013.
 '60 **Robinson, Don Shane**; March 25, 2016.
 '62 **Miller, Roy Eugene**; March 29, 2016.
 TX B '41 **Parrish, Clifford Marion**; April 19, 1987.
 '52 **Messersmith Sr., Robert C.**; November 7, 2007.
 TX Γ '45 **Hartsook, Edmund Arthur**; no details.
 '49 **Swingle, Michael Patrick**; September 7, 2013.
 '57 **Norman, Hilary Milord**; June 9, 2014.
 '80 **Agatstein Jr., Louis Wilton**; June 25, 2013.
 TX Δ '41 **Oliver, William McClellan**; June 3, 2013.
 '46 **Gregg Jr., John Ernest**; 2016.
 '47 **Autry, Aaron Enloe**; October 20, 2012.
 '49 **Thompson, Louis Jean**; September 19, 2013.
 '50 **Hope Jr., Alvin Chappell**; April 29, 2016.
 '50 **Hughes, Roy Neal**; April 12, 2015.
 '50 **Marak, Kenneth Joseph**; April 8, 2013.
 '50 **Myre, William Charles**; September 7, 2012.
 '54 **Russo, Anthony Sam**; August 26, 2013.
 '59 **McDaniel, William Noel**; October 2, 2015.
 '60 **Zetik, Donald F.**; December 16, 2012.
 '61 **Minor, John**; October 1, 2014.
 TX E '42 **Petersen, Elwin Laverne**; March 20, 2014.
 '49 **Mull, Horace Houk**; March 14, 2014.
 TX Z '58 **Haas, Gregory Mendel**; March 17, 2013.
 TX ⊖ '90 **Nebhan, Kenneth George**; March 31, 2014.
 TX Δ '59 **Todd, Donald Enos**; December 25, 2013.
 UT A '48 **Andersen, Richard Kendall**; September 21, 2015.
 '52 **Holland, Lester Kaye**; May 31, 2012.
 UT Γ '83 **Embry, Leo James**; May 25, 2014.
 VT A '72 **Perron, Eric Donald**; April 29, 2013.
 VA A '45 **Birnie Jr., Clotworthy**; October 19, 2012.
 '48 **Feild, Robert Beverley**; August 9, 2012.
 '53 **Burgess Jr., William Harold**; June 1, 2015.
 '57 **Smith Jr., James Samuel**; no details.
 '61 **Jander, Mark Henry**; January 15, 2015.
 '74 **Baum, Paul Wallace**; March 2, 2013.
 VA B '36 **Costan, George Arthur**; September 23, 2012.
 '43 **Watkins, Peter Haynes**; February 8, 1992.
 '47 **Lampe, Robert Wesley**; February 16, 2014.
 '50 **Carden Jr., Carl Iven**; November 26, 2013.
 '50 **Sommers, Roy Addison**; April 20, 2013.
 '52 **Beck, Charlie Aaron**; February 13, 2015.
 '53 **Osborne, John McKinley**; no details.
 '59 **Crowson, Revel Dennis**; September 20, 2013.
 '64 **Herrington, William A. D.**; November 28, 2015.
 '76 **Kerr, John Vincent**; September 6, 2015.
 '82 **Royster, Darryl W.**; April 14, 2015.
 '93 **Hale, Wesley Raymond**; July 16, 2012.
 VA Γ '73 **Kohn, Bernard Andrew**; April 18, 2013.
 '78 **Miller, James Bell**; August 4, 2013.
 WA A '50 **Prather, Samuel Earl**; February 1, 2016.
 '56 **Ross, Darrell LaVerne**; June 20, 2006.
 '56 **Sussex, George R.**; no details.
 '57 **Nodland, Wayne Ender**; June 2, 2013.
 '61 **Huelsdonk, Robert Adolph**; November 24, 2014.
 '61 **MacGregor, Robert Keith**; February 23, 2014.
 '62 **McHenry, John Patrick**; May 9, 2016.
 '62 **Poole, Richard Woodrow**; September 28, 2015.
 '79 **Gaston, Darrell Wayne**; February 1, 2013.
 WA B '42 **Lewis, Roy Vernal**; July 30, 2014.
 '49 **Nelson, Sandy Hilton**; March 23, 2016.
 '49 **Swanson, David Paul**; June 25, 2014.
 '49 **Verhei, Vernon Anchor**; December 3, 2012.
 '52 **Tonder, James Albin**; March 9, 2013.
 '58 **Acheson, William Allan**; December 19, 2012.
 '59 **Bell, James Earl**; June 21, 2012.
 '59 **Hanneman, Rodney Elton**; August 21, 2013.
 WA Γ '64 **Mac Isaac, James Wallace**; December 6, 2014.
 WA Δ '74 **Bailey, Gardner Stanton**; March 23, 2016.
 WV A '50 **Stephenson Jr., Allan A.**; September 9, 2014.
 '51 **Palowitch, Eugene R.**; August 10, 2013.
 '71 **Garvick, Charles Stanley**; December 14, 2012.
 '76 **Blasingame, James Dale**; May 28, 2015.
 '76 **Lutz, Steven Allen**; January 9, 2015.
 WI A '44 **Luecker, George Edwin**; April 1, 2016.
 '49 **Steele, Thomas Salisbury**; August 5, 2014.
 '50 **Boyle, Robert Chenoweth**; March 19, 2014.
 '50 **Fisher, Donald Lee**; January 7, 2015.
 '50 **Johnson, Robert Royce**; March 25, 2016.
 '56 **Akey, John Gordon**; October 18, 2015.
 '59 **Frey, Anthony L.**; October 29, 2014.
 '72 **Morley, Roger Stevens**; December 2, 2013.
 '72 **Wildenberg, John Thomas**; March 9, 2013.
 '77 **Lashua, Duane Walter**; October 6, 2012.
 '80 **Thews, Eric Richard**; November 24, 2014.
 '84 **Freeman, Jeffrey Scott**; January 30, 2013.
 WI B '44 **Warekois, Edward P.**; April 29, 2014.
 '45 **Bridges, Robert Bruce**; May 29, 2012.
 '49 **Hambuch, George Mathias**; December 7, 2012.
 '50 **Hessling, George Nicholas**; August 21, 2012.
 '53 **Pritzlaff, Herbert Edward**; June 22, 2014.
 '56 **Huber, James William**; January 8, 2014.
 '59 **Burghardt, Robert Raymond**; December 14, 2013.
 '60 **Brault Jr., Adelard Lionel**; February 13, 2007.
 '69 **Kohl, Frederick William**; December 24, 2013.
 WY A '66 **Land, Carlon Sanford**; November 3, 2012.
 '77 **Jelaco, Paul**; September 22, 2012.



Brain Ticklers

RESULTS FROM SPRING

Perfect

*Bohdan, Timothy E.	IN	Γ	'85
*Christianson, Kent B.	CA	Δ	'85
Crawford, Martin	TN	A	'54
*Gerken, Gary M.	CA	H	'11
*Griggs Jr., James L.	OH	A	'56
*Gulian, Franklin J.	DE	A	'83
Gulian, William F.		Member's son	
*Hackstock, Tobias D.	MI	H	'02
*Harpole, George M.	CA	E	'74
*Johnson, Mark C.	IL	A	'00
*Kimsey, David B.	AL	A	'71
Minnick, Michael V.	SC	A	'81
*Norris, Thomas G.	OK	A	'56
*Prince, Lawrence R.	CT	B	'91
*Richards, John R.	NJ	B	'76
Riedesel, Jeremy M.	OH	B	'96
*Schmidt, V. Hugo	WA	B	'51
Shepperd, Stanley W.	MA	B	'70
*Slegel, Timothy J.	PA	A	'80
*Spong, Robert N.	UT	A	'58
*Strong, Michael D.	PA	A	'84
*Widmer, Mark T.	OH	A	'84
Willman, Christopher R.	WA	A	'94

Other

Alexander, Jay A.	IL	Γ	'86
Aron, Gert	IA	B	'58
Beaudet, Paul R.		Member's father	
Brule, John D.	MI	B	'49
Bunch, Christopher		10th grade	
Colbourne, Richard J.	PA	E	'78
Colbourne, Jessica		Member's daughter	
*Couillard, J. Gregory	IL	A	'89
Handley, Vernon K.	GA	A	'86
Harvey, Arthur J.	OH	A	'83
Jones, Donlan F.	CA	Z	'52
Jones, John F.	WI	A	'59
Jones, Jeffery C.		Member's son	
Jordan, R. Jeffrey	OK	Γ	'00
Katz, Robert P.	NY	P	'89
Lalinsky, Mark A.	MI	Γ	'77
Partanen, Thomas A.	MI	B	'70
Pendleton III, Winston K.	MI	Γ	'62
Quan, Richard	CA	X	'01
Rentz, Peter E.	IN	A	'55
Rentz, Mark		Member's son	
Routh, Andre G.	FL	B	'89
Schweitzer, Robert W.	NY	Z	'52
Sigillito, Vincent G.	MD	B	'58
Snodgrass, Brian W.	IN	Δ	'06
*Spring, Gary S.	MA	Z	'82
*Stribling, Jeffrey R.	CA	A	'92
Summerfield, Steven L.	MO	Γ	'85
*Voellinger, Edward J.		Non-member	
Wetterlind, Eric J.	MN	B	'93

* Denotes correct bonus solution

Don A. Dechman, TX A '57, is calling it quits and retiring after 20 years of faithful service as a Brain Ticklers judge. **Jeffrey R. Stribling**, CA A '92, a longtime solver of Brain Ticklers with a sound record of correct answers, has agreed to take his place. Jeff will be writing the winter columns from now on.

SUMMER REVIEW

The Spring Ticklers appear to have been relatively easy, as almost half the entries were perfect. Of the regular problems, No. 2, about the divisibility of an expression by 4^n , was the most difficult, but even it received 75% correct answers. All the other problems, including the Bonus, had over 90% correct solutions. The Double Bonus (3rd grade test problem) elicited some really ingenious replies.

SUMMER SOLUTIONS

1 The shortest distance between the two cities is **9511 km**. The radius at the equator of Topsis is 4000 km, so the circumference of the planet is $2\pi 4000$ km. The distance along the equator between Topsy and Turvy is 4000π km. Pythagoras tells us that the surface distance from the equator to a Topsis pole is $\sqrt{(4000^2 + 3000^2)} = 5000$ km. Project the surface of half a "hemisphere" onto a plane as a circular sector with radius $r = 5000$ km and minor arc length $L = 4000\pi$ km. The central angle of the arc is $\theta = L/r = 0.8\pi$ radians. The shortest distance between the two cities is a chord that connects the endpoints of the arc. The length of the chord is given by the common formula $(2r)\sin(\theta/2) = 2(5000 \text{ km})\sin(0.4\pi) = (10000\text{km})(0.951056) \approx 9511$ km.

2 The expected difference for 10000 flips is **79.79**. For n flips, there are 2^n equally possible outcomes, and sum of the absolute differences for those outcomes is $2 \sum_{i=0}^{\lfloor n/2 \rfloor} C(n,i) (n-2i)$, where $C(m,k)$ is the combination function $m!/[k!(m-k)!]$.

Empirically, we observe that $EV(1) = 1$. For n even, $EV(n) = EV(n-1)$, and for n odd, $EV(n) = EV(n-2) [n/(n-1)]$. A simple recursive program computes that $\prod(\text{odd ints } \leq 10000) / \prod(\text{even ints } \leq 10000) = 79.786$. Alternatively, $EV(n) = (2 \sum_{i=0}^{\lfloor n/2 \rfloor} C$

$(n,i)(n-2i))/2^n = (\sum_{i=0}^{\lfloor n/2 \rfloor} nC(n,i) - 2 \sum_{i=0}^{\lfloor n/2 \rfloor} iC(n,i)) / 2^{n-1} = (n \sum_{i=0}^{\lfloor n/2 \rfloor} C(n,i) - 2n \sum_{i=0}^{\lfloor n/2 \rfloor} C(n-1,i-1)) / 2^{n-1} = n(\sum_{i=0}^{\lfloor n/2 \rfloor} C(n,i) - 2 \sum_{i=0}^{\lfloor n/2 \rfloor} C(n-1,i)) / 2^{n-1}$. Observe that the difference of the two sums is the difference between two successive lines in Pascal's triangle, so we get the closed form for $EV(n) = n C(n-1, \lfloor (n-1)/2 \rfloor) / 2^{n-1}$. The closed form, which can be rewritten as $n! / 2^{n-1} (\lfloor (n-1)/2 \rfloor! (\text{ceiling}((n-1)/2)!)$, is still laborious to compute for large n . Using Stirling's approximation $n! \sim \sqrt{(2\pi n)}(n/e)^n$, we can see that as n gets large, $EV(n) \sim \sqrt{(2n/\pi)}$. For $n = 10000$, this approximation yields 79.789.

3 1112113122123132133222333311
Start by listing the 27 possible three-digit combinations in numerical order. Then, begin with 111 and add successively the smallest number available (cross off each combination as you use it). The first few additions would be 112 (the smallest after 111) to give 1112. Next, add 121 to give 11121; then 211 to give 111211; then 113 to give 1112113; then 131 to give 11121131. Now, we would like to use 311, but we can't, because there are no more combinations 11x, so we have to use 312 to give 111211312. Proceeding in this way gives the sequence shown above. Remember that the sequence bends around to form a circle.

4 Denmark won 4, Estonia 3, Azerbaijan 2, Cyprus 1, Belarus 0. Each team played each other team once, and since each won a different number of games, there is a strict hierarchy to the teams. That is, every team beat all others that won fewer games than themselves and lost to all others that won more. Three games were won by the away team, which means two were won by Team 4, and one by Team 3. Team 0 lost twice at home, and Team 2 once. A=2 was given, and since B and C played at A, B<2 and C<2, so D>2 and E>2. D was home to E, so

$D > E$, and $D=4$, $E=3$. Since B played away at C, then $B < C$, so $B=0$, $C=1$.

5 The thirteen digits are **1153721781101**. The first digit is, by definition, 1, so $10^0 \rightarrow 1$. Single digit integers fill the first 9 places of the string. There are 90 two digit integers that extend the string to $9 + 2(90) = 189$ places. Three digit integers fill the string to $189 + 3(900) = 2,889$ places. And so on, until we see that all integers ten digits or smaller cover 98,888,888,889 places, and with eleven digit integers, 1,088,888,888,889 places are covered. Therefore, the 10^{12} place is filled by the $(1,000,000,000,000 - 98,888,888,889) = 901,111,111,111^{\text{st}}$ place of eleven digit integers. $901,111,111,111 / 11 = 81,919,191,919$ remainder 2, so the required digit is at place 2 of 91,919,191,919, or 1. Similar reasoning for places of smaller magnitudes: for 10^{11} , place 11 of 10,101,010,100 is 0; 10^{10} , place 1 of 1,111,111,111; 10^9 , place 1 of 123,456,790; 10^8 , place 7 of 788,888,889; 10^7 , place 4 of 1,587,301; 10^6 , place 1 of 185,185; 10^5 , place 1 of 22,222; 10^4 , place 3 of 2,777; 10^3 , place 1 of 370; 10^2 , place 1 of 55. The first and tenth digits are clearly 1, so the sequence of 13 digits is 1153721781101.

Bonus The travelers lifted off at **9:35pm GMT**. Let t_{GMT} and t_{space} be the time the conversations start. Call s the start/launch time. The clocks are synchronized at start, so s_{GMT} and s_{space} are identical. Interpreting the four space travelers' statements, here are the relevant facts:

- At time $t_{GMT}(t_{space})$, D says that it is after 11:30pm.
- At $t_{GMT}+5(t_{space}+10)$, A says that it is *10 minutes past the hour*. A also states that in *23 minutes* it will be $150-34=116$ minutes since they set off.
- At $t_{GMT}+10(t_{space}+20)$, B says that it is before *10:00 pm* and before 10:30pm.
- C says that C and A are honest, and B and D are liars.

The statements made by B and D are inconsistent because it can't be both after 11:30 pm and then 20

minutes later, before 10:30 pm. At least one of the two is a liar.

C states that C and A are honest and that B and D are liars. If C is a liar, then both B and D must be honest. But we've shown that one of B and D must be a liar, therefore C and A are honest and B and D are both liars.

From A, known to be honest, we can infer that t_{GMT} is *5 minutes past the hour*. Also, since 116 minutes is *58 minutes GMT*, $s = t_{GMT}+5+23-58 = t_{GMT}-30$ or $s = t_{space}-60$. We conclude that s and t_{space} are both 35 minutes past the hour.

B is known to be a liar. Therefore at $t_{space}+20$, it must be after 10:30 pm. So t_{space} is after 10:10pm.

D is also a liar, so t_{space} is 11:30 or before.

Combining that t_{space} is 35 minutes past the hour, before 11:30pm, and after 10:10pm, $t_{space} = 10:35\text{pm}$ and $s = 9:35\text{pm GMT}$.

Computer Bonus. For the year **1998**, the 24 digit number **556,111,667,222,778,333,889,445** is the shortest number that can be multiplied by the year to get a product which has only zeros and ones. The judges' programs cycled through potential legal products, searching for the smallest which was evenly divisible by the year. More than 268 million products were examined to find the shortest in 1998. Of course, support for arbitrary precision integers is key to a programmed solution. One judge used REXX, another Java. Running times ranged from a few minutes to a few hours, depending upon the language and hardware used. The second longest minimum multiplier is for 1980 which is only 16 digits long and required the examination of little more than 1 million products.

NEW FALL PROBLEMS

1 Solve: ONE / FIVE = .TWO with TWO being even. Different letters are different digits and there are no leading zeros.

—*Journal of Recreational Mathematics*

2 John is shopping for a used car and has found one being offered by Alice for \$12,000, based on \$2,000 down and a \$10,000 balance to be paid to Alice over 36 months at 6% (annual) simple interest paid monthly on the unpaid balance (John's monthly payments would be $\$10,000/36 + \text{unpaid balance} \times 0.06/12$). However, if he pays cash, he can get a reduction of D dollars so the cash payment would be $\$12,000 - D$. Although Alice will finance the car at 6%, she believes she can better invest her money at 10% elsewhere. If the 36 monthly payments are discounted to the present at a rate of 10%, how big a reduction in the cash price (to the nearest dollar) can Alice afford to give John so that buying the car for a single cash payment and the net present value of financing over 36 months (plus \$2,000 added to account for the down payment), are equivalent propositions? Assume all months have 30 days, and a year is 360 days.

—**John W. Langhaar†**, PA A '33

3 Algernon, Basil and Clarence are either English or Irish, either Conservative or Liberal, and either Protestant or Catholic. In each case there is, as they all know, at least one of each.

None of them know which the others are, but Algernon and Basil have both been told that if Clarence is an Irish Catholic he cannot be a Liberal.

Basil asks Algernon whether he is a Conservative or a Liberal, and whether he is English or Irish. Algernon tells him.

After a pause for reflection, Basil is able to announce correctly the full particulars (English or Irish, Protestant or Catholic, Conservative or Liberal) of both Algernon and Clarence.

What are the particulars for the three men?

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

4 Our library has several copies of Boremaster's commentary on Hegel. It is not exactly a jolly read, as you

well know if you have ever waded through its 36 chapters, but is much in demand on the grounds that it is less painful than Hegel himself. Even so, I was surprised to see my friend Jones leaving the library with three copies under his arm. "Steady on, old bean," I exclaimed, "there are other readers to think of."

"The other copies are all on the shelf," he replied airily, "but I had to take three to get a complete text. Some rotter has snipped whole chapters out of every copy."

"Well, surely two copies would have done."

"No, no two copies would yield a full text."

"Do you mean that I shall have to check every copy if I want to be sure of a full text?"

"Oh no. Just take any three at random, as I did. You are bound to get a full text, even though no chapter is present in all copies. For each pair of chapters there is at least one copy with only one of them."

For this to be true, what is the minimum number of copies that the library have in total? Also, provide an N row by 36 column matrix, where each row represents a copy of the book, each column represents a chapter, and each element of the matrix is either 1 if the chapter is present in the indicated copy or 0 if the chapter is absent.

—a Tantalizer by Martin Hollis in *New Scientist*

5 A hexagon inscribed in a circle has side lengths of 2, 2, 2, 11, 11, and 11. What is the exact radius of the circle?

—Puzzle Corner in *Technology Review*

Bonus Sally's Spa has installed a security system consisting of a row of N switches wired so that, unless

the following rules are followed, an alarm will go off: (1) the switch at the far right can be turned on or off at any time and (2) any other switch may be turned on or off only if the switch to its immediate right is on and all other switches (if any) to its right are off. If all N switches are initially on, what is the least number of moves required to deactivate (all switches off) the alarm system? A move consists of turning a switch on or off. Express your answer without using recursion or summation. You can use $(N \bmod 2)$ or $(-1)^N$ as a way to find even versus odd.

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

Computer Bonus Let $f(N)$ be the smallest positive integer whose prime factorization contains the N digits 1 to N each exactly once. So, $f(3)=26=2 \times 13$. Find $f(N)$ and its

prime factorization, for N equal to 4 through 9, inclusive.

—Adapted from Puzzle Corner in *Technology Review*

Postal mail your answers to any or all of the Brain Ticklers to Curt Gomulinski, Tau Beta Pi, P. O. Box 2697, Knoxville, TN 37901-2697 or email to BrainTicklers@tbp.org as plain text only. The cutoff date for entries to the Fall column is the appearance of the Winter *Bent* in late December (the digital distribution is several days earlier). The method of solution is not necessary. We welcome any interesting problems that might be suitable for the column. The Computer Bonus is not graded. Curt will forward your entries to the judges who are **H.G. McIlvried III, PA Γ '53**; **J.C. Rasbold, OH A '83**; **J. R. Stribling, CA A '92**; and the columnist for this issue, **F. J. Tydeman, CA Δ '73**

SUPPORT OUR STUDENTS

FUND A FELLOWSHIP OR SCHOLARSHIP

Ruth and Cleve, IA A '47, Campbell with TBPi Scholars at the Convention. They have funded dozens of Campbell Scholarships and permanently endowed two scholarships.



Undergraduate Scholarship:

\$2,000 gift – one year award, or \$1,000 gift – one semester award

\$40,000 gift – permanently funds one annual scholarship

Graduate Fellowship:

\$10,000 gift – one year stipend

\$200,000 gift – permanently funds one annual fellowship

To sponsor a TBPi fellowship or scholarship, contact Patricia McDaniel, Director of Development (pat@tbp.org). Phone: 865-546-4578

\$\$ Benefit for Members

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



Did you know that GEICO provides a discount to Tau Beta Pi members on their auto insurance, which benefits Tau Beta Pi whenever a member gets a quote? Members could save up to an additional 8 percent on car insurance. Also, GEICO can help you find great insurance rates on motorcycle, homeowners,

renters, boat, and much more. Get a free quote today to see how much you could save with GEICO. It will be a very wise decision! Visit <http://www.geico.com/greek/tbp> or call 1-800-368-2734 for your free quote.

LONGHORNS' CENTURY MARKED



Texas Alpha celebrated 100 years on the University of Texas campus in Austin on April 9. Members from the late 1950s to current initiates and advisors were present for the celebration. Decades worth of chapter scrapbooks were on display for alumni to reminisce. Texas Alpha's current president, Amber D. Dressler, started the dinner by showing a video of current members discussing why they love our organization. Dean Sharon L. Wood, Ph.D., *Virginia Alpha '82*, spoke about her involvement in TBPi and the current state of the Cockrell School. Kelly Hammar, D10 Director, presented a centennial plaque to the current officer team. The event concluded with three members performing "Tau Beta Pi, to You," followed by the Tau Beta Pi yell.

ALUMNI CHAPTER INSTALLED IN SAN DIEGO



The **Greater San Diego Alumni Chapter** was officially installed by Executive Director Curtis D. Gomulinski in conjunction with the District 16 Conference on Saturday, April 16. Students attending the conference joined area alumni for dinner at Fuddrucker's and the installation ceremony. Martha B. Lachmayr-Pomes, chair of the chapter, accepted the charter. Email the chapter at SanDiegoTBPAlumni@gmail.com to hear about their upcoming activities and Convention.



- The **Tucson Alumni Chapter** was officially installed by Executive Director Curtis D. Gomulinski on April 24.
- Nineteen alumni, 6 undergraduates, and 9 guests joined the Executive Council, Executive Director, Director of Alumni Affairs, and the four **Chicago Alumni Chapter** officers at Gino's East River North in Chicago for dinner on June 11.
- President J.P. Blackford and Executive Director Gomulinski enjoyed dinner with 7 alumni, 3 guests, and 3 students at the Great Dane Brewery in **Madison, Wisconsin**, on June 12.
- The **Richmond Alumni Chapter** was reactivated on August 10 at a gathering with President Blackford.

To join an alumni chapter, contact the Director of Alumni Affairs, Tricia Gomulinski, at tricia@tbp.org.

Headquarters staff are available to take your calls from 7:30 a.m. to 5:00 p.m. ET, Monday through Friday at 865/546-4578. The office will be closed in observance of the following holidays:

- | | | | |
|-------------------|--------------------|-----------------------------|------------------|
| • New Year's Day | • Memorial Day | • Thanksgiving | • Christmas |
| • President's Day | • Independence Day | • Friday after Thanksgiving | • New Year's Eve |
| • Good Friday | • Labor Day | • Christmas Eve | |



ALUMNI NOTES

Alabama Alpha

Kasey M. Cooper, '18, was named the ELITE 90 award winner. This is



given annually "to an athlete who has achieved the highest cumulative GPA among

her peers, while competing at a championship level." Cooper has a 4.0 GPA while majoring in mechanical engineering at Auburn. Other recent accolades include SEC Player of the Year, first-team All-America by the National Fastball Coaches Association, and being the SEC Scholar Athlete of the Year.

Daryl B. Russell, Ph.D., P.E., '88, has become planning and engineering manager



for Mobile Area Water and Sewer System (MAWSS) in Alabama. He will focus on project management, system planning, and future

growth. Previously, Russell was vice president of engineering for McCrory-Williams, Inc., and brings more than two decades of experience as a consulting engineer to MAWSS.

California Alpha

Joyce H. Keyak, Ph.D., '82, has become a fellow of the American



Institute for Medical and Biological Engineering for contributions to imaging and skeletal biomechanics. She is professor in residence of radiological sciences

at UC Irvine School of Medicine. Keyak is widely recognized for using engineering principles to treat bone

problems. She developed a technique to evaluate hip bone strength for people with osteoporosis and bones susceptible to fracture. Collaborating with NASA, Keyak is also working on osteoporosis in astronauts who serve on long missions.

California Tau

Matthew J. Traum, Ph.D., '01, has joined Philadelphia University as



director of engineering programs. He will lead both graduate and undergraduate engineering and mechanical engineering programs. Traum was an

assistant professor of mechanical engineering at Milwaukee School of Engineering.

Illinois Delta

José R. Sánchez, Ph.D., '00, has been chosen by the University of Indiana-



napolis to lead its new engineering programs. He will serve as director of UIndy's software engineering and industrial and systems engineering degree

programs and will be an associate professor of physics and earth space science. Previously, Sánchez was an associate professor of electrical and computer engineering at Bradley University, where he served served as an Advisor to IL Δ.

Iowa Alpha

Mary J. Wickham, Ph.D., '80, has been named associate dean for operations and planning at the Iowa State University college of



engineering. She joined ISU in 2015 as an adjunct professor in aerospace engineering after a 20-year career in management and leadership positions at Caterpillar, Inc. In her new role, she will "oversee operations and strategic planning."

Massachusetts Epsilon

Jillian L. Goldfarb, Ph.D., '04, has been awarded a teaching/research



Fulbright for her project "Global Insights into Sustainable Energy Engineering" at the University of Trento, Italy. For this award, she will develop

a course for the energy engineering graduate program at the University of Trento. She is research assistant and professor of mechanical engineering and materials science and engineering at Boston University, and an Advisor of MA H.

Michigan Beta

Andrew H. Rosenberger, Ph.D., '86, has received the American Society



for Testing and Materials International award of merit for his work in the area of metals fatigue and fracture. He is an engineer with the Air Force

Research Laboratory materials and manufacturing directorate, where he leads the engine organic life assessment program, working to determine and extend the useful life of F100-220 engine fracture-critical components using existing data.

New York Kappa

Richard R. Andre, C.S.P. '96, is now an associate pastor with the Missionary Society of St. Paul the Apostle



(a.k.a. the Paulist Fathers) at St. Austin Parish in Austin, TX. He thanks Curt and Tricia Gomulinski and the entire TBPI Headquarters staff for their

hospitality over the past five years while he served as an associate pastor at St. John XXIII University Parish at the University of Tennessee campus in Knoxville.

Oklahoma Gamma

Cara A. Cowan Watts, Ph.D., '97, has earned a Ph.D. in biosystems engineering from Oklahoma State University with the support of the NSF Louis Stokes Alliances for Minority Participation in STEM.

After 12 years as an elected Cherokee Nation Tribal Councilwoman, she has returned to the private sector. Cowan Watts has acquired majority ownership in Tulsa Pier Drilling, LLC and been named CEO of commercial pier drilling operations. She continues to provide education solutions for Indian Country and encourage STEM careers for Native youth via her consulting company Cherokee Star.

Pennsylvania Alpha

Henry L. Dorkin, Ph.D., '70, has become president-elect of the Massachusetts Medical Society. He will serve a one-year term as one of the three top officers of the society. Dorkin is clinical chief of the division of respiratory

diseases, director of the pulmonary clinical research program, co-director of the Cystic Fibrosis Foundation Clinical Center, and co-director of the Cystic Fibrosis Foundation Therapeutic Development Center, all at Boston Children's Hospital.



Edward P. Gorzkowski III, Ph.D., '99, has been awarded the 2016



Du-Co Ceramics Young Professional Award by The American Ceramic Society (ACerS). The award goes to “a young professional member who demonstrates exceptional leadership and service to ACerS.” Gorzkowski is currently acting head of the ceramics and rapid prototyping section at the U.S. Naval Research Lab in Washington, DC. He has served on several ACerS committee awards panels and is a TBPI District 4 Director.

Puerto Rico Alpha

Eddie M. Guerra Fuentes, P.E., '08, is one of a group of professionals who have founded The Nuclear Alternative Project and are looking for engineers to join them. The initiative is focused on community awareness.



Guerra Fuentes is a structural engineer with RIZZO Associates specializing in earthquake engineering and structural reliability of nuclear power plants. He seeks to eradicate “myths and public misconceptions about risk and overall safety of nuclear power.”

South Carolina Gamma

John D. Forcier, P.E., '72, has joined the team of experts at bioenergy and biofuels consulting group Lee Enterprises Consulting. He has more than 43 years of experience in the planning, design, permitting, and construction of



small through multi-million dollar municipal and private renewable energy, biogas, anaerobic digester, wastewater and composting projects throughout the eastern U.S.A.

Tennessee Delta

Jacob “Jake” R. Porter, '15, has joined Nashville, TN-based Civil Site Design Group recently as an engineer and civil designer for land development projects across Middle Tennessee. He had been a summer engineering intern with Civil Site since 2008. Porter also serves in the Tennessee Army National Guard as a combat engineer.



West Virginia Alpha

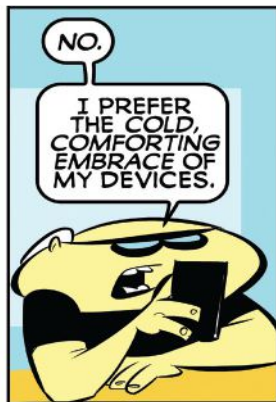
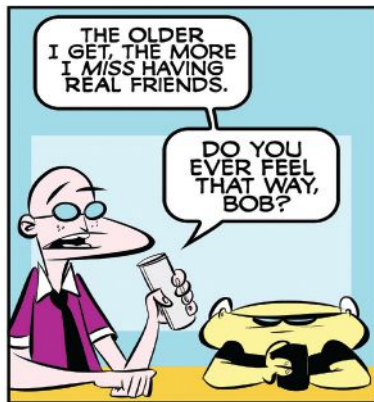
John F. Gardner, P.E., '75, is president—global strategic accounts for EMERSON Process Management. Under his leadership the strategic accounts program has grown 5x and was chosen by SAMA-Strategic Account Management Association as the global strategic accounts program of the year. John is active in the Emerson Global Leadership Institute and is now a director for SAMA. He and wife Nancy live between Austin, TX, and Nashville, TN.



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!

The PC Weenies



© 2014 KRISHNA M. SADASIVAM WWW.PCWEENIES.CO

WWW.PCWEENIES.COM

WITH PERMISSION FROM KRISHNA M. SADASIVAM, TN A '95

Advertiser's Index

ADVERTISER	WEB ADDRESS	PAGE NO.
Lincoln Labs	www.ll.mit.edu/employment	3
APL	www.jhuapl.edu	5
SMART	http://smart.asee.org/	7
CNA	www.cna.org/careers	9
NSA	IntelligenceCareers.gov/NSA	Cover 4

Member Benefits

SEE COMPLETE LIST at tbp.org/memb/benefits.cfm

- **GEICO**—additional discounts on automobile insurance.
- **LinkedIn**—join 23,300 members in our official group for professional networking and career discussions. (Search: Tau Beta Pi Engineering Honor Society)
- **Local Hospitality**—access to a worldwide inventory of hotels at exclusively discounted rates.
- **LTCFP**—long-term care outreach and education program with access to favorable rates on long-term care insurance.
- **SIRVA Home Benefits**—discounts on real estate, mortgages, and moving services.
- **PPI**—discounts on professional licensing exam review materials (FE/EIT, PE, LEED, & more).
- **TBP Job Board**—post a resume online and browse through hundreds of engineering jobs at top companies.

Tau Beta Pi Insignia

Integrity and Excellence in Engineering

Call 865-546-4578, or visit the online store at www.tbp.org/store.cfm for complete pricing and availability of colors and sizes. Orders are accepted online, over the phone, or by mailing this form with payment.

Member's Name: _____ TBP Chapter & Class: _____

Shipping Address: _____ Day Phone: _____

_____ Email: _____

Item Description	Quantity	Price
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Mail your order and check to:
 TAU BETA PI
 P.O. BOX 2697
 KNOXVILLE, TN 37901-2697

Total Amount Enclosed: _____

ORDERING INFORMATION: ALLOW 8 WEEKS FOR DELIVERY OF JEWELRY & CERTIFICATES & 12 WEEKS FOR DELIVERY OF CUSTOM-MADE RINGS.

TAU BATES...

Show your Commitment to Excellence.

10k Gold \$159/160

Gold finish \$29/30

OFFICIAL ENGRAVED BENT CHARM/PIN

10k Gold \$93/94

Gold finish \$26/27

SMALL BENT CHARM/PIN

10k Gold \$92

Gold finish \$25

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

USB CAR CHARGER W/ TBP IMPRINT

\$50

GOLF SHIRTS (GREG NORMAN)

XXL add \$2 \$41

\$16

SILVER/NAVY or GOLD/BLACK T-SHIRT

XXL \$18

\$25

INSIGNIA LICENSE PLATE FRAMES

\$16

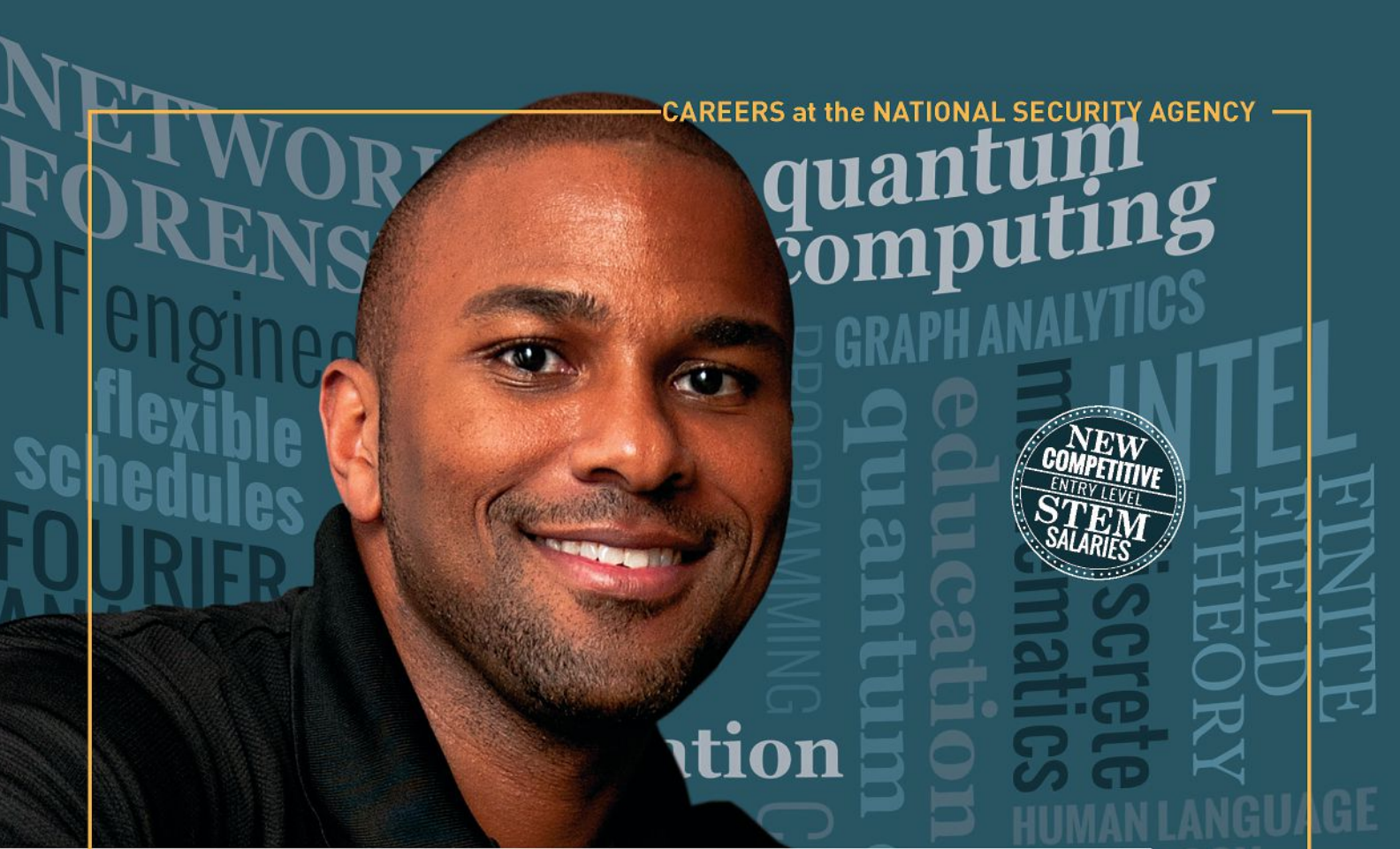
ENGINEER SHIRT 10 COLORS (XXL-\$18)

\$28

HOODIES 8 COLORS (XXL-\$33)

Order Your TAU BETA PI
Official Insignia

AT WWW.TBP.ORG (PAYPAL) OR CALL (800/828-2382) FOR CREDIT CARD ORDER.



EXTRAORDINARY WORK

Inside our walls, you will find the most extraordinary people doing the most extraordinary work. Yet it's not just finite field theory, quantum computing or RF engineering. It's not just discrete mathematics or graph analytics.

It's all of these and more – rolled up into an organization that leads the world in signals intelligence and information assurance. Inside our walls you will find extraordinary people, doing extraordinary work, for an extraordinary cause:

The safety and security of the United States of America.

U.S. citizenship is required for all applicants. NSA is an Equal Opportunity Employer and abides by applicable employment laws and regulations. All applicants for employment are considered without regard to age, color, disability, genetic information, national origin, race, religion, sex, sexual orientation, marital status, or status as a parent.

- Computer/Electrical Engineering
- Computer Science
- Cybersecurity
- Data Science
- Information Assurance
- Mathematics
- Foreign Language Analysis
- Intelligence Analysis
- Cryptanalysis
- Signals Analysis
- Security & Counterintelligence
- Business
- Finance & Accounting
- Paid Internships, Scholarships & Co-op

APPLY TODAY



NSA

WHERE INTELLIGENCE GOES TO WORK®



Search NSA to Download



IntelligenceCareers.gov/NSA