

THE BENT

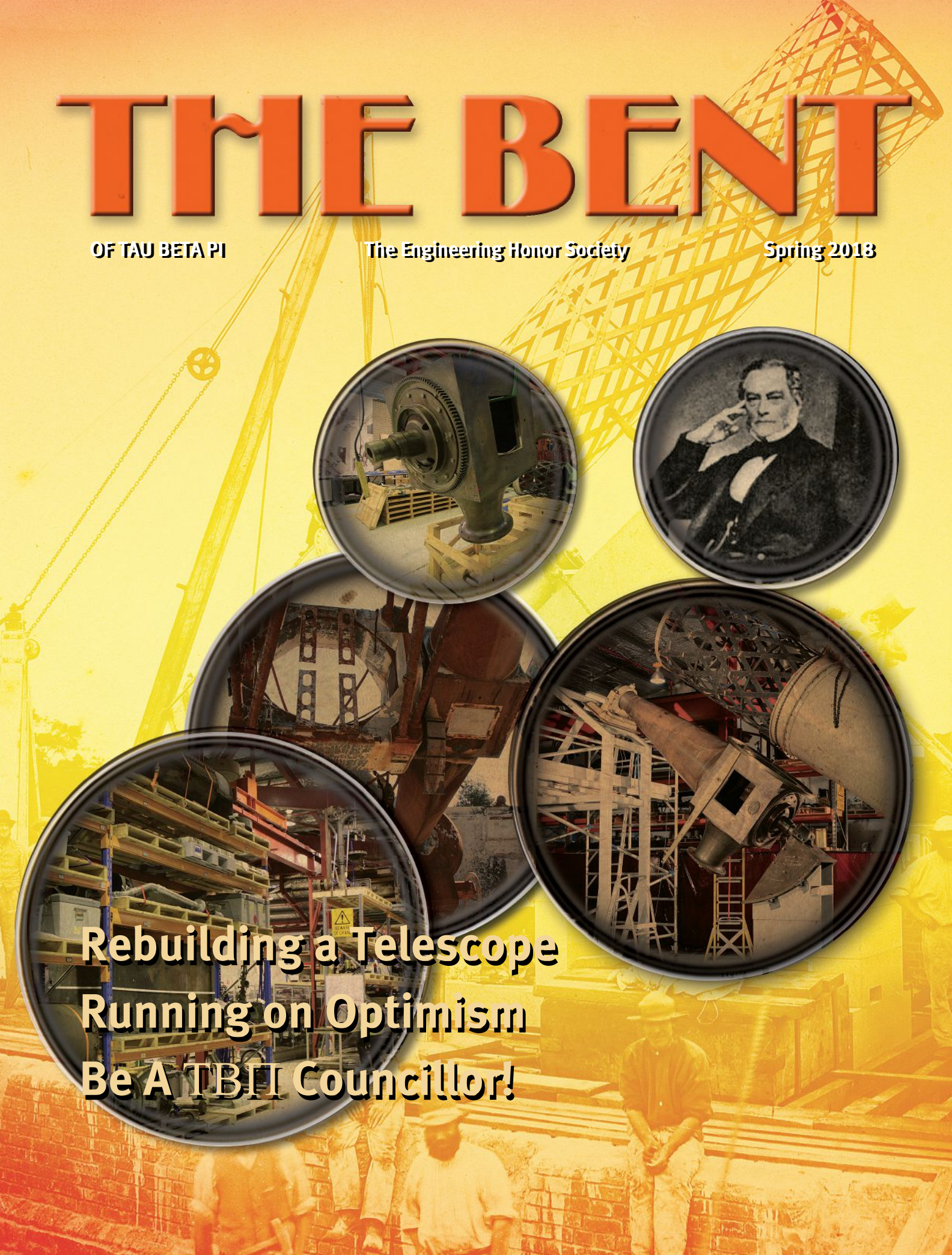
OF TAU BETA PI

The Engineering Honor Society

Spring 2018



**Rebuilding a Telescope
Running on Optimism
Be A TBEI Councillor!**



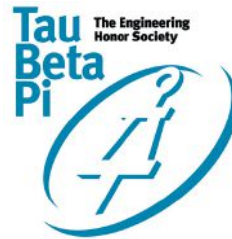
OF TAU BETA PI

on the web at www.tbp.org?areaAlumni

DISTRICT	ALUMNI CHAPTERS (44)	CURRENT CONTACT	EMAIL
1	Central Connecticut	Ming De Lin	tbp.ct.alumni@gmail.com
1	Greater Boston Area, MA	Leah Moore	chapter@tbpboston.com
2	Central Jersey, NJ	Stephen Leong	leong.stephen.m@gmail.com
2	New York Capital District	Tom Finn	thomas.v.finn@gmail.com
2	New York City, NY	David Keim	tbpnycalumni@gmail.com
2	Rochester, NY	Gavrail Tatarliev	gavrail.tatarliev@gmail.com
3	Pittsburgh, PA	Giorgio DiPaolo	tbpittsburghalumni@gmail.com
4	Baltimore, MD	Heather Hunt	TBPBaltimoreAlumni@gmail.com
4	Research Triangle, NC	Suzette Morales	tbp.rt.alumni@gmail.com
4	Washington, DC	Khabeer Salaam	dctbpalumni@gmail.com
5	Atlanta, GA	Tanya Kiryutina	tbp.atlanta.alumnus@gmail.com
5	Palm Beach/Broward, FL	Midge Hill Royer	tbpplambrowardalum@gmail.com
5	Tampa Bay, FL	Jason Abellada	tbp.tbac@gmail.com
6	Great Smoky Mountains, TN	Robert W. Bowers	rwbowers33@gmail.com
6	Louisville, KY	Larry Tyler	larry.tyler@louisville.edu
6	Rocket City (Huntsville, AL)	Khira Morgan	rocketcitytbp@gmail.com
7	Ann Arbor Area, MI	Andy Boucher	yandersb@gmail.com
7	Dayton, OH	Morgan Highlander	tbpdaytonalumni@gmail.com
7	Ohio's North Coast	Zak Benmerzouga	oncac.tbp@gmail.com
7	Southeastern Michigan	Colleen Hill-Stramsak	tbp.semiac@gmail.com
7	West Michigan	Lisa Dohn	tbpwmiac@gmail.com
8	Central Illinois	Lauren Logan	centraliltbp@gmail.com
8	Chicago, IL	Erum Qayyum	tbpchicago@gmail.com
8	Indianapolis, IN	Clarence Brooks	tbpindy@gmail.com
8	Milwaukee Area, WI	Aaron Hartwig	tbp.milac@gmail.com
9	Pioneer (OK)	Kurt Rouser	tbp.pioneer.alumni@gmail.com
9	St. Louis, MO	Kaitlin Page	knpage88@gmail.com
10	Central Texas	Stephen Meserve	centextBP@gmail.com
10	Greater New Orleans, LA	Ryan Schexnaydre	tbpnotreasurer@gmail.com
10	North Texas (DFW)	Michael Futer	tbpalumni.dfw@gmail.com
10	Texas Gulf Coast	Alex Zheng	txgulf.tbpalumni@gmail.com
11	Minnesota, Twin Cities	John Chapman	tbp.twincities@gmail.com
12	Front Range (CO, WY)	Kyle Adams	frtbppresident@gmail.com
12	Pikes Peak (CO)	Michele Gaudreault	pikespeakalumnitbp@gmail.com
12	Treasure Valley (ID)	Thomas Robbins	treasurevalleytbp@gmail.com
13	Phoenix, AZ	Jelena Culic-Viskota	phx.tbp@gmail.com
13	Tucson, AZ	Christopher Stemple	tbptuc@gmail.com
14	Portland, OR	Jeffrey Zola	jsz3@cornell.edu
14	Puget Sound, WA	Nancy Chang	pugetsoundalumni.tbp@gmail.com
15	Sacramento Valley, CA	Rachel Alexander	SacAlumni@tbp.org
15	San Francisco, CA	Joey Li	president@sfbac.com
16	Greater San Diego, CA	Andrew Reinhardt	SanDiegoTBPAlumni@gmail.com
16	Los Angeles, CA	Riley Winship	lataubetapialumni@gmail.com
16	Orange County, CA	Tricia Gomulinski	tricia@tbp.org



the Bent^{of}



Spring 2018
Vol. CIX / No. 2

Features

“Masterpiece of Engineering” Rises From the Ashes

by Trudy E. Bell

8

Leadership: Ray Rothrock

by Alan S. Brown

14

Reports

Chapter Endowment Update

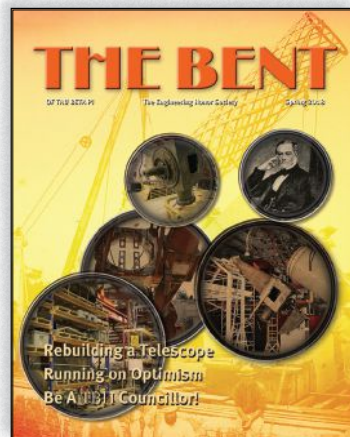
18

Contributors to 2017 Alumni Giving Program

24



Families - 40



ON THE COVER:
Trudy Bell describes the restoration of a major 19th century astronomers' telescope.

Departments

After Graduation - 4



Council's Corner	2	Brain Ticklers	34
Association Briefs.....	5	Chapter Eternal.....	37
Who's Who.....	6	Alumni Notes	46
Authors	23	Caption Contest.....	47
In The Colleges.....	33	Insignia	48

Editor: David S. Roberts Managing Editor: Patricia B. McDaniel
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

*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.

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 \$95. 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

Vol. 109 No. 2 Circulation: 87,000 Initiated Members: 589,216

Copyright © 2018 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.



The Tau Beta Pi Association

Visit www.tbp.org

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

Making Our VISION a REALITY

aS YOU ARE ALL probably aware, the members of the last “slate elected” Executive Council, the Elevate Slate, are now finishing their terms (many thanks to Alan Passman and Norman Pih for their creativity and outstanding service).

As we work to ensure the relevancy of Tau Beta Pi, we have used these past few years to transition from our familiar processes to a new Executive Council structure, a new Headquarters structure, a revised and updated Constitution and Bylaws, and, most importantly, utilizing a strategic plan to achieve our goals.

The Elevate Slate created Vision and Mission statements for Tau Beta Pi.

The Vision is:

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

And the Mission is:

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*

With the addition of three Executive Councillors, we spent much of last year refining the Strategic Plan and organized priorities for achieving that mission. Our strategic goals are:

- *Improving the Organizational Processes of the Association*
- *Enhancing the Image, Visibility, and Branding of Tau Beta Pi*
- *Improving Chapter Support and Operations*
- *Providing Relevant and Recognized Leadership and Professional Development*
- *Strengthening the Finances and Fundraising of the Association*

Many of our plans have been put into action: Curt Gomulinski, our Executive Director, has accomplished a re-organization of the Knoxville, TN, Headquarters operations. He added a couple of staff members but most

of the increased effectiveness has been made possible by our staff working to re-focus their skills. We continue to be grateful for the dedication and diligence of our loyal Headquarters team. Without their work, we would not be able to keep moving forward.

Our volunteers have also been busy. The Executive Council spent much time creating a Strategic Plan that is assessable and can be implemented with the help of our network of dynamic members. Katy Colbry, Director of



Sue Holl

Engineering Futures, streamlined operations which allowed more students to participate in EF sessions at a significantly reduced cost to the organization. Kelly Hammar, Director of the District Program, worked effectively with her District Director teams to ensure continuity for the collegiate chapters and to help provide a connection to the alumni chapters. Tricia Gomulinski, Director

of Alumni Affairs, helped coordinate the operations of 44 active alumni chapters. At the 2017 Convention, we conducted another successful annual election of three new Councillors who began their terms January 1, 2018: Scott E. Fable, California Tau '96; Stephan L. King-Monroe, Michigan Epsilon '08; and C. Craig Smith, Tennessee Epsilon '80. The 2017 Convention also approved the updated Constitution and Bylaws. These are all important steps in fulfilling our strategic goals.

So what does this mean to you as a member? Our Vision, *Tau Beta Pi Engineers Making Extraordinary Contributions to Create a Better World*, sounds lofty and idealistic, but that is exactly what a vision should be. To me, it means that the technological advancements which drive our society and progress in so many ways should always be associated with TBPI.

When people think “Engineering Excellence” they should think of us. And who is Tau Beta Pi? YOU! You are the engineers making these important and influential contributions... so if you are wearing some TBPI swag, or have your certificate displayed in your office, it is furthering our strategic goal of “Enhancing the Image,

Visibility, and Branding of Tau Beta Pi.” Publicly acknowledging that TBPi is not just something people “do” in college is relatively easy and enhances our ability to achieve the goals.

You might include becoming involved in an alumni chapter or assisting a local collegiate chapter, or becoming an Engineering Futures Facilitator or District Director, or perhaps even considering running for Executive Council. There are countless ways our members contribute to bettering the world. The Association supports you and your efforts and we know your affiliation with us ensures the continued strength of the organization. We are interested in your ideas and your participation.

It is undeniable that the contributions of numerous Tau Bates have influenced our society, but at this time the influence and support of the *largest engineering society in the world* is unrecognized. Our Mission and strategic goals support continuing the good and important work we achieve by having our members proudly identify with the Association throughout their long and varied careers. We are a society based on high achievement. Our members have proven that, “Integrity and Excellence in Engineering” is not just a mere slogan.

My dream is that one day Tim Cook, CEO of Apple, will not only be an Auburn Tiger yelling, “War Eagle!” He will also be a proud Tau Bate yelling, “Ammeter, Indicator, Wye Level Wye, Slide Rule, Dynamo, TAU BETA PI!”

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

JOIN THE EXECUTIVE COUNCIL: CANDIDATES SOUGHT

IT'S TIME to start choosing members for our Executive Council. With the recent changes to the structure of the EC in effect, the 2018 Convention will elect three members to serve the 2019-21 term. They will join the six continuing members elected in 2016 and 2017.

TBPi's current Constitution and Bylaws, particularly Const. Article III, Secs. 3, 4, and 5, delineate the nominating and electing procedures and the Council's responsibilities. Additional information and a position description is available at: www.tbp.org?ECjob Members interested in serving on the Executive Council must be nominated by a chapter—either collegiate or alumni—by April 1. The Executive Director can work with candidates needing a formal nomination.

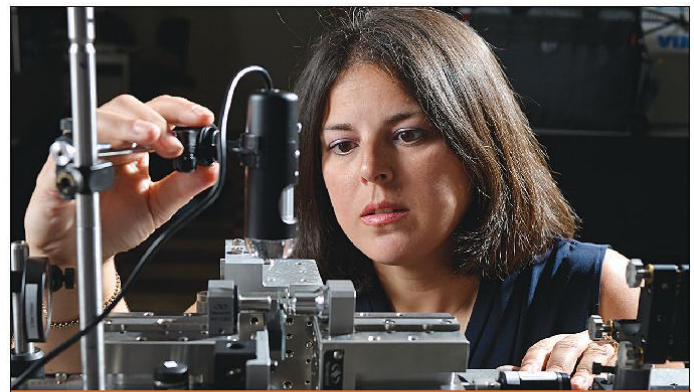
The Executive Council is looking for members with experience in a variety of functions—management, finance, teaching, business, research, etc. Those with knowledge in the areas of image enhancement, branding, fundraising/development, alumni relations, and advising collegiate chapters are strongly encouraged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

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

Councillors are asked to also make several trips per year for new-chapter inspections, installations, and District Conferences. They typically attend two District Conferences each year.

Candidates should plan to attend this year's Convention in Denver on October 11-13 where the delegates will elect the new members.

Individuals interested in serving on the Executive Council can receive more information from, and chapters can submit nominations to, the Executive Director via email to tbp@tbp.org.



MIT LINCOLN LABORATORY

Create, Prototype, Deliver.

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/careers**

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



AFTER GRADUATION...

Connected Through Our Association

how many of you have gotten a job or met your significant other through connections? These are an important part of our lives, and our connection through Tau Beta Pi is what brought us together and continues to unite us.

In the early 1900s, Chicago alumni formed an association for the “maintenance of loyalty to Alma Mater and Tau Beta Pi, and the promotion of the welfare of local brethren by social intercourse.” They wanted to continue getting together. The Chicago Alumni Association was followed by similar groups in Pittsburgh, Schenectady, Boston, Washington, DC, and New York City. In 1947, they became alumni chapters, and by 1950, they numbered 25. By 1978, this had grown to 51.

I came onto the alumni scene after serving 12 years as a District 12 Director in Colorado. When Curt and I moved to Tennessee, I started volunteering at Headquarters. I discovered a hole—a big hole—regarding members after graduation. We were not really supporting or utilizing them, and since then, I have heard many comment that “I haven’t heard from Tau Beta Pi in ___ years.” You fill in the blank. In 2012, there were only 18 active alumni chapters surviving out of the 60 chartered. I began working with existing ones and alumni wanting to establish new chapters or reactivate old ones. In 2013, I was appointed to the volunteer position of Director of Alumni Affairs to “stimulate and maintain alumni interest and support for Tau Beta Pi, to encourage the formation and support the operation of alumni chapters, and to represent the alumni at the Convention and before the Executive Council” per the Constitution.

At the 2015 Convention, we established a vision and mission to stress lifelong membership and our connection:

Vision: *Providing a community for Tau Bates for life.*

Mission: *The Tau Beta Pi Alumni Chapters strive to connect Tau Beta Pi members through networking and outreach and to inspire integrity and excellence in engineering.*

Now 44 alumni chapters are active, of the 77 chartered. I encourage them to offer opportunities for networking, social events, professional development, and service, as well as to work with local collegiate chapters. Many alumni activities are published each year in the Association Briefs section of *The Bent*, on our social media

sites, and in the blog. I encourage you to join an alumni chapter near you. Contact details are listed on the inside front cover of this *Bent* and at tbp.org/Memb/alumniContacts.cfm. If there is no active one in your area, contact me at tricia@tbp.org. If an active chapter once existed, I can help you reactivate it. If not, I can advise you on starting a new one.

What is the role of these chapters? Members support our students by attending initiations, sponsoring them to attend Convention or engineering banquets, holding mock interviews and resume reviews, and passing on their experiences. They organize outings to a ball game, a picnic, a barbeque, or a restaurant, offer visits to local factories and research facilities and even behind-the-scenes engineering tours. They volunteer at food banks, robotics competitions, and science fairs, and do great things!

I believe alumni are TBP’s biggest, but untapped, asset. Bit by bit, we are making our way to all of you. Thank you to those who donate, lead chapters, organize activities, and spread the word—we couldn’t do it without you!

By the time you read this, our fifth annual Tau Beta Pi Day on March 14th (3.14) will be done. Thank you to those who participated in promoting us! We look forward to you taking part next year by wearing your Bent or TBP apparel on March 14, 2019. If you did not receive an email regarding Tau Beta Pi Day or any others from us during the past year, please email member.update@tbp.org to update your record.

We also launched a new networking and mentoring app through VineUp. To join, visit tbp.vineup.com.

In February, after the Association of College Honor Societies (ACHS) meeting in Albuquerque, I caught up with some of my former District 12 officers in Los Alamos (pictured with me). It is great to keep these connections and see and hear what they are now doing.

To all of my former District 12 collegiate chapter officers, I think about the times I spent with you often. You are still connected to me and thus to TBP.

To my alumni chapter officers, I thank you for volunteering to serve and look forward to working with you to engage and involve our alumni. Keep up the good work!

Tricia E. Gomulinski, *South Dakota Alpha '98*
Director of Alumni Affairs



Tricia, left, meets up with some of her former District 12 officers in Los Alamos.

ALUMNI GET TOGETHER

- The Greater San Diego Alumni Chapter held its winter social event on Monday, January 22, at Woodstock's Pizza. Members discussed upcoming activities over pizza and beer, which included California Tau's professional development event, California Psi's initiation, and a Pi Day celebration with California Xi. (Photo on right)



- Tricia Gomulinski, Director of Alumni Affairs, hosted an alumni event at the El Pinto restaurant in Albuquerque, NM. Attending the February 8 dinner were 19 alumni and 7 guests along with 3 students from the New Mexico Beta Chapter.



- On Saturday, January 20, the Front Range Alumni Chapter (CO and WY) members and families attended a lecture on the X-15 rocket plane at Wings Over the Rockies Air and Space Museum in Denver, CO. (Photo on right)

PROFESSIONAL DEVELOPMENT EVENT



The California Tau Chapter hosted their second annual professional development session on January 27 on the campus of UC Irvine. Several area alumni presented eight different sessions on topics including transition into the workforce, networking, tech startup, venture creation, and intellectual property. The agenda also included 30 minutes of short "lightning talks" and the event wrapped up with a picnic at a nearby park.



WHO'S WHO

Serena M. Auñón-Chancellor, M.D., DC Gamma '97, has been assigned



by NASA to Expedition 56/57 crew to the International Space Station, launching in June. She joined the astronaut corps in 2009 and has been at NASA since 2006, when she became a flight surgeon. Before being selected as an astronaut, she spent more than nine months in Russia supporting medical operations for space station crew members, including water survival training in the Ukraine. Auñón-Chancellor served as the deputy lead for medical operations for NASA's Orion spacecraft. In addition to a bachelor's degree in electrical engineering from George Washington University, Auñón-Chancellor holds a doctorate in medicine from the University of Texas Health Science Center at Houston and is board certified in internal and aerospace medicine.

Jeffrey P. Bezos, New Jersey Delta '86, has announced that he is donating \$33 million to a scholarship fund for young "dreamers," immigrants brought



to the United States illegally as children. The founder of Amazon and owner of *The Washington Post*, billed as the wealthiest person in the world, is giving the sum to TheDream.US, a scholarship program that has awarded over 1,700 immigrants more than \$19 million in financial assistance since it launched in 2014.

Grace M. Bochenek, Ph.D., Florida Delta '97, is director of the National

Energy Technology Laboratory within the Department of Energy's Office of Fossil Energy. She also served as the acting U.S. Secretary of Energy in early 2017. Bochenek previously had spent much of her career at the U.S.



Army Tank Automotive Research, Development, and Engineering Center. She earned a B.S. in electrical engineering at Wayne State University in 1986, followed by a master's from the University of Michigan-Dearborn, and a Ph.D. from the University of Central Florida.

Louis J. Lanzerotti, Ph.D., Illinois Alpha '60, has received the National Academy of Engineering's (NAE) Arthur M. Bueche Award. Dr.



Lanzerotti was recognized "for leadership in understanding the Earth's radiation environment and its effects on communications and space hardware, and for contributions to public policy on space-based research." He is a distinguished research professor at New Jersey Institute of Technology and previously worked on the technical staff of AT&T Bell Laboratories from 1965-2002.

Rhodes Scholars

The 2018 list of Rhodes Scholars included three Tau Bates among the 32 Americans named. Rhodes Scholarships provide all expenses for two or three years of study at the University of Oxford in England and may allow funding in some instances for four years. The Tau Bates are:

Matthew Chun, Massachusetts Beta '18, is a mechanical engineering senior at MIT. He will do a B.A. in jurisprudence at Oxford. Matthew researches intellectual property law, is captain of the MIT wrestling team, and is designing a prosthetic knee for the developing world.

Naomi T. Mburu, Maryland Delta '18, studies chemical engineering at the University of Maryland, Baltimore County. She will pursue a D.Phil in engineering science at Oxford. Naomi is the first student in UMBC history to receive the prestigious Rhodes Scholarship, supports STEM education, and is a Goldwater Scholar.

Jaspreet "Jesse" Singh, Colorado Zeta '18, is a student at the United States Air Force Academy majoring in mechanical engineering. He will pursue an M.Sc. in engineering science at Oxford. Jesse conducts research at the Center for Aircraft Structural Life Extension and serves as Colorado Zeta recording secretary.

Fortune 500 Women CEOs

Four TBP alumni were in the latest list of top 20 women CEOs at Fortune 500 companies published recently.

#1 Mary T. Barra, Michigan Zeta '85, CEO of General Motors.

#2 Virginia M. Rometty, Illinois Gamma '79, president and CEO of IBM Corporation.

#12 Geisha J. Williams, Florida Beta '83, president and CEO of PG&E Corporation.

#18 Vicki A. Hollub, Alabama Beta '81, president and CEO of Occidental Oil and Gas Corporation.

National Academy of Engineering

The National Academy of Engineering has elected 83 new members and 16 foreign associates, announced NAE President C.D. (Dan) Mote Jr., Ph.D., CA A '59, in early February. Election to the academy is among the highest professional distinctions accorded to an engineer. It honors those who have made outstanding contributions to "engineering research, practice, or education, including, where appropriate, significant contributions to the engineering literature," and to the "pioneering of new and developing fields of technology, making major advancements in traditional fields of engineering, or developing/ implementing innovative approaches to engineering education." New Tau Beta Pi/NAE members are listed below.

Pedro J.J. Alvarez, Ph.D., P.E., *MI Γ '89*, director, Nanosystems Engineering Research Center on Nanotechnology-Enabled Water Treatment, and George R. Brown Professor and chair, department of civil and environmental engineering, Rice University, Houston. For contributions to the practice and pedagogy of bioremediation and environmental nanotechnology.

Aristos A. Aristidou, Ph.D., *TX Γ '89*, director, biotechnology R&D, Cargill Inc., North Plymouth, MN. For contributions to bioprocess and metabolic engineering for the commercial production of sustainable chemicals and plastics.

Mary T. Barra, *MI Z '85*, chairman and chief executive officer, General Motors Co., Detroit. For leadership in automotive manufacturing, product engineering, and product development.

Jeffrey P. Bezos, *NJ Δ '86*, president, chief executive officer, and chairman, Amazon.com Inc., and founder and chief executive officer, Blue Origin LLC, Kent, WA. For leadership and innovation in space exploration, autonomous systems, and building a commercial pathway for human space flight.

Carolina Cruz-Neira, Ph.D., *IA A '87*, director, George W. Donaghey Emerging Analytics Center, and interim chair, department of computer science, University of Arkansas, Little Rock. For contributions to immersive visualization.

Bruce E. Engemann, Ph.D. *IL Z '83*, chief technology officer, Dassault Systèmes Simulia Corp., Johnston, R.I. For development of software for the simulation of complex problems in engineering mechanics.

William G. Gray, Ph.D., *CA A '69*, research professor, University of North Carolina, Chapel Hill, and adjunct

professor, department of civil and environmental engineering, University of Vermont, Burlington. For advances in understanding of the physics of flow and transport in porous media.

Ann R. Karagozian, Ph.D., *CA E '78*, distinguished professor, department of mechanical and aerospace engineering, University of California, Los Angeles. For contributions to combustion and propulsion, education of future aerospace engineers, and service to the country.

Jay R. Lund, Ph.D., *WA A '83*, director, Center for Watershed Sciences, and Ray B. Krone Professor, department of civil and environmental engineering, University of California, Davis. For analysis of water and environmental policy issues leading to integrated water resources planning and management.

Gary S. May, Ph.D., *GA A '86*, chancellor, University of California, Davis. For contributions to semiconductor manufacturing research and for innovations in educational programs for underrepresented groups in engineering.

Dennis A. Muilenburg, *IA A '86*, chairman, president, and chief executive officer, Boeing Co., Chicago. For leadership in defense, space, security, and commercial aircraft.

Paul F. Nealey, Ph.D., *TX Γ '85*, Brady W. Dougan Professor in Molecular Engineering, Institute for Molecular Engineering, University of Chicago, Chicago. For the development of directed self-assembly of block copolymers as an industrially significant process for nanolithography.

Nils J. Nilsson, Ph.D., *CA Γ '55*, Kumagai Professor Emeritus of Engineering, department of computer science, Stanford University, of Medford, OR. For foundational contributions to robotics,

heuristic search, planning, and machine learning.

W. Mark Saltzman, Ph.D., *IA A '81*, Goizueta Foundation Professor of Biomedical Engineering and Chemical Engineering, Yale University, New Haven, CT. For contributions in drug delivery, biomaterials, and tissue engineering that have led to improved patient treatments.

David N. Seidman, Ph.D., *NY E '60*, Walter P. Murphy Professor, department of materials science and engineering, Northwestern University, Evanston, IL. For contributions to understanding of materials at the atomic scale, leading to advanced materials and processes.

Lisa T. Su, Ph.D., *MA B '91*, president and chief executive officer, Advanced Micro Devices Inc., Austin, Texas. For contributions to silicon-on-insulator technology and industry leadership.

Charles E. Sukup, P.E., *IA A '76*, president, Sukup Manufacturing Co., Sheffield, IA. For contributions to the design and manufacturing of agricultural equipment for grain handling and storage.

Susan H. Tousi, *PA B '91*, senior vice president, product development, Illumina Inc., San Diego. For engineering leadership increasing throughput and decreasing costs of genome sequencing, enabling the path to the \$100 human genome.

Jiming Hao, Ph.D., *OH B '84*, professor and dean, Institute of Environmental Science and Engineering, Tsinghua University, and director, Tsinghua-Toyota Research Center, Beijing, China. For leadership in the development and implementation of air pollution control theory, strategy, and technologies.—*Foreign Member*

‘Masterpiece of Engineering’ Rises From the Ashes

Restoring what 150 years ago was the world’s largest clock-driven, equatorially mounted telescope is itself a monumental 21st-century technical feat

By **Trudy E. Bell** (Text Copyright 2018 Trudy E. Bell)

WHEN IN 1869 the Great Melbourne Telescope (GMT) in Australia first raised its mighty lattice tube to behold the star-studded southern heavens, the instrument was an engineering marvel.

The reflecting telescope had a mirror 48 inches across, largest in the southern hemisphere and second largest in the world. The speculum-metal (copper-tin alloy) mirror weighed over 2,000 pounds, yet was free of flexure at all observing angles because of a pioneering mirror support system—a design still used in many telescopes. Although it topped 18,000 pounds of moving mass, the telescope was so well-balanced that an astronomer could slew it from horizon to zenith in 20 seconds. It was also clock-driven, able to track an object automatically across the sky.

Despite its technological innovations and great promise, the GMT was dogged by a string of unfortunate circumstances. Technical complications delayed commissioning the instrument, the first observer was relatively inexperienced, the observatory was perennially understaffed, and research observations were continually interrupted by dignitaries wanting to look through the eyepiece. In the 1890s, a major worldwide financial crisis dried up funding both for publication of the GMT’s results as well as for continued observations. The telescope lay idle for most of the first half of the 20th century.

In 1945, it was sold for a nominal sum to the Mount Stromlo Observatory near Canberra. Over the decades, its mount was modified and it was fitted with a series of three slightly larger 50-inch glass mirrors, so it confusingly came to be called both “the GMT” and “the 50-inch.” During each rebuild, more original parts were discarded.

Fortunately, by the 1980s, the heritage value of the 1869 telescope was recognized: discarded parts were retrieved and warehoused at the “museum store”—the offsite collection storehouse of the Museum of Victoria (renamed Museums Victoria in 2016).

On January 18, 2003, a fierce firestorm engulfed the Mount Stromlo Observatory. Heated to cherry-red temperatures of 900° to 1,475°F, the steel struts of the modernized telescope softened and slumped, and its borosilicate mirror splintered. For half a decade, insurance companies wrangled while the telescope’s ruins stood unprotected through hot summers and freezing winters.

In 2008, three major Australian organizations banded together for an ambitious goal: to restore the original Great Melbourne Telescope to its former glory in its original telescope house on its original site. Their vision: to have the historic instrument in full working order in time for its 150th anniversary in 2019, but equipped with modern optics—turning it into one of the world’s largest telescopes dedicated to public astronomy education.

The restoration effort is itself an engineering marvel. Among the challenges: whatever existed in the way of original plans and engineering records were consumed in the 2003 Mount Stromlo bushfire (or in an earlier fire in 1952). So, supplied only with diagrams published in one 150-year-old article plus a dozen historic photographs, the restoration team has meticulously reverse-engineered crucial drawings to recreate missing components.

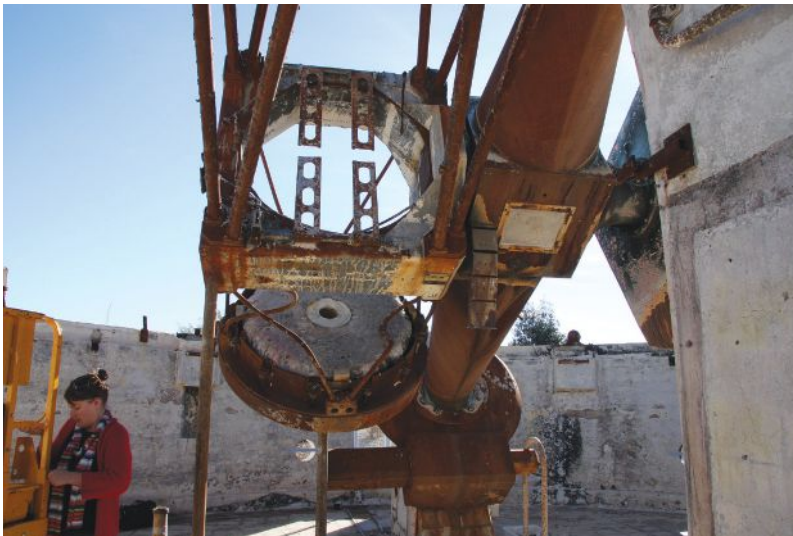
Elements of Design

By 1850, astronomers faced fundamental questions: Just what were all those fuzzy, nebulous patches of dim light scattered amongst the pinpoint stars? Were such nebulae clouds of gas relatively nearby within our own “sidereal system,” perhaps forming solar systems of planets like our own? Or were they distant, independent “island universes” (today called galaxies) so remote that their individual stars could not be distinguished? How did the nebulae repeatedly examined in the northern heavens compare with many others lesser known in the southern? And did any nebulae change over time?

The only way then feasible to answer those questions was to build a gigantic telescope and mount it in the southern hemisphere to complement large northern-hemisphere telescopes.

In late 1852, the British Association for the Advancement of Science and the Royal Society of London jointly appointed a Southern Telescope

Remains of the modernized 50-inch telescope at Mount Stromlo Observatory near Canberra after a firestorm in 2003 stood out in the weather until 2008. *Photo: Steve Roberts.*



Committee, consisting of the British Empire's leading astronomers, to study potential locations and designs.

The committee selected the Dublin, Ireland, firm of Thomas Grubb. Grubb was engineer to the Bank of Ireland, for which he designed and built complex engraving machinery for printing banknotes; he also designed and built experimental apparatus for scientists. Grubb grasped optics as well as mechanics: he was possibly the first to use ray-tracing to design microscope lenses and he held at least one optical patent.

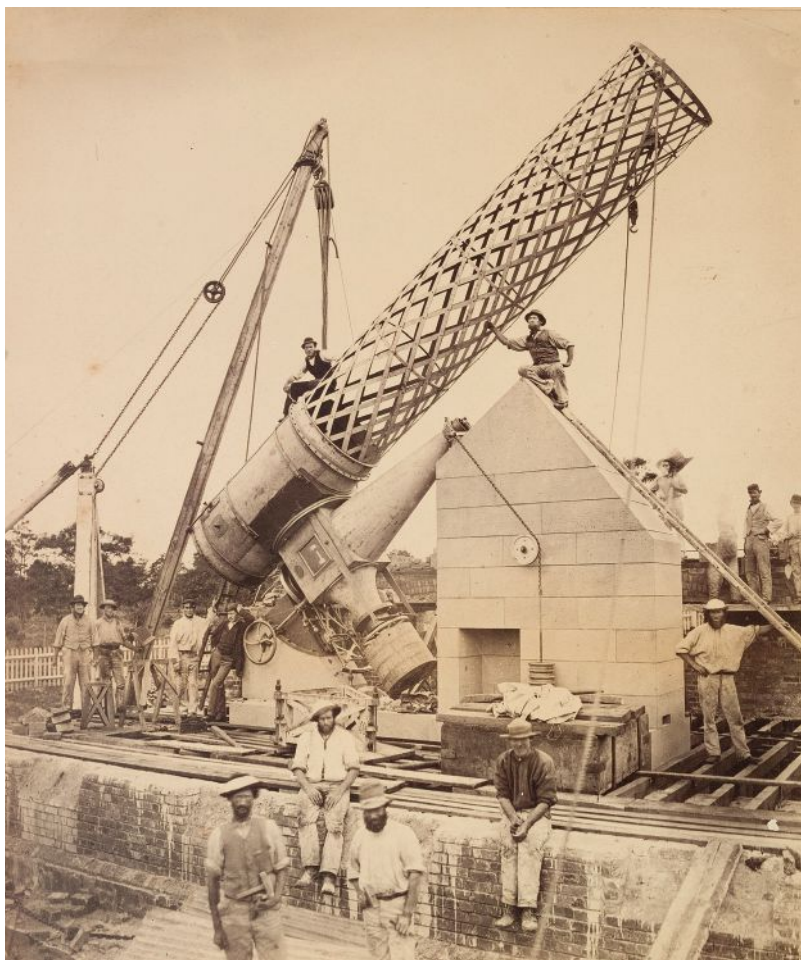
To allow an astronomer to observe from on or close to the ground instead of atop a high platform in the dark, the committee chose the Cassegrain focus: incoming starlight would bounce off the concave 48-inch primary mirror, converge up to a smaller convex secondary mirror, which would direct it back downward again through a hole in the center of the primary to an eyepiece behind the mirror [see diagram on following pages].

Innovative Optics

By 1853, Grubb had fleshed out the Southern Telescope Committee's astronomical specs into an innovative optical and mechanical design. The entire back of the mirror was supported at all observing angles by a 48-point system of equilibrated triangular levers—a "flotation" system invented by Grubb but perfected by his brilliant young son Howard.

Mechanically, Grubb was one of the first to break with past practice of giving large telescopes wooden altazimuth mounts: mounts that rotated horizontally and vertically. Instead, he designed an equatorial mount: he tilted the vertical axis to an angle parallel with Earth's axis of rotation, giving the telescope a polar axis. That allowed the telescope to track an object across the sky using a single axis (the polar axis) to counteract Earth's rotation. The GMT became the world's largest equatorially mounted telescope.

For rigidity, Grubb specified that the telescope be of cast iron and other metals. Each end of its polar axis was to be supported on bearings atop a stone pier (in a mounting style today called English cross-axis). Mass-produced precision ball and roller bearings were still in the future. So Grubb designed a system of axial and lateral counterbalances loaded by weights hanging on cables to reduce up to 99% of the bearing friction on both axes, allowing the astronomer single-handedly to move the telescope quickly from one celestial object to another. Moreover, a weight-powered clock drive could keep a celestial object centered in the eyepiece for up to two hours at a time.



ABOVE: The Great Melbourne Telescope was assembled in Australia in early 1869; then, its protective house with a roll-off roof was put up around it. The lower third of the GMT's tube was boiler plate (wrought-iron plate of the standard used for manufacturing steam boilers) while the upper two-thirds was a cylindrical lattice of riveted iron strips. *Image: Museums Victoria.* **BELOW:** Trial reassembly of the GMT was far enough along for photos to be taken in late 2014 to aid in fundraising for the restoration project. All five of the restored pieces from Mount Stromlo are shown: cube, upper cone, bell housing, and quadrant on the supporting pier; the declination axle is lying in the foreground (partially cropped out at the bottom of the photo). *Photo: John Robinson.*





FATHER AND SON ENGINEERS: Thomas Grubb (1800-1878), top, was an Irish optical and telescope engineer. His youngest son, Sir Howard Grubb (1844-1931), below, joined him in the family business. He is credited with perfecting the submarine periscope during World War I and inventing the reflex rifle sight, still widely used around the world. He was knighted by Queen Victoria in 1887. *Image below from the collection of Ken Launie.*



Shortly after the committee approved Grubb's design and started to set up procedures for letting the contract, the Crimean War broke out and matters stalled—for a decade. The plans were revived essentially unchanged in the 1860s when Australians in high places became keen to establish a grand southern telescope in Melbourne, the capital of the British colony of Victoria—now wealthy because of a gold-mining boom and aspiring to be a world center of culture and learning.

By then, Grubb was overwhelmed with other contracts. So he handed the southern telescope project to his capable 21-year-old son Howard, who dropped out of engineering studies at Dublin's Trinity College to shoulder the project that helped make his own name.

The work was dangerous, capable of killing Howard or his workmen at any time. One early task was casting two 48-inch mirror blanks of speculum metal. By mid-1866, a peat-fired furnace, heated iron and stone mold (complete with central core to form the hole for the Cassegrain focus), and annealing oven were ready. Workmen poured more than a ton of molten white bronze “at full red heat” in 16 seconds, and chain-dragged the mold and liquid mirror into the annealing oven, where it cooled gradually over 24 days. A few months later, the process was repeated, yielding two 48-inch speculum-metal disks (dubbed A and B).

A Tough Grind

Meanwhile, Howard Grubb oversaw the construction of a mechanical two-ton mirror grinding and polishing machine (MGPM), belt-driven by a one-horsepower steam “donkey engine.” Disk A was supported face-up on the flotation mirror-support system in its cell, immersed in a water bath that kept it at an even temperature. Then, using a slurry of grinding compound of successively finer grit, steel arms applied about 100 pounds of sideways force to move a rotating metal tool slowly back and forth across the mirror's front surface in an irregular, constantly changing elliptical path, so that no one area became overworked. After three months, two million strokes, and many optical tests, mirror A developed the desired highly polished concave paraboloid surface. Then, it was time to grind, figure, and polish mirror B.

Speculum mirror A was tested by examining challenging celestial objects in October 1867; in early 1868, mirror B and the entire rest of the telescope were completed, assembled in the Grubbs' factory yard, and ready for inspection. A subcommittee from the Southern Telescope Committee was delighted how the movements of the equatorial mount with its weight-relieved bearings were “surprisingly smooth and steady” and how some faint stars in nebulae used as tests for the optics were “dazzling.” After minute inspection of the GMT's every mechanical and optical detail, the committee came “unanimously to the conclusion that it is a masterpiece of engineering.”

The telescope was sent south by ship, along with the MGPM for periodically shining away tarnish that inevitably accumulates on mirrors of speculum metal;

everything arrived in Melbourne in November 1868. Local workmen erected bluestone (basalt) piers by New Year's Day (in Australian summer), assembled the telescope in place, and then built the walls of the GMT House around the instrument. Instead of being surmounted by a rotating drum or dome, the entire gable roof of the GMT House rolled off on rails to the south so the astronomer observed in the open air. By mid-1869, the Great Melbourne Telescope was ready for astronomical work.

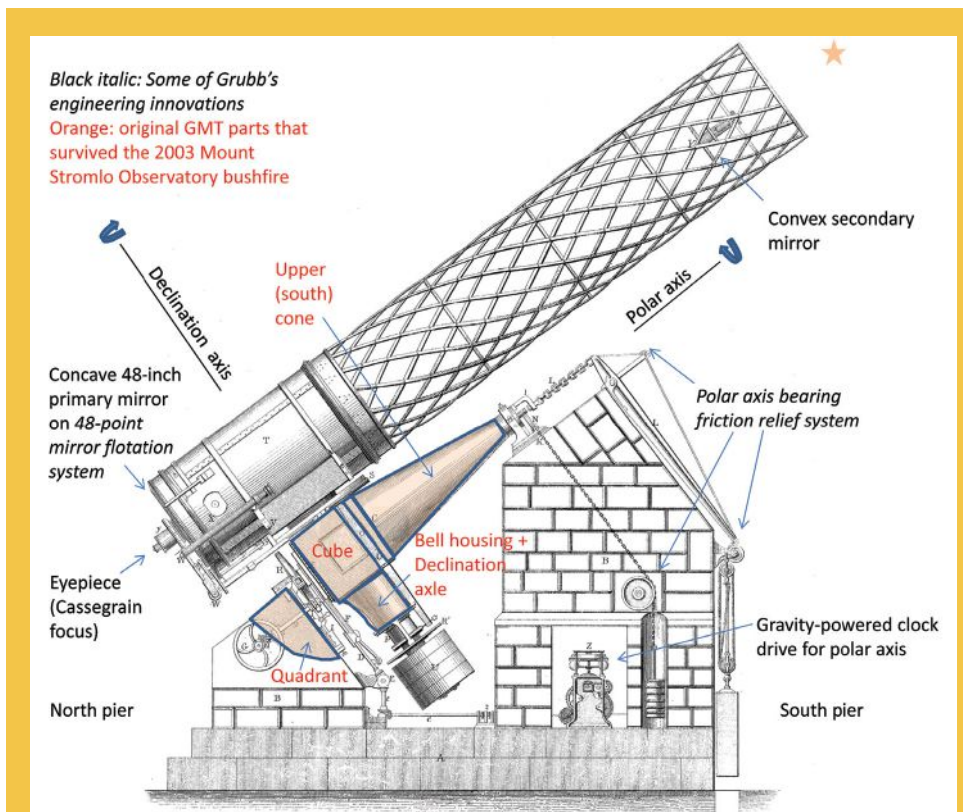
Phoenix from the Ashes

Fast forward through the twentieth century: after the 2003 Mount Stromlo fire, it dawned on several Victorians that with volunteer labor, the stored original parts, the burnt remnants at Mount Stromlo, and new optics, the GMT could be reconstructed. Representatives of Museums Victoria and the Astronomical Society of Victoria (one of the largest astronomical societies in the world, now 1,000+ members strong) began negotiations with Mount Stromlo management and other relevant organizations.

In 2008, after insurance issues were finally settled, three organizations signed a formal memorandum of understanding: Museums Victoria (which owns the telescope parts plus restoration resources), the Royal Botanic Gardens (which manages the original GMT House on its original site), and the ASV (which has ample volunteer retired labor with needed optical and engineering skills and time). To acquire a modern mirror and reconstruct missing parts, the entire GMT restoration was initially projected to cost about \$3 million (in Australian dollars), requiring grants and fundraising. In November 2008, the mangled 50-inch telescope at Mount Stromlo was disassembled and trucked back to the museum store. There, every Wednesday, ASV volunteers work on the GMT in ample space that includes a 10-ton capacity overhead gantry crane and a machine shop.

Plan the Work, Work the Plan

The GMT reconstruction team conceptually divided the work into three phases: Stage 1 was dismantling, drawing, and cataloguing, Stage 2 design and reconstruction of mechanical components, and Stage 3 the provision of new optics and final assembly and installation at the historic site. Because of the daunting magnitude of the project, much of 2009 was devoted to laying essential groundwork for Stage 1.



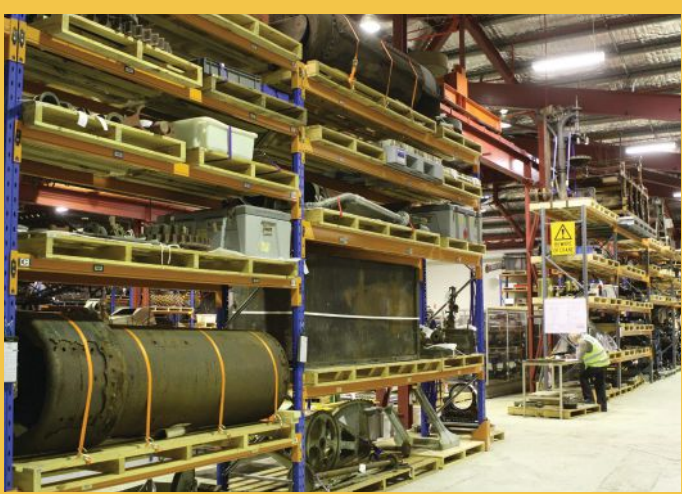
A modified diagram of the GMT as published in *Philosophical Transactions of the Royal Society of London* in 1868 illustrates some engineering innovations by the Southern Telescope Committee and the Dublin telescope maker Thomas Grubb. It was the largest equatorially mounted telescope in the world (English cross-axis style). Grubb's counterpoise system for minimizing frictional loads on the bearings allowed the telescope to be slewed easily by one person and to be clock-driven to compensate for the rotation of the earth. Other innovations included the 48-point mirror support system to avoid flexure at different observing angles, and the use of the Cassegrain focus so the astronomer could observe from floor level. Although Grubb did not invent all these features, he was the first to combine them for such a large instrument. The few parts colored in orange also went through the 2003 bushfire at Mount Stromlo Observatory. Image: *Phil. Trans.* 1868; annotations by Trudy E. Bell

To document every part, ASV volunteers began building an engineering spreadsheet. They photographed and measured every part to an accuracy of 0.1 mm and weighed larger parts to the nearest 0.5 kg (5 g for smaller parts under 2 kg) so the rebuilt telescope could be properly counterweighted. Some parts could be reused as is. But others clearly needed some repair, modification, or replacement. In those cases, documentation included writing a proposal for the work needed.

The volunteers also drew up a gigantic flow chart to identify critical paths in the restoration project: which sequence of tasks must be completed on time for the entire project to finish on time. Meantime, the three organizations jointly developed a communications strategy—including mission statement, fact sheets, photographs, logo, and website—for seeking publicity and funding.

In 2009–10, the restoration team felt ready to begin dismantling and cleaning. They started with the GMT's heaviest structural component: the giant central 620-kg (1,400-lb) cast iron cube that supported the telescope tube. Attached to it were the south (upper) cone of the telescope's polar axis and the bell housing for the telescope's declination axis [see diagram].

To everyone's surprise and gratification, the nuts and bolts were still in good shape even after enduring the Mount Stromlo bushfire and nearly six years out in the weather, raising hopes for the integrity of other parts. "We grew to relish the sound of the 'crack' as a nut or



ABOVE: At least 70% of the original GMT parts are safely sheltered in the “museum store”—the offsite collection storehouse for large engineering objects of Museums Victoria in Melbourne. Since 2009, a restoration team from the Astronomical Society of Victoria and from the museum has met weekly to document and clean parts, undo 20th-century modifications, and reverse-engineer missing parts, all with the goal of reconstructing the 1869 instrument for public astronomy education. *Photo: Trudy E. Bell.* **BELOW:** The cube, upper (south) cone, and bell housing of the GMT’s polar and declination axes that had gone through the 2003 bushfire had been documented, cleaned, and partially reassembled by August 2014. This heart of the GMT’s equatorial mount is suspended by the 10-ton overhead crane of the cavernous workspace at the museum store in about the same orientation as the mount shown at left in the wall-sized photograph of the fully operational GMT taken about 1875. That enlarged image is not decoration; the restoration team relies on it and other 19th-century photographs to obtain crucial measurements and understanding of how the GMT’s parts fit together. *Photo: Steve Roberts.*



[machine screw] suddenly began to rotate under our ministrations,” recalled ASV volunteer Steve Roberts, who documented the GMT’s progress in the project’s occasional newsletter aptly named *Phoenix*. “That, and the smell of WD-40 in the morning.”

Everything was carefully cleaned by hand, a tricky task as many painted parts had a toxic red lead undercoat. Moreover, on parts that had survived the Mount Stromlo bushfire, the paint had baked into an almost enameled finish that resisted all chemicals and was slippery under a wire brush: the only technique that worked was lightly tapping with a chisel to spall off the coating in small flakes. (Powered wire brushes were not permitted for use on such historically significant heritage parts.) Finishing the job with

a hand-held wire brush and paint stripper threw up “a stinging, filthy spray of solvent, dust, and paint particles against which we [had] to wear protective gloves and face shields,” Roberts recalled.

After many Wednesdays of patient, grueling labor, by May 2010 all the beautifully machined surfaces of the big iron cube, cone, and bell housing were gleaming; they and their fasteners were then protected from rust with a thin coat of oil, assigned a number, and stored either inside a numbered gray box or strapped to a pallet with a barcode label.

By early 2012, the team had catalogued all the GMT’s parts, cleaned them, understood where they worked in the telescope, and were halfway through photographing them and documenting their condition, function, appearance, and markings. From carefully hand-drawn life-size or scale technical drawings and measurements, ASV AutoCAD expert Campbell Johns produced CAD engineering drawings. Some especially complex parts required multiple drawings: for example, the cube with all its uniquely shaped openings and different sized and irregularly spaced screw holes required no fewer than 12 drawings—one each for the inner and outer faces of its six sides. Every CAD drawing was cross-checked by a different volunteer and Johns corrected the final version in the file server.

Plans for Posterity

All the meticulous steps sometimes felt tedious and exasperating. But the “GMT being an irreplaceable relic of a bygone age” and also public property, Roberts noted, “we should not make any mistakes with heritage materials.” Another goal was to leave a complete set of engineering plans for posterity. “The drawings provide a record of the state in which components were found and any changes or alterations made, which is an important part of thoroughly documenting a conservation/restoration project,” explained Matthew Churchward, a senior curator of Museums Victoria.

Also in 2012, the ASV team began provisionally fitting cleaned parts back together to plan reassembly. Although they knew how parts they had disassembled fit together, where the hundreds of loose parts in the museum store since the 1980s fit was not always apparent, especially where pieces were missing.

Meantime, the volunteers began searching in earnest for a modern 48-inch mirror. Three promising leads for potential donation of pre-owned mirrors ended in disappointment (including one from the decommissioned Table Mountain Observatory telescope, then in offsite storage of NASA’s Jet Propulsion Laboratory in Southern California, which I tried to broker for the ASV in 2012).

In 2013, team members led by ASV member physicist and optical engineer Barry Clark produced a major report identifying restoration needs grouped by type, highlighting needs requiring donation of funds or goods. For a brand new replacement mirror set, Clark’s team calculated a Cassegrain configuration with about three-quarters of the original effective focal length and other

modern modifications better for both public viewing and for celestial photography and spectroscopy. Their provisional designs were independently verified by the consultants Prime Optics and tweaked using Zemax optical design software.

Last October (2017), Museums Victoria released a formal request for Expressions of Interest (an Australian precursor to a Request for Tender) describing precisely what would be required in the mirror set and other opto-mechanical components, including working replicas of the original eyepieces.

‘Press On In the Hope’

Conservatively, the GMT’s restoration is about half complete, delayed in part by unexpected engineering challenges. The biggest discovery: the massive cube is slightly distorted. Opposite faces are no longer exactly parallel or perpendicular. They are not off by much—the faces remain parallel within about 2 minutes of arc and the declination axis is about 5 arc minutes from a right angle with the polar axis. But that small divergence is enough to cause excessive runout of the polar drive mechanism (i.e., the polar axis and attached hour circles would not rotate concentrically but would describe an eccentric circle). Moreover, the cube has several fatigue cracks.

So the big question is: If three of the four faces involved are remachined, will the cube maintain enough strength to support over eight tons of moving mass? Will internal reinforcing plates reduce further growth of the cracks? One factor gives hope: in the 1860s, Grubb deliberately over-engineered the mount to be strong and stiff enough to carry the mass of a 60-inch speculum mirror, support system, and tube, should a larger telescope someday be desired. The team is exploring the possibility of fixing the cube’s angular errors with shims and steel-filled rigid epoxy gaskets cast in place, with continuous optical monitoring of the corrected angles while the epoxy is setting.

In the October–November 2017 issue of the ASV’s bimonthly magazine *CruX*, the director of ASV’s GMT Section Jim Pollock expressed his midnight fears: “[I]t now appears it will be impossible to complete the GMT restoration in time for the telescope’s 150th anniversary of its original installation” in mid-2019. But after more than 20,000 hours of dedicated volunteer work since 2008, “the team will press on in the hope that further funds will be forthcoming and a start on the reinstallation can be made by the end of 2019.”

Gratitude is expressed to the following expert sources and reviewers for helpful information, images, and feedback: Roger Ceragioli, Matthew Churchward, Barry Clark, Philip Edwards, Richard Gillespie, Ken Launie, Fred Orthlieb, Steve Roberts, and Matilda Vaughan—and especially to Jim Pollock, who also hosted my all-day visit to the GMT restoration work space.

Selected references

- The most recent authoritative book about the GMT is Richard Gillespie’s lavishly illustrated *The Great Melbourne Telescope*, Museums Victoria Publishing, 2011.
- To get a feel for the magnitude of the GMT restoration, see the Australia Broadcasting Corp.’s seven-minute video www.youtube.com/watch?v=C0KlzIxlKU4 from 2016 (featuring several people helpful to this article), especially beginning around minute 3.
- For sheer first-person drama of casting the GMT’s mirrors and other construction, see T.R. Robinson and Thomas Grubb, “Description of the Great Melbourne Telescope,” *Philosophical Transactions of the Royal Society of London* 159: 127–161, 1869, available at <https://www.jstor.org/stable/108993>.
- For perspective on how meticulously the Southern Telescope Committee weighed design decisions and risk trade-offs for optics, mechanics, and location, see *Correspondence Concerning the Great Melbourne Telescope. In three parts: 1852–1870* (London, 1871).
- “Report of the Committee on the Melbourne Telescope to the President and Council of the Royal Society,” *Proceedings of the Royal Society of London* 16: 313–316 (1867–8). This is the document that pronounced the GMT a “masterpiece of engineering.”
- Those hankering for more in-depth engineering details (some quite funny) about the GMT restoration project will enjoy the 11 issues of the project’s newsletter *Phoenix* published between June 2009 and April 2015; PDFs can be downloaded from the project’s website at <https://greatmelbournetelescope.org.au/newsletter/>. (My attempt to broker a 48-inch mirror for the ASV is summarized in issue #7 (November 2012), pp. 7–8.)

Academic secondary references include:

- Andropoulos, Jenny Ioanna, *Astronomical Publications of the Melbourne Observatory* (James Cook University, 2014) is a two-volume, illustrated Ph.D. thesis topping 800 pages that in part exhaustively reexamines the scientific contributions of the Great Melbourne Telescope.
- Andropoulos, Jenny, and Wayne Orchiston, “Melbourne Observatory and the Genesis of Astrophysics in Australia,” *Anglo-Australian Observatory Newsletter*, February 2006: 18–20.
- Gascoigne, S.C.B., “The Great Melbourne Telescope and other 19th-century Reflectors,” *Quarterly Journal of the Royal Astronomical Society* 37: 101–128 (1996).
- Gillespie, Richard, “The Great Melbourne Telescope: A Contextual History,” in *400 Years of Astronomical Telescopes: A Review of History, Science and Technology* (Springer, 2010 [on CD-ROM and <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.611.8535&rep=rep1&type=pdf>]).
- Hart, J., et al., “The Telescope System of the MACHO Program,” *Publications of the Astronomical Society of the Pacific* 108: 220–222 (1996).
- Hyde, W. Lewis, “The Calamity of the Great Melbourne Telescope,” *Proceedings of the Astronomical Society of Australia* 7: 227–230 (1987).

Trudy E. Bell, M.A. (t.e.bell@ieee.org), former editor for *Scientific American* and *IEEE Spectrum* magazines and senior writer for the University of California High-Performance



AstroComputing Center, is author or co-author of a dozen books and 500+ articles. Her journalism prizes include the 2006 David N. Schramm Award of the American Astronomical Society. This is her 28th feature

article for *The Bent*. She is pictured during a visit to Australia, holding an original name plate reading “Grubb 1868 Dublin” before the Great Melbourne Telescope’s historic 48-inch speculum mirror (mirror is facing the wall; central hole is for the Cassegrain focus). *Photo: Jim Pollock.*

Profiles in Leadership #12

Ray Rothrock: Tech Investor Who Runs on Optimism

Ray A. Rothrock, P.E., Texas Delta '77, Venture Capitalist Extraordinaire

by Alan S. Brown

RAY ROTHROCK, the general manager at the Rockefeller family's venture capital firm, Venrock, moves fast. When opportunity presents itself—and sometimes even when it does not—he plunges forward, certain that action will create its own luck.

So, when the Benedictine monks from Woodside Priory, a small secondary school located in the foothills of Silicon Valley, called for help, Rothrock's wife, Meredith, knew her husband would take the lead.

Priory had a fine reputation but an aging infrastructure. Within months, Rothrock was chairing the board and mapping which facilities to refurbish or build. With the building fund running out of money while the \$25 million expansion languished in municipal committees, Rothrock acted. He excavated a large hole for a building foundation in the middle of the parking lot.

The gaping hole added urgency to his final presentation to the town, which okayed the permits. He then called 10 of the school's wealthiest parents, pointed to the permit and the hole, and raised \$5 million in one night. He helped make Priory one of California's top schools.

It was vintage Rothrock, a can-do attitude, salesmanship backed by mastery of details, and enough optimism

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.

to embrace risks that make most people flinch.

That optimism, fueled by a booming economy, was infectious when Rothrock was born in 1954. His parents, who met at a dance hall, never attended college. Yet his father, a machinist, could buy a two-story brick home in Ft. Worth, TX, where young Ray helped him fix appliances and

tear down transmissions, and motorcycles.

Rothrock was intensely curious, devouring *National Geographics* and the entire *World Book Encyclopedia*. His passion for music prompted his parents to sell their horse to buy a piano.

As a teen, he was a straight-A student, an Eagle Scout, and the school band's drum major. "My scout friends were very different from my music or academic friends, but I learned to get along with all of them on their terms," he recalled.

Excelled in Class

The summer after graduating as valedictorian, Rothrock worked in an asphalt roofing plant while debating whether to pursue nuclear engineering or music. When he visited Texas A&M University, an associate engineering dean offered to enroll him on the spot. "I remember

thinking, 'This smart guy thinks I should be in college and the alternative is hard labor in 110 degree heat,' so I enrolled," he added.

Rothrock excelled in class, became a Tau Beta Pi officer, and helped plan TBI's annual Convention at Texas A&M. He learned to work with many engineers at a time when "interdisciplinary" was not part of academia's vocabulary. His ability to reach across technology barriers would define his career.

He became a student leader, opening Texas A&M's music program to all students and growing the ham radio club to 500 members, from 50.

After Texas A&M, he opted for an MIT Ph.D. in nuclear engineering. It proved a cul-



Breaking the ground for Woodside Priory's new Rothrock Performance Hall in 2006. Rothrock, third from left, helped the small school raise \$25 million to upgrade its facilities.

ture shock. Many classes were highly theoretical, while Rothrock saw himself as “a mechanic who still carried my dad’s toolbox.”

Rothrock opted for practice over theory. After completing a master’s project to measure how well liquids cooled runaway nuclear reactors, he left the program for Yankee Atomic Electric. It was not what he had imagined. As a safety engineer in western Massachusetts, he spent his days filling out forms. “There was no research, no science.”

Bored, Rothrock began writing code. Safety engineers spent hours combing through printouts for data. Rothrock’s software captured it automatically.

Rothrock was reinventing his career when the Three Mile Island partial reactor meltdown occurred in 1979. “Our leadership was saying a meltdown could never happen and I was watching it happen on television,” he said.

Frustrated, he left for a job with Exxon in Houston, where he wrote computer code to simulate solution mining of uranium with hot pressurized liquids. Yet, Three Mile Island had soured the nation on nuclear power and demand for uranium declined. “Exxon gathered all 200 of us,” he recalled. “A vice president from New York walked to the front of the room, introduced himself, and said that Exxon was shutting down the division. They called us into a room one by one and gave us either a pink slip or our next assignment.”

Rothrock declined the assignment and joined a startup where he wrote code and designed plant retrofits. When the business failed, he joined a large consulting firm, but left when it was acquired.

Classic Success Story

In 1984, he joined a small startup called Sun Microsystems. It became a classic Silicon Valley success story, pioneering high-performance PC’s for engineering and scientific computing. Rothrock’s job was to convince CAD/CAM developers like Autodesk and Intergraph to adapt their software to run on Sun workstations.

Rothrock was good at it. He wrote and used CAD software and he had grit. When one CEO failed to respond, he found a picture of him and then ambushed him in his company’s parking lot to get an appointment.

Rothrock was living the startup dream, yet he was increasingly drawn to the work his roommate, Steve Krausz, was doing in venture capital. Rothrock tagged along with Krausz to VC events and parties. When Sun went public, he wrote a regulatory document describing the company’s technology.

“I got touched by the business,” he said. “I mean, why not? I was curious, I could sell, and I was interested in new technology. All I needed was my union card, which was an MBA.”

Rothrock’s future wife, Meredith, was living in Boston and offered to support him while he went to Harvard Business School.

Rothrock graduated during the recession of 1988. Sun, Apple, and Steve Jobs’ new company, NeXT Computer, all offered him jobs. VC work was harder to come by.



This Leader In Brief

Full professional name: Ray Rothrock.

Most recent position: chairman and CEO, RedSeal Inc.

Birthplace: Ft. Worth, TX, 1954.

Highest degree: S.M., in nuclear engineering, Massachusetts Institute of Technology (MIT), 1979.

Major career highlights: Director, CAD marketing, Sun Microsystems, 1984-88; partner (1988-95) and general partner (1995-2013), Venrock; chairman, National Venture Capital Association, 2012-13; and chairman/CEO, RedSeal, 2014-current. At Venrock, he invested in more than 50 companies, including Spyglass, Check Point, Double-Click, Lycos, PGP, Shape Security, CTERA Networks, Tri Alpha Energy, and Vontu, as well as RedSeal.

Board memberships: Continues to serve on the boards of some of his investments, including Tri Alpha, Check Point, Roku, and Shape Point. He is currently chairman of RedSeal and on the board of the MIT Corporation, the \$40 billion University of Texas Investment Management Co. (UTIMCO), and a trustee of TheatreWorks, a local theater company.

Honors: Rothrock was named a distinguished alumnus by MIT for nuclear engineering in 2013; Tau Beta Pi in 2015; and Texas A&M in 2016. He appeared on the Forbes Midas list of best VC dealmakers in 2012 and 2013.

Greatest accomplishment: My son. I’ve raised a good citizen, a great friend, and a talented musician.

Family: Married Meredith in 1987. Their son, Nathaniel, 27, is a professional actor and musician.

Leaders most admired: Robert Gates, Jim Lovell, Earl Rudder (a D-Day hero and the architect of modern Texas A&M), Winston Churchill, Steven Jobs, and Lawrence and David Rockefeller.

Hobbies: Music, ham radio emergency communication, skiing, bicycling, hiking, and pro bono work for education.

Favorite books: Biographies, most notably *Duty* by Robert Gates; *Titan*, *The Life of John D. Rockefeller* by Ron Chernow; *Lost Moon: The Perilous Voyage of Apollo 13* by Jim Lovell and Jeffrey Kluger; and *The Smartest Guys in the Room: The Amazing Rise and Scandalous Fall of Enron* by Bethany McLean and Peter Elkind. He also binge watches such streaming television shows as “Billions.”

Personal motto: I would have fought harder to invest in Yahoo. I would not have let business get in the way of some friendships. I would have married Meredith and learned to play bass in a rock band sooner.



Above: Ray, two years old, with his parents and older brother Gary in Ft. Worth, TX. **Center:** Rothrock, 18, as drum major of his high school marching band. **Bottom:** Armed with his MIT master's, Rothrock begins his career as a nuclear engineer in 1980.



Only three Harvard grads got VC positions, compared with 35 in 1987. Rothrock was one of them.

“What set me apart was that I was older,” he said. “I worked at startups that failed and at one big success. I had a strong track record, I could sell and had advanced degrees in engineering, and business.”

Venrock, the Rockefeller’s family fund, invited him in for an interview. “When I came in for the last interview, the lead partner had my resume on his desk. So, I picked it up and said, ‘Why won’t you hire this guy?’”

“He smiled and started to list his objections. Salesmen love that, because it gives us an opportunity to knock them down. He said, ‘You don’t have an electrical engineering degree.’ So, I said, ‘If I had one, it would have been in analog because digital processors hadn’t been invented yet.’ And he said, ‘Good answer.’ We kept going back and forth, but I think those aggressive tactics are the reason I got the job. VC’s have to compete for companies and I had to show that I could do that,” he said.

His first big success came in 1992, when he bought into Spyglass, a company developing an internet browser. Rothrock had used ARPANET, the internet’s text-based precursor while at Sun, and understood the value of a point-and-click interface. He ponied up \$1.25 million for one-quarter of the company. When the internet exploded several years later, Microsoft licensed the technology for Internet Explorer—at \$1 per copy. Venrock made millions and Rothrock became a partner.

He redoubled his internet efforts, investing in Lycos, an early search engine, and Double-Click, which managed website ads. He was one of only a handful of VC’s to attend the first internet software conference, where he met Check Point Software, an Israeli security company.

The Good and the Bad

Rothrock wanted that deal. He realized that the internet posed security threats and he had heard good things about Check Point’s network firewall from friends at Sun.

“Word got out and it turned into a feeding frenzy,” Rothrock said. “Everyone wanted that deal. But before I met with them, I installed their firewall at Venrock. When I told that to Check Point’s CEO, he didn’t believe me and made me convince him. My understanding of his technology made the deal.”

It was also the beginning of a relationship with Check Point founders Shlomo Kramer and Gil Shwed, a veteran of Israel Defense Force’s secretive Unit 8200 signal intelligence corps. Rothrock went on to do several other IT security deals with them and other Unit 8200 veterans.

He had a great track record of picking companies with complex technologies. During his 25 years at Venrock, seven investments went public, 34 were bought or merged, three still involve him, and seven went under.

The failure that hurt most was Autonomics Networks which made software to control access to sensitive data.

“It had a great CEO, the technology worked, and we had Beta customers on Wall Street who loved it,” he said. “It could have been a billion dollar deal, but the 2008 recession hit. The bankers kept promising to buy software

and I kept convincing my partners it would bounce back.”

Autonomics expanded to meet those orders. When they never came, Rothrock had to shut it down.

The deepening recession tested Rothrock, now Venrock’s general manager, in other ways. Many of Venrock’s limited partners needed cash and wanted to liquidate their investments. Rothrock used facts and threats to talk them out of it. He argued that they would receive only pennies on the dollar and that he would not allow them to invest in Venrock’s next round of investments.

They stayed, yet by 2013, Rothrock was ready to leave. He thought VC’s were overpaying for businesses that had no way to spend such enormous cash infusions.

Rothrock never quite retired. He taught, chaired several startups, and helped manage Texas’ \$40 billion university endowment trust. He volunteered with MIT, professional organizations, charities, and government.

Then, in 2014, he became CEO of RedSeal, a security business that helped networks handle cyberattacks. Rothrock and his partners had cobbled the business together in 2004 and found an executive to run it. “It was the only investment I ever made that did not have a founder in the CEO role,” he said. “I started a company without a leader and it was the worst thing you could do.”

When RedSeal started hemorrhaging money, Rothrock and fellow investor Pete Sinclair decided to step in. As CEO, Rothrock had to fire half the company. Yet, he had learned something from his time at Exxon. “You don’t just give them an envelope in a back room,” he said. “You can deliver a tough business message with optimism—we’re going to be okay, we’ll all get through this.”

Rothrock changed the culture. His reputation helped him recruit a strong management team. RedSeal began reaching decisions faster. Sales and profitability rose.

Rothrock was enjoying it too much to leave, though it was a sharp departure from his past: “When I was on the board, I was the CEO’s greatest fan and harshest critic. As CEO, I’m like a kindergarten teacher. I have a plan, maybe it’s optimistic, and if we get knocked down, I have to pick up everything, dust it off, and get going again.”

That optimism explains why Rothrock raised \$600 million to fund Tri-Alpha, which plans to commercialize fusion based on particle accelerator technology. He expects it will take another \$2.5 billion to reach market.

“If successful, it changes the world,” Rothrock said.

He raised the money by pitching family investment funds with a social mission and large funds able to spend a fraction of a percent of assets to balance portfolios.

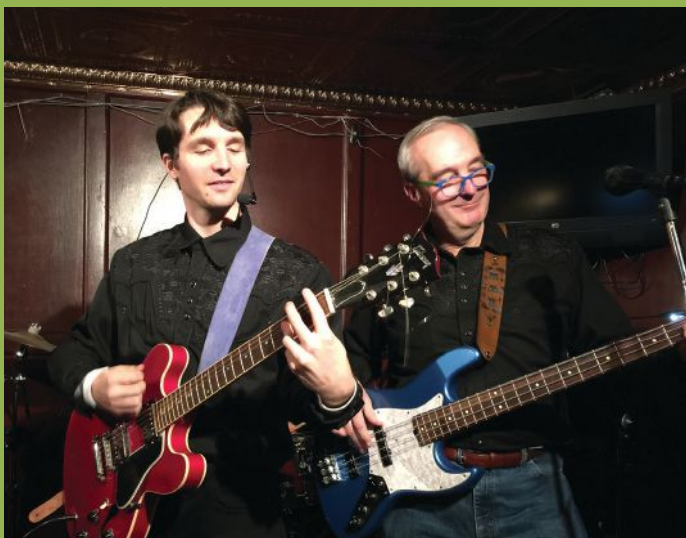
Rothrock calls Tri-Alpha a glimmer of greatness. “People are hungry for optimism,” he said.

It is the type of deal this optimist has been chasing since he was a boy.

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: Meredith, Nathaniel, and Ray Rothrock. **Center:** Board member Rothrock celebrates the IPO of streaming service Roku with founder Anthony Wood. **Below:** Ray learned to play bass so he could form a band with his son Nathaniel. They play locally in Silicon Valley.





The TAU BETA PI Chapter Endowment Initiative was launched in Spring 2014 to fund Association activities that support the collegiate chapters. Major Gifts Officer Sherry D. Jennings-King, Tennessee Alpha '93, pictured at left, shares progress and developments.

Chapter Endowment Update

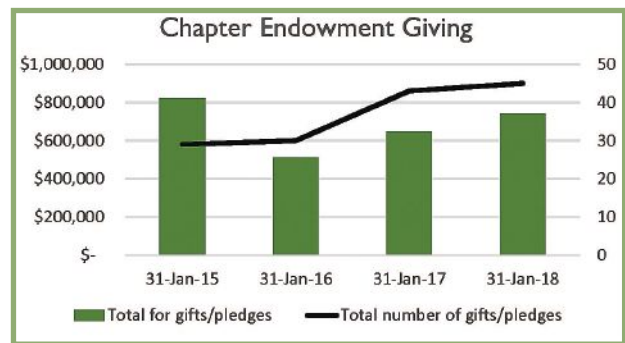
HERE IS MUCH GOOD NEWS to report this year on our Chapter Endowment Initiative, by which alumni, companies, and foundations can permanently endow the Association's activities that support any of our 246 student chapters. Last year we reported 43 gifts/pledges and this year we have another 45 to add to the list as we strive to endow all of our chapters.

At this time, endowed chapters at the level of \$100,000 or more include:

California Delta	University of Southern California	\$100,000
California Upsilon	Cal. State University, Sacramento	\$100,000
Illinois Alpha	Univ. of Ill., Urb-Champaign	\$130,000
Indiana Gamma	University of Notre Dame	\$125,000
Iowa Alpha	Iowa State University	\$110,289
Michigan Beta	Michigan Tech. University	\$100,000
Michigan Gamma	University of Michigan	\$104,912
Michigan Epsilon	Wayne State University	\$250,000
Michigan Zeta	Kettering University	\$100,000
New York Delta	Cornell University	\$105,000
Ohio Beta	University of Cincinnati	\$100,000
Ohio Gamma	The Ohio State University	\$100,000
S. Dakota Alpha	S. Dakota School of Mines & Tech.	\$120,000
Texas Beta	Texas Tech University	\$100,000
Virginia Alpha	University of Virginia	\$115,000
Wyoming Alpha	University of Wyoming	\$100,000

When the Spring 2017 issue of *The Bent* hit mailboxes, our alumni took notice and another four chapters (in bold) were endowed. Special thanks to Lester and Marfa Holland, *IL A '66*, David Brule, *MI B '72*, Renee Schoenborn, *WY A '85*, and Randy Alexoff, *OH B '81*, for stepping forward with these leadership gifts.

The current value of the Chapter Endowment Initiative fund including growth and interest is \$2,667,697.34.



How to Help

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

Tax-deductible

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

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

Challenges/Matches

Over the past year, gifts from alumni launched five "challenge matches" in support of these chapters:

California Alpha	University of California, Berkeley	David Kepler, CA A '75	\$20,000
Iowa Beta	University of Iowa	David Kilzer, IA A '96	\$20,000
Mississippi Alpha	Mississippi State University	Bill Sinclair, MS A '63	\$20,000
Ohio Alpha	Case Western Reserve University	Charles Reed, OH A '34	\$20,000
Pennsylvania Theta	Villanova University	John Hennessy, PA Q '73	\$25,000

Want to Know More?

Please check out our website at tbp.org/give/chapterEndowment.cfm or email Sherry at sherry.jenningsking@tbp.org or call cell (612)226-2922.

New Gifts and Pledges Received

Randall L. Alexoff , <i>OH B '81</i> for OH Beta at University of Cincinnati	\$100,000	Joe R. Fowler , Ph.D., <i>TX Δ '68</i> for TX Delta at Texas A&M University	\$5,000
David J. Brule Sr. , <i>MI B '72</i> for MI Beta at Michigan Technological University	\$90,000	Clinton R. Gilliland , <i>GA A '59</i> for GA Alpha at Georgia Institute of Technology	\$5,000
Lester M. Holland Jr. , <i>IL A '66</i> for IL Alpha at Univ. of Illinois at Urbana-Champaign	\$90,000	Justin M. Glasgow , M.D., Ph.D., <i>IA B '05</i> for IA Beta at University of Iowa	\$5,000
Renee M. Schoenborn , P.E., <i>WY A '85</i> for WY Alpha at University of Wyoming	\$80,000	Harbor Capital Advisors for WI Alpha at University of Wisconsin-Madison	\$5,000
Carleton C. Hoffner Jr. , P.E., <i>NY Γ '57</i> for CA Gamma at Stanford University	\$10,000	Lawrence J. Hollander , PE, <i>NY E '51</i> for NY Mu at Union College	\$5,000
for MD Gamma at U.S. Naval Academy	\$10,000	Theodore C. Jarvi , <i>AZ B '66</i> for AZ Beta at Arizona State University	\$5,000
for NY Gamma at Rensselaer Poly. Inst.	\$10,000	Dennis C. Jerome , <i>MS A '67</i> for MS Alpha at Mississippi State University	\$5,000
† Warren H. Bossert Jr. , <i>PA B '45</i> for PA Beta at Pennsylvania State University	\$25,000	Howard E. Jessen , <i>CA B '46</i> for CA Beta at California Institute of Technology	\$5,000
John L. Hennessy III , Ph.D., <i>PA Θ '73</i> for PA Theta at Villanova University	\$25,000	Sandi and Kevin S. Kayse , P.E., <i>CO B '78</i> for IA Beta at University of Iowa	\$5,000
Alan V. Dausman , P.E., <i>IN E '77</i> for IN Epsilon at Trine University	\$20,000	Raymond R. LaFrey , <i>MI A '61</i> for MI Alpha at Michigan State University	\$5,000
David D. Kilzer , <i>IA A '96</i> for IA Beta at University of Iowa	\$20,000	Larry T. Nelms , <i>MS A '63</i> for MS Alpha at Mississippi State University	\$5,000
† Charles E. Reed , D.Sc., <i>OH A '34</i> for OH Alpha at Case Western Reserve University	\$20,000	Stewart C. O'Dell , <i>TX Γ '78</i> for TX Nu at University of Texas Rio Grande Valley	\$5,000
Larry A. Simonson , Ph.D., P.E., <i>SD A '69</i> for SD Alpha at South Dakota Sch. of Mines & Tech.	\$20,000	Roy Franklin Quick Jr. , <i>MA B '70</i> for MA Beta at Massachusetts Institute of Technology	\$5,000
William F.H. Sinclair , <i>MS A '63</i> for MS Alpha at Mississippi State University	\$20,000	Stephen W. Ricks , <i>IN A '63</i> for IN Alpha at Purdue University	\$5,000
George O. Trebaol , <i>CA H '75</i> for CA Eta at San Jose State University	\$20,000	T. Richard Robe , Ph.D., P.E., <i>OH Δ '55</i> for OH Delta at Ohio University	\$5,000
R. Dudley White , <i>VA A '76</i> for NY Gamma at Rensselaer Polytechnic Institute	\$20,000	Bobby S. Shackouls , <i>MS A '72</i> for MS Alpha at Mississippi State University	\$5,000
Stanley Korzep , <i>OH E '66</i> for OH Epsilon at Cleveland State University	\$12,000	Carl M. Stahle , Ph.D., <i>MD B '81</i> for MD Beta at University of Maryland	\$5,000
David J. Cowan Jr. , <i>FL E '14</i> for FL Epsilon at Florida Atlantic University	\$5,171	William Wen , <i>DC A '68</i> for DC Alpha at Howard University	\$5,000
Alan J. Amici , <i>MI I '85</i> for MI Iota at University of Michigan-Dearborn	\$5,000	Richard O. Wilson , <i>TX Γ '56</i> for TX Gamma at Rice University	\$5,000
Gordon W. Anderson , Ph.D., <i>NY Δ '59</i> for NY Delta at Cornell University	\$5,000	Anonymous , <i>DE A '70</i> for DE Alpha at University of Delaware	\$5,000
COL William (Dan) Benton , USAF (ret.), <i>MS A '71</i>	\$5,000	Anonymous , <i>PA A '90</i> for PA Lambda at University of Pittsburgh	\$5,000
for MS Alpha at Mississippi State University		Anonymous , <i>TX A '63</i> for TX Alpha at University of Texas at Austin	\$5,000
CAPT Thomas C. Crane , USN (ret.), <i>MD B '62</i>	\$5,000	Anonymous , <i>TX Z '86</i> for TX Zeta at Lamar University	\$5,000
for MD Beta at University of Maryland			
Richard A. Derbes , <i>OH A '68</i> for OH Alpha at Case Western Reserve University	\$5,000		
Franklin T. Dodge , <i>TN A '60</i> for TN Alpha at University of Tennessee	\$5,000		

Randall L. Alexoff, OH B '81

Endowment for the Ohio Beta Chapter at University of Cincinnati

GROWING UP in Poland, OH, Randy Alexoff had dreams of pursuing a career in music. As a trumpet player in the high school band, he enjoyed his time performing and playing in small groups noting, "I liked that it was artistic and creative."

Randy's plans for his future changed as he was exposed increasingly to the field of engineering. His father was a partner in a machine tool building company and Randy often worked there after school. He admired the engineering professionals who were their customers and took a special interest in one who happened to be a metallurgist at a steel company in Ohio.

Randy chose to attend the University of Cincinnati as he liked their co-op program and the idea of working and learning concurrently and also making some money to help out with college expenses. He began taking courses in electrical engineering but during his sophomore year (of a 5-year program) changed to materials science.

In 1985, Randy founded Vari-Wall Tube Specialists beginning operations in an 800-square foot garage in north-east Ohio. Their mission is to provide solutions to customers with tubular design problems and many of their initial projects centered around automotive suspension and bicycle frame tubes where they developed and perfected their patented processes. The company began manufacturing operations in 1986 and quickly grew into a high-volume parts manufacturer. His father joined him in this new endeavor and together over the next three decades they designed and built 150 custom machines needed to make their products.

Revolutionized Mountain Bike Frames

During the late 1980s, they helped revolutionize mountain bike frames and suspension fork systems creating the world's first butted aluminum frame tubes. These parts helped push weight reduction in bicycles while increasing performance. In a few short years, Vari-Wall became a key supplier of butted bicycle tubing for many companies including Cannondale Bicycles, Huffy Bikes, Trek Bikes, RockShox, and Gary Fisher Bicycle.

By the early 1990s, the business expanded into automotive suspension systems and their products were used in many areas including independent suspension link arms on Toyota Camrys and variable wall thickness twist axles on PT Cruisers. In 1992, upon meeting Ray DeMarini, Randy helped his company build a full line of single and double-wall aluminum baseball bats. The business continued to expand into light truck axle housing tube

manufacturing in 2002 producing 100% of the axle housing tubes for Jeep Grand Cherokee and Dodge Durango vehicles. By 2006, they were building over 1,000,000 housing tubes per year. Six years ago, Vari-Wall moved into the aerospace seating market and their parts revolutionized aerospace seat beam design by providing the ultimate light-weight variable-wall thickness tubes manufactured from high strength aluminum alloys.



The company celebrated 32 years of business last year and continues to evolve and change to meet the needs of current and future customers. One recent personnel change within the company is particularly exciting for Randy. His youngest daughter and her husband recently joined the Vari-Wall team. He is enjoying mentoring them and looks forward to collaborating with them as the company develops new products and processes.

Randy notes, "Some of the most fun things looking back on our history were dealing with people who were starting small companies and helping them to make better performing light-weight products. We worked with many founders of companies trying to make the next 'latest/greatest' product and along the way we helped various industries improve things that didn't exist before we were there."

"Good Work Ethics"

Reflecting on his ten years, Randy shares advice for future engineers, "A good work ethic is critical," adding, "Whether you recognize it at the time or not, as the years go by, you understand the effort required to make a business survive. Keep searching for a work or activity...something you feel inspired to do in life...you've got to have passion and be 100% committed to the end result."

In his spare time, Randy enjoys collecting and refurbishing cars from Model Ts to muscle cars and enjoys driving all of them. This past year saw the completion of an extensive rebuild of a '23 Model T and the addition of a 2016 Super Snake.

Regarding his \$100,000 gift to the Chapter Endowment Initiative in support of the Ohio Beta Chapter, "This is a long-term commitment to support my home chapter, and I like the fact that it will support our students' attendance at the annual Convention and district conference. It's nice to know that you've left some legacy that will help future generations of engineering students."

David J. Brule Sr., *MI B '72*

Endowment for the Michigan Beta Chapter at Michigan Technological University

David Brule is a native of Michigan's Upper Peninsula (UP) having spent his entire academic and professional life in this part of the country...and likes it that way.

He has enjoyed an extremely successful career in engineering yet shares that his academic travels starting out were "Somewhat interesting..." Upon graduation from high school, he was accepted into only one school, Northern Michigan University. During his brief time there, he focused more on college life and the activities offered rather than academics. He was asked to leave because he received grades of "F" in each of his four classes and admits that he had "No direction in life, no focus...I was having fun." The dean of students kept open the possibility of returning saying that he was the kind of person who should be studying for a Ph.D. With that remark, David turned things around. Newly married, he went to work as a lineman digging holes in -30°F weather which afforded him time to contemplate his future and at the same time igniting an interest in his work on electrical lines. It occurred to David that his interest in the power field was fairly significant and he decided to do whatever it took to return to Northern Michigan University, which he did. David went on to stellar academic performance and in the fall of 1969 transferred to Michigan Technological University to join their electrical engineering program.

David was invited to join Tau Beta Pi during his junior year and became president of the chapter attending the annual Convention in Knoxville, TN. He was also instrumental in raising money for the Bent monument which stands on campus today.

Fresh out of college, he went to work for Wisconsin Public Service where he worked as a Division Engineer. At the same time he was contemplating either pursuing graduate work at the University of Wisconsin or joining his family's business, MJ Electric, which at the time was an electrical contracting firm. He made the decision to join MJ Electric in June 1973 and has worked there since. David notes that they were a relatively small business when he eventually purchased it from his father and grew it to become one of the top ten electrical contractors in the U.S. He sold MJ Electric in December 2000 but continued with another company called Systems Control that provides protection and control equipment for the electric transmission grid. In 1985, David purchased a patent for the BOSS Snowplow and it became the #1 largest selling brand of snowplows in North America. He

eventually sold BOSS Snowplow to The Toro Company in 2014.

A primary interest of his family is in education of children in the U.S. and the developing world. This has led to providing significant funding for libraries and the purchase of books and educational materials locally and in ten developing countries. Support for Michigan Tech includes funding for the MBA program and scholarships for electrical engineering students. Michigan Tech also hosts a STEM summer program for which David funds attendance for 100% of the children from the Iron Mountain region resulting in around 50 full-ride scholarships to this youth program which targets middle school students. David remarks that it's great for Michigan Tech because 70%+ of all these students apply there for college.

David has a long history of volunteering with Michigan Tech having served as a member of the trustees (twice as chair). He received an honorary Ph.D. from Michigan Tech and notes this recognition was an honor.

David also finds time to have fun and cites his former hobby of racing sports cars. Because the sport as something he had wanted to do since the age of 12, he took a driving class in 1995 and in the process was able to meet Phil Hill, a Formula One World Champion. He has taken part in the 24 Hours of Daytona race twice and in the second year took second place overall.

Make Things Happen

David maintains that there are three types of people in the world...those who make things happen, watch things happen, and wonder what happened. His advice to students is to be a member of that first group, believing that the biggest single measure of future success is the level of tenacity an individual shows at an early age. He encourages students, "Continue working hard and ultimately you can achieve anything you want."

Being chosen to join TBPi was something he cherished. He shares, "My academic performance early on was obviously quite poor and to receive the nomination to Tau Beta Pi representing high academic achievement in a field known to be difficult and at a highly regarded school meant a lot." His support of the Chapter Endowment Initiative stems from his belief that "It is important for others to have the opportunity to receive the recognition that represents a lot of hard work and tenacity...the fundamentals of success...and I want my chapter to continue to recognize those worthy individuals."



Renee M. Schoenborn, P.E., WYA '85

Endowment for the Wyoming Alpha Chapter at University of Wyoming

BORN IN La Mirada, CA, Renee pursued her degree in electrical engineering at the University of Wyoming as her family had moved to the state during her high school years. She notes that she started out as an instrument engineer at the Shell Oil Company Deer

Park Refinery supporting operations and maintenance. Recently, she has come full-circle in her career and was re-assigned to the refinery as Team Lead for the Control Systems Project Engineering group.

Renee has a passion for capital project work and has pursued this in instrumentation, automation, and process control in project support for most of her career. She enjoys being part of each stage including early project scoping, detailed engineering and design, through construction. “The ability to see the whole process, from conception to production is fascinating. While seeing a design on paper is nice, there’s still nothing as cool as watching the real hardware rise up from the ground.”

By mid-career, Renee was assigned to a “mega-project” on Sakhalin Island, Russia, where Shell built a \$22 billion integrated project, including a liquefied natural gas (LNG) plant and oil export terminal. Renee took part in the engineering and design work which was done in Yokohama, Japan, for 1½ years. She went on to Sakhalin and spent four years constructing the infrastructure and production units. Then she headed to the Canadian Oil Sands in Alberta to help build Shell’s expansion Upgrader, a process that turns bitumen into synthetic crude.

Next Move

Her next move took her back to Houston working in the projects and technology group as a control systems engineering manager. She was supporting major capital projects for the Americas, plus managing reviews and audits of the management process for safety shutdown systems. “Our priority is to deliver projects and products safely. To do this, we have to be ever-vigilant that our safety systems are functional and operate correctly—every time. So we continually audit ourselves to ensure that our management processes keep our safety systems healthy and ready to use, if that barrier is ever needed.”

Shortly after moving back to the Deer Park Refinery, Hurricane Harvey hit Houston. Renee remembers, “For the most part the process units didn’t have a lot of problems in drying out and restarting—it was more the flooding that affected the effluent treaters, tank bunds, and dock areas that kept us down for so long. We

had water-filled junction boxes, submerged pumps and instruments...water everywhere.” To compound the problem, there were scheduled maintenance turnarounds planned to begin on October 1 for several of the chemical production units. Instead of cleaning up and preparing to re-start those units, the decision was made to begin the maintenance immediately, even though preparations weren’t fully complete for all the work to begin yet. It’s been a very long two months since Harvey hit, but satisfying to see so much come together so well.

Renee enjoys long-distance running and is looking forward to an annual favorite race in November for the eighth time since 2010. She also enjoys international travel, has been across most of Europe, and notes a 2015 trip to Northern Ireland where she visited the Giants Causeway known for striking hexagonal column formations. She spends time with family; her mother also lives in the Houston area. Renee is also active in her church.

Reflecting on her time growing up in Wyoming, “I was a pretty dutiful and nerdy kid; much harder on myself than my parents were. The lesson I remember learning from my Dad was about not being pride-filled. Sometimes you’re asked to do tasks that don’t make sense or seem below you. But if you can see beyond these trivial things, great things can be accomplished.” Renee shares that it’s taken her many years to figure out her personal leadership style, but sees her role as a team lead to remove obstacles so her teammates can do their jobs. “The whole concept of ‘they work for me’ doesn’t exist on my team...I work for them.”

Thinking of the young engineers and students today, she stresses the importance of learning interpersonal, leadership, and management skills, adding, “It’s important to know how to make an effective presentation or a strong argument. Just spitting out data doesn’t do much good. You can show people all the technical data, graphs and charts, but the real question is: why should we spend the shareholder’s money on this?” Her advice for students is, “Success in engineering is in large part being able to understand the problem and describe it to others to get buy-in to your pragmatic solution.”

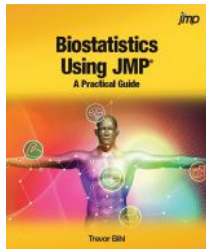
When Renee was a student and President of Wyoming Alpha, she attended the annual TBPI Convention during the centennial celebration of 1985 at Lehigh, PA. Her experiences there, and with her local chapter, made her want other UW students to freely have the same opportunity. And giving to the Chapter Endowment Initiative does this!





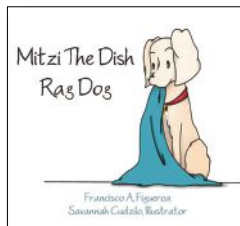
AUTHORS

Trevor J. Bihl, Ph.D., Ohio Eta '15, has authored *Biostatistics Using*



JMP, a Practical Guide which presents a step-by-step approach to solving biostatistics problems using the JMP statistical software. Coverage ranges from basic statistics, data cleaning/wrangling, through neural networks and survival analysis. Publisher is SAS Press.

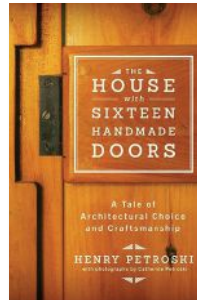
Francisco A. Figueroa, Ph.D., Texas Beta '67, has written his first children's book, *Mitzi, the Dish Rag Dog.*



It is illustrated by Savannah Cudzilo. Figueroa received his doctorate, in systems

engineering management from Texas Tech University in 2017, 50 years after graduating with a bachelor's in E.E. He is a former vice president and chief financial officer for Sandia National Labs. Publisher is Lulu Publishing Services.

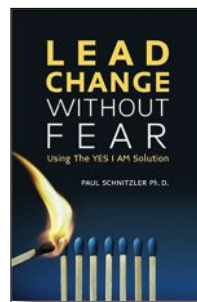
Henry Petroski, Ph.D., P.E., New York Xi '63, is an engineer and historian who has written *The House with Sixteen Handmade Doors.* This



is an architectural whodunit that exposes the construction, history, and uniqueness of an island home he and his wife bought in Maine. It even had its own secret passage.

With photos by wife Catherine, the book is published by W. W. Norton & Company.

Paul Schnitzler, Ph.D., Florida Gamma '57, has authored *Lead*

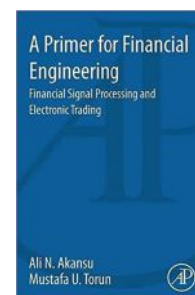


Change Without Fear: Using The YES I AM Solution. It answers the question: "Why don't leaders use the vast array of advice offered by change management experts?"

Schnitzler is Chief Advisor to Florida Gamma at the University of South Florida, where he teaches graduate-level courses in engineering management. Publisher is CreateSpace Independent Publishing Platform.

Mustafa U. Torun, Ph.D., New Jersey Gamma '12, has co-authored, with Ali N. Akansu, *A Primer for*

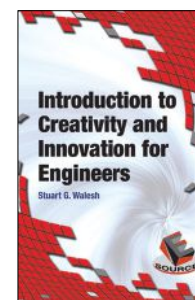
Financial Engineering: Financial Signal Processing and Electronic



Trading. The book bridges the fields of finance, mathematical finance, and engineering, and is targeted at engineers and computer scientists who are looking to apply

engineering principles to financial markets. Torun is an Amazon software development engineer and Akansu was one of his teachers at NJIT. Publisher is Academic Press.

Stuart G. Walesh, Ph.D., P.E., Indiana Delta '63, has written



Introduction to Creativity and Innovation for Engineers. It provides engineering students and practitioners with neuroscience-based knowledge and methods that

enable them to be much more creative and innovative as individuals and team members. Walesh consults, teaches, and writes about management, leadership, communication, and creativity/innovation. The book is published by Pearson.

\$\$ Benefit for Members

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% on car insurance. Also, GEICO can help you find great insur-

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

ance 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 www.geico.com/greek/tbp or call 1-800-368-2734 for your free quote.



2017-18 Alumni Giving Program November-January Contributors

The names of 4000 Tau Beta Pi alumni who made donations to the Association in the 2017 Alumni Giving Program appear in two separate sections on the following pages. Their gifts totaling \$681,047 arrived between November 1, 2017, and January 31, 2018. Gifts received after January 31 do not appear here but will be published in the Summer 2018 issue of The Bent.

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

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

Donor Recognition Clubs

The names of 2467 Tau Bates appear in this first section. They made donations to the Alumni Giving Program between November 1, 2017, and January 31, 2018, 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

OH B Alexoff, Randall Lynn '81

HEIKES CLUB

CT A Soderberg, Peter Holton '68
IA A Anonymous '69
MI E Anderson, James Anton '66
RI A Anonymous '72

ALPHA CLUB

CA E Chow, Bob '85
CA E Chow, Hilda Chung-Ching '85
Pappone, Daniel Charles '77
IL A Spitzer, Robert Edward '61
IN A Ford, Steven Richard '80
Newcomb, Robert Wayne '55
IA A Faidley, LeVern William '67
LA I Kitchens, Philip Hudgins '67
MD B Stahl, Carl Michael '81
MI Z Thebert, Alan Wilbert '57
TX A Yates Jr., Peyton '65

BETA CLUB

CA B Jessen, Howard Ellsworth '46
CA E Goodin, William Rex '75
CO A Armentrout, Michael Lee '94
CO B Kayse, Kevin Stewart '78
FL B Crews, Renard Calvin '70
GA A Gilliland, Clinton R. '59
IN A Sarkisian, Nancy Louise '77
IN E Dausman, Alan Vernon '77
MD B Farmer, Nick Arthur '68
MA A Fenton, Harvey Albert '58
MI I Crouch, Dennis Eugene '62
† Simmons, Charles David '50
MS A Shackouls, Bobby Stone '72
MT B Samuels, Blake Robert '84
NH A Sherman, John Lincoln '54
NJ A Bezos, Jeffrey Preston '86
NY A Florman, Samuel C. '44
NY Ø Van Wagenen, W.E. '78
NY K Knox, Keith Thomas '70
NY E Denning, Peter James '64
NC A Johnson Jr., Jim William '77
OH A Robe, Richard '55
PA H Sykes, Robert Foulkes '47
RI A Vigar, Judith Wells '83
SC B Brandel, Bill '52
SD A Gomulinski, Tricia E. '98
TN A Hopkins, John A. '88
King III, Philip Woodson '66
Pih, Norm '82
Tuttenrow, Jack Norman '63
TN I Hall, Kristofer Brian '98
TX H Trich, John Albert '70

UT A Morrison, Michael George '88
WV A Baker, David Wesley '76
WI A Anonymous '64
WI B Huribert, Gordon Charles '46
WI I Crouce, Richard Gordon '77

DELTA CLUB

AZ A Milan, John M. '67
AZ B Story, Franklin H. '81
CA B Shombert, Lee Alan '79
CA I Tyson Jr., James J. '58
CA A Davis, John Leo '60
Duckworth, Jack E. '66
CA E Tozaki, Ronald Yuji '74
CA H Crotchett, Denton Robert '71
Noble, Gary D. '96
CA Ø Koblitz, Gordon Frank '66
CA I Pickett, Stephen Euan '75
CA A Dodding, Edward Ernest '84
CA N Cadcock Jr., Richard E. '72
CA O Turhollow, Charles B. '81
CO A Knight, William James '79
Musser, Jack William '72
CO B Harris, James Robert '68
Kidd, T. Wayland '44
CO A Laughlin II, George T. '75
DE A Anonymous '70
DC B Youssef Mir, Paul '78
FL A Anonymous '99
Bolton, Charles Houston '62
Kalter, Howard Leo '66
IL A Tracy, Mark Alfred '86
IN A Barker, Kenneth Dale '64
Neal, Stuart Marcus '56
Sedlacek, Warren Richard '45
IN A Stechholz, Jonathan M. '72
IA A Carlson, Mary Terese '78
Krambeck, Scott David '82
IA B Carson, David N. '54
Glasgow, Justin Matthew '05
KS A Kleist, Robert A. '51
LA A Comeaux, Keith A. '89
Olivier, Donald Andrew '51
LA I Samuels, Katie '86
MD B Crane, Thomas Clemson '62
MA A Duris, Robert Alan '74
MA B Freeman, Reed Harlow '61
MA A Coutts, Robert Bruce '72
Patkin, Murray Solomon '64
MI A Colbry, Dirk J. '06
Colbry, Katy Luchini '99
LaFrey, Raymond R. '61
MI I Fay, John Edward '56
MI E Frye, James Henry '51
Gomulinski, Curt Dennis '01

MI I Amici, Alan J. '85
MS A Jerome, Dennis C. '67
Nelms, Larry Thomas '63
MT A Carlson, Gene Stewart '64
Royer, Erlind George '61
NJ A Post, Edwin Lewis '62
Skowronski, Victor J. '71
NJ B Mudie, Samuel Hunter '62
NJ I Petrucci, Raymond A. '84
NJ A Mendelsohn, Andrew Jay '77
NM B Slominski, Paul '78
NY A Mayer, Ernest '62
NY I De Groot III, Ward W. '54
NY A Kemp, Thomas Ward '59
NY I Judd, Robert Paul '78
NY N Weber, Thomas William '53
OH A Ferencz, Robert Mark '80
OH B Throckmorton, Dean W. '82
OH I Beans, Bill '53
OH I Ross, Elliot Bennett '69
OK A Hall, Ralph Roy '64
Morris, Jay Kevin '81
OR A Lynch, Stanley Clark '73
PA A Wagner, Theodore Walter '71
PA I Spector, Scott Jay '74
PA H Hettiche, Leroy Raymond '61
PA Ø Gigliotti, Michael Philip '73
Hennessy III, John L. '73

SC B Gibbons, Joseph Harrison '56
TN A Cook, James Michael '72
Froula, Jim Dewayne '67
TX A Mickelson, Kent Burdell '77
TX B Ingram, Wesley Warren '77
TX I O'Dell, Stewart Conn '78
TX H Schmidt, Robert William '84
TX Ø Barrett, Jerry George '70
TX A Beal, Barry A. '65
UT A Eide, Eric Norman '89
VA A Brown, Lee Merry '88
Pitzer, William Ciroh '75
VA B Bresser, Jeffrey William '83
WA A Gunter, Robert Arnold '62
Okita, Richard Y. '56
Pierce, Russ W. '70

WA B Cass, Robert Dennis '83
WV A Landes II, Junior H. '64
WI B Smith, John Gerard '87

ZETA CLUB
AL A Rowell, William Johnston '69
Uptagraff, Dewitt '72
AL A Koelb, Terry Gene '84
AK A Dombrowski, Roger Alan '69
AZ A McIntosh, Duncan Mooers '65
Seabury, David G. '82
AZ B Mingo, Doug M. '83

AR A Biggadike, Robert Holden '58
CA A Edgar, Tim Matthew '08
Kuo, Winnie '08
McCune Jr., Earl William '79
Meyer, Jack Andrew '54
Van Thiel, Thomas W. '84
CA B Lee, Roland Robert '75
Lippey, Jerry '55
CA I Bowerman, Lawrence J. '69
Dohner, John Walter '72
Hardison, R. Logan '57
Hess, Kenneth Lafferty '74
Hetzl, Geoff Orin '82
Kwok, Munson Arthur '62
Marks, Stuart Warren '84
Trane, Frank Hood '53
CA E Gaunt, Arnold John '86
Miller, Jeffrey Clark '83
Warner Jr., John Hilliard '63
Wenck, James Carl '77
CA H Battersby, Leslie Charles '98
Burrows, Stanford '63
CA Ø Smith, Gregory W. '75
CA A Hall, Victoria Lee '86
Holl, Sue '76
Horn, Jeffrey Ben '79
Pickles, William Raymond '80
Yamamoto, Ko '84

CA N Savage, Homer Emory '74
CA O Treinen, James Patrick '85
CA Ø Jenkins Jr., Lester Alfred '01
CO A Van Dinter, Jennifer Ann '97
CO B Aerstin, Franklyn George '64
Kern, Robert Edward '43
Shapiro, Robert Joseph '47
Walker, Richard Frank '49
CA A Beal, Mark Eugene '82
CT B Bonazzo, Vincent Anthony '80
Chatfield, Larry Allen '71
Killingbeck, David R. '77
DE A Hyer, Frank Sidney '58
Swope, Richard Dale '60
DC A Belcher, Wade D. '70
Engram, Robert Louis '69
Griffin, Earl H. '57
DC I Altamore, Annette '79
Haldeman, Paul Metz '70
FL A Newlands, David Michael '62
Shacter, Philip '79
Vice, William Eugene '70
FL B Tilles, Arno William '85
FL I Shimura, Mitsuo '74
GA A Driggers, Herbert H. '63
Fawcett, Clinton Douglas '92
Mowrey, Dan B. '65
Rogers, Don Edwin '68

IL A Beernink, Kurt Patrick '82
IL B Hughes, Joseph L.A. '79
Jaras, Anthony A. '67
Lewis, Ted Howard '68
IL I Haglund, Birgit Lyn '82
IL A Hachtel, Dale Arnold '68
IN A Carlson, Richard Alan '70
Novy, Robert Alan '85
Papanicolaos, Mitchell '65
Taylor, Harold LeRoy '51
IN B Badger, Jerry Delon '72
IN I Boehnen, Daniel A. '72
Burian Jr., Joseph Edward '75
Jones, Walter Thomas '64
McDonald, Patrick John '60
IN A Luecke, Edgar Jacob '55
Spring, Bradford Hall '59
IA A Berkholz, Nicholas Evald '56
Derr, Curtis R. '85
Feisel, Lyle Dean '61
Shepherd, Kevin John '83
KS A Knapp, Roy Marvin '63
KS I Bucher, William A. '76
KY A Dunning, William Edward '61
Howe, Richard Samuel '59
LA A Williams, Colleen Mary '82
LA I Poole, Ronald Gene '69
Wright, Cameron H. G. '83
LA E Champagne Jr., Pierre '76
ME A Brigham, Ernest Bennett '53
MD A Gutsmith, Henry Ronald '56
MD B Rowland, Wilson '51
Schaefer Jr., William J. '70
BUjancius, Jerry Alan '79
Chace, Brian David '69
Descoteaux, Kenneth G. '89
Snively, Fred Strock '60
MA B Gilkes, Alan Martin '88
Goldstein, Andrew Carl '69
McKim, Thomas Francis '75
MA E Mahoney, John Joseph '56
Pinkham IV, Tom A. '88
Sladek, John Richard '77
Stevens, Janet Marie '72
MA Z Boraski, Nicholas '50
Cetti, Richard Phillip '70
Grzeslak, Kazmierz T. '88
Harrison, C. Brett '64
MI A Chamberlain, Adrian Ray '51
MI B Jenekhe, Samson A. '77
Leven, Peter Johannes '93
MI I Battel, Steven J. '79
Bell, Lawrence David '68
Cameron, John Joseph '66

ZETA CLUB, CONTINUED

- Engelhardt, Larry N. '77
- Padzieski, Robert Joseph '70
- Seidel, David Allen '81
- Smithies, Henry '49
- Trankle, Thomas Lynn '71
- Vlasic, Robert Joseph '49
- MI Δ Dietrich, Robert William '57
- Kogut, Kenneth Joseph '71
- Rose, Jonathan Douglas '81
- MI E Boileau, James Maurice '87
- Thompson, George W. '55
- Tillingier, Steven Jay '68
- MI Z Pettiford, Steven Douglas '72
- MI H Fischer, Reinhold M. '65
- MI A Peters, Timothy Gene '78
- MO A Weary, Franklin Grimm '70
- MO B Ash Jr., Richard L. '70
- Davis, Jon Timothy '85
- MO Γ Kilest, Harold Harold '63
- Rossetti, David Joseph '74
- Taber, Norma J. '80
- MT A Collins, Douglas Macnab '71
- NJ B Fletcher, Leroy Stevenson '58
- NJ Γ Branco, Maria dos Milagres '74
- Krumins, Aivars Edgars '75
- Kunyz Jr., Joseph John '73
- NY B Phillips, Glen E. '71
- NY Γ Cole, Marie Rosa '84
- Hartung, Edward Clinton '63
- Luckett, Larry Wayne '83
- Thal Jr., Herbert Ludwig '53
- NY Δ Gibson, Michael Addison '66
- NY E Hellman, Martin Edward '66
- NY Θ Kaylor, James M. '88
- NY I Dujmich, Louis Charles '78
- Neuschaefer, Howard E. '65
- NY K Moore, Duncan T. '69
- NY A Abrardo, Joseph M. '72
- Schmitt, Robert E. '71
- NY M Czuba, John Stanley '78
- NY E Burke, George Leo '71
- Runowich, Carl Joseph '8
- NC A Vercaemert, Carol Starnes '76
- Walker, Gary Kenneth '70
- NC Γ Anapol, Edward '77
- ND B Smtuka, Joshua James '96
- OH A Ockunzki, Kelly Anne '94
- OH Γ Albergy, James Orestes '59
- Hagenlocker, Edward E. '62
- Howland, Smith Eugene '69
- Schauwecker, Harry Erich '52
- OH Δ Moore, Mathew Franklin '62
- OH Z Libbe, John Franklin '58
- Zelms, Charles Michael '73
- OH H Senyk, Joseph Michael '67
- OH Θ Fuemmeler, Jason Alan '00
- OH M Bowers, Keith Alan '91
- OK A Love Jr., Tom Jay '47
- West, Earl Ray '59
- OK B Royce, Robert Michael '73
- OR A Carlson, Burton Carter '53
- Hanson, Steve William '69
- Milton, Stuart W. '84
- PA B Stockburger, Richard '73
- Williams, John Roger '60
- PA Γ McIvried III, Howard G. '53
- Robb, Frank Jay '73
- PA E Lissenden Jr., George C. '58
- PA Θ Daniels Jr., Harold E. '66
- RI B Luz, James J. '80
- SC A Davis, Joseph Howard '91
- Doss, Thomas Glenn '71
- Jones, Walter Fleming '78
- Rushton, Floyd Robert '63
- SC B Pinckney, Charles Porcher '77
- SC Γ Hanes, Richard Michael '67
- Lowndes III, William '51
- SD B Ufford, Donald A. '87
- TN A Baker, Jon Pankey '74
- Jennings-King, Sherry D. '93
- Massimini, Michael Ian '76
- Peisheil, Frank Louis '61
- Whitten, James Raymond '59
- Marianelli, Walter David '75
- TN A Chauvin, Wendy M. '89
- Stewart, John Dale '78
- TX A Carroll, Billy Dan '64
- Dorr, Lawrence Daniel '68
- Khump, D. Craig '77
- Smith, Matthew Thomas '93
- Wilson, Randy Wayne '97
- TX Δ Porter, Larry Gene '64
- TX H Lin, Kuo-Chiang '80
- Nooyi, Raj Kishan '78
- UT A Davidson, Stuart Wayne '83
- Lyman, George Randall '79
- VT A Ketcham, Kenneth James '68
- Scribner, Charles Franklin '70
- VA A Anderson, Robert Steven '80
- Hardy Jr., Edward Ira '69
- Orphan, Victor John '62
- Wadsworth, Robert M. '82
- VA B Harras, Edgar Daehn '67
- Jones, John Hamilton '73
- VA Γ Glass, Christopher Earl '83
- WA A Confer, Peggy Jean '81
- McDonald, Bruce G. '91
- WA B Grossman, Robert James '59
- McClelland, Robert Lloyd '59
- WV B Ashman, Michael D. '84
- Payne, Michael E. '81
- WI A Debbink, John Dirk '49
- Branco, Gregory James '59
- Derusha, James Ronald '55
- Larson, Nils Irving '58
- WI B Cockayne, John E. '65
- WI Δ Whalen, David Alan '91
- WY A Gallensky, Neil Ellis '82
- Quan, Alan Chung '00
- Simsarian, Gregory G. '82
- Weland, Joseph Stephen '64
- Woo, Raymond '72
- Yoshizumi, Steven Akira '88
- CA Z Benson, Chris Alan '84
- Downey, James Bryant '62
- Pham, Alexander H.N. '88
- Vlahutin, Paul Andrew '65
- Wagner, J. Arthur '61
- CA H Clark, William Charles '72
- Trebaol, George Olivier '75
- CA Θ Bianco, Catherine Elaine '97
- Gerwien, Phillip Harvey '77
- Kennedy, Joseph Albert '76
- Lawson, Wayne Alan '69
- Anonymous '84
- Thabault, Charles W. '91
- CA I Kuspa, Joseph Anthony '93
- CA K Humphreys, Evan '75
- Ramirez, Marvin Jerome '82
- CA A Hafer, Edward Henry '70
- Snyder Jr., Roland Curtis '74
- Stanley, Richard Loren '79
- CA M Barth, Todd Vincent '79
- Brownell, Michael Philip '84
- WI Δ Whalen, David Alan '91
- Johnson, Bruce William '78
- Keiser, Randy Jay '73
- Mitsuoka, Jeffrey Minoru '79
- Rodgers, Patrick James '80
- CA N Bohaman, Jim '70
- Jordan, Patrick Anthony '87
- Lamoureux, Mark S. '81
- Lopez, Michael Howard '95
- Mayer, Robert James '85
- Reukauf, Paul James '70
- Ruud, John Emil '73
- CA E St. Clair, Christine Marie '81
- CA O Caballero, Ross Charles '72
- Fiedler, James Michael '78
- Fitzsimons, Michael J. '79
- Page, John Arnold '61
- CA II Steinberg, Dennis Philip '72
- CA P Andersen, Eric Kenneth '79
- CA Y Intagliata, John David '95
- CA Ψ Chiu, Corinna Jane '93
- CO A Cochran, Noelle Renee '86
- Kranzler, Irvin '54
- CO B Aronson, Haskell Harold '52
- Bartlett, Paul Eugene '51
- Robidoux, Phillip Henri '80
- Steinwachs, Donald M. '68
- Womack, Donald Eugene '50
- AZ B Forster, Karl David '86
- Leach, David Robert '76
- Marchand, Jean Maurice '68
- AZ Γ Bruening, Brenda I. '82
- Bruening, Gregory Wilfred '80
- Heaton, Janet Day '84
- AR A Peters, Brett Avery '87
- Zaleski, Michael Ernest '63
- Ziegler, Norval Finn '52
- CA A Feldsher, Theodore Baker '85
- Gottwald, Carl Hans '48
- Hoe, Albert '92
- May, Howard Russell '51
- Ravenscroft, Dewey S. '63
- Richman, Mitch I. '77
- Trezek, George James '61
- Wing, Jimmie '52
- CA Γ Barnum, James Robert '65
- Cotton, Thomas Arthur '65
- Inouye, Lance Masao '68
- Likins, Peter William '57
- Love Jr., Ralph Edwin '57
- Muscha, Leslie Catherine '95
- Rodriguez, David Albert '58
- Roodhouse, James G. '59
- Sansbury, James Douglas '66
- Tirado, Leo A. '73
- Ullman, Marc Albert '83
- CA Δ Agajanian, Shoohsang D. '79
- Brooks, James Ray '72
- Hedin, Richard Allen '69
- CA E Anton, Philip Sean '85
- Kastenberg, William E. '62
- Masumura, Robert A. '62
- Edmunds, Robert C. '68
- Evans Jr., Andrew Joseph '75
- Gordon, Horace Cadwell '64
- Hayden, James George '69
- Lewis, Lee Conley '91
- Lorberbaum, Henri Stuart '77
- Milam, William E. '78
- Perrygo, Charles Maurice '75
- Roberts, Richard '67
- Townsend, Frank Charles '62
- FL B Ault, Richard Harold '64
- Elnaggar, Suzanne '93
- Jennings IV, Tipton Davis '54
- FL Γ Chenkin, Joseph Alan '82
- Copeland Jr., Edwin '73
- Dip, Anthony '86
- Giovannelli, Ronald Frank '76
- Jones, William David '74
- Lancor, Barbara Jean '79
- Ink Ault, Richard '82
- Stagner, Ralph Scott '82
- FL A Nugent, James Charles '95
- FL E Stierlen, Lorelei Beth '97
- FL H Baran, Thomas Vincent '93
- FL Θ Burrow, Gregg Dunkin '11
- GA A Akridge, G. Russell '62
- Backhaus, George Peter '83
- Brush, Gary Stoddard '80
- Bryant, Robert Packard '58
- Coons, Louis Whatley '81
- Cooper Jr., Basil Pearson '65
- Hair, James Graham '59
- Kuniansky, Eve Louise '81
- LeCroy Jr., Edwin Pateat '67
- Monk, Robert Franklin '63
- Negro, James Eugene '68
- Smith, Micheal Monroe '79
- Watts, David Lee '77
- ID A Peters, Daniel J. '80
- IL A Bein, Robert Walter '56
- Boehm, Ronald Jack '81
- Daughters, Timothy E. '81
- Flitman, Jeff Edward '82
- Gromala, Edward Joseph '79
- Hanus, Daniel Joseph '86
- Jones, Douglas Warren '80
- Kasik, Phillip Mark '68
- Kent, Michael Edwin '64
- Knox, Thomas David '86
- Krupka, John Frank '52
- Olson, Robert David '88
- Ostrodka, David Leon '70
- Pubentz, Lawrence James '81
- Saltzman, Jay Adam '90
- Schoenberg, Kurt Francis '72
- Schub, Linda Gail '79
- Vogel, Frederick M. '80
- Wilkins, Gregory Martiné '92
- Williams, Allan Richard '71
- Zielinski, Edward Lee '74
- IL B Anderson, Robert Francis '62
- Gurney Jr., Donald P. '59
- Kinast, John Arthur '79
- Kusner, William John '59
- Lewis, Burton A. '48
- IL Γ Aagaard, James Stuart '53
- Davis Jr., Charles F. '48
- Ferraro, Anthony Samuel '59
- Guest, Howard Brandon '81
- PL A Pineaute, Wayne '79
- IL A Klesing, Wayne Gil '65
- IL E DeVantier, Bruce Allen '77
- Dip, Anthony '86
- Hopkins, Mark Alan '82
- IL Z Wislek, Michael Anthony '89
- IN A Bullions III, Robert J. '64
- Carter, Eric Lee '72
- Delleur, Jacques William '49
- Eglsrud, Richard Leslie '81
- Findley, Richard Allen '66
- Ginter, James Lee '67
- Good, Larry David '67
- Grot, Arnold Stephen '71
- Hall, Thomas Wayne '67
- Hanover, Marilyn Kay '78
- Harper Jr., Clarence M. '48
- Hohn, Richard Edward '62
- Howard, Donivan Richard '58
- Jicha, Albert John '52
- Kettering Jr., Floyd F. '63
- Lambert, Ralph Edward '68
- Livingston, Julian Richard '60
- Maloney, Eugene David '64
- Montgomery, Stephen T. '71
- Mosier Jr., Andrew C. '78
- Orr, Donald James '61
- Roth, Robert Howard '72
- Schwiesow, Ronald Lee '62
- Shaffer, Gerald Harley '74
- Shullaker, Edward Ray '72
- Sublette, Ivan Hugh '49
- Tirio, Mark Charles '73
- White, Stanley Archibald '57
- Williams, Kenneth William '73
- Yoder, Norman Everett '71
- IN B Graham, James Henry '72
- Noblitt, Niles Leonard '73
- Osburn, Richard Kimmell '67
- Rose, Willis Earl '44
- Rosenbarger, Donald G. '78
- Ruddick, Everett Lindley '64
- Waterman, Robert Carl '70
- IN Γ Fitzgerald, Edward John '86

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

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

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

- Edmunds, Robert C. '68
- Evans Jr., Andrew Joseph '75
- Gordon, Horace Cadwell '64
- Hayden, James George '69
- Lewis, Lee Conley '91
- Lorberbaum, Henri Stuart '77
- Milam, William E. '78
- Perrygo, Charles Maurice '75
- Roberts, Richard '67
- Townsend, Frank Charles '62
- FL B Ault, Richard Harold '64
- Elnaggar, Suzanne '93
- Jennings IV, Tipton Davis '54
- FL Γ Chenkin, Joseph Alan '82
- Copeland Jr., Edwin '73
- Dip, Anthony '86
- Giovannelli, Ronald Frank '76
- Jones, William David '74
- Lancor, Barbara Jean '79
- Ink Ault, Richard '82
- Stagner, Ralph Scott '82
- FL A Nugent, James Charles '95
- FL E Stierlen, Lorelei Beth '97
- FL H Baran, Thomas Vincent '93
- FL Θ Burrow, Gregg Dunkin '11
- GA A Akridge, G. Russell '62
- Backhaus, George Peter '83
- Brush, Gary Stoddard '80
- Bryant, Robert Packard '58
- Coons, Louis Whatley '81
- Cooper Jr., Basil Pearson '65
- Hair, James Graham '59
- Kuniansky, Eve Louise '81
- LeCroy Jr., Edwin Pateat '67
- Monk, Robert Franklin '63
- Negro, James Eugene '68
- Smith, Micheal Monroe '79
- Watts, David Lee '77
- ID A Peters, Daniel J. '80
- IL A Bein, Robert Walter '56
- Boehm, Ronald Jack '81
- Daughters, Timothy E. '81
- Flitman, Jeff Edward '82
- Gromala, Edward Joseph '79
- Hanus, Daniel Joseph '86
- Jones, Douglas Warren '80
- Kasik, Phillip Mark '68
- Kent, Michael Edwin '64
- Knox, Thomas David '86
- Krupka, John Frank '52
- Olson, Robert David '88
- Ostrodka, David Leon '70
- Pubentz, Lawrence James '81
- Saltzman, Jay Adam '90
- Schoenberg, Kurt Francis '72
- Schub, Linda Gail '79
- Vogel, Frederick M. '80
- Wilkins, Gregory Martiné '92
- Williams, Allan Richard '71
- Zielinski, Edward Lee '74
- IL B Anderson, Robert Francis '62
- Gurney Jr., Donald P. '59
- Kinast, John Arthur '79
- Kusner, William John '59
- Lewis, Burton A. '48
- IL Γ Aagaard, James Stuart '53
- Davis Jr., Charles F. '48
- Ferraro, Anthony Samuel '59
- Guest, Howard Brandon '81
- PL A Pineaute, Wayne '79
- IL A Klesing, Wayne Gil '65
- IL E DeVantier, Bruce Allen '77
- Dip, Anthony '86
- Hopkins, Mark Alan '82
- IL Z Wislek, Michael Anthony '89
- IN A Bullions III, Robert J. '64
- Carter, Eric Lee '72
- Delleur, Jacques William '49
- Eglsrud, Richard Leslie '81
- Findley, Richard Allen '66
- Ginter, James Lee '67
- Good, Larry David '67
- Grot, Arnold Stephen '71
- Hall, Thomas Wayne '67
- Hanover, Marilyn Kay '78
- Harper Jr., Clarence M. '48
- Hohn, Richard Edward '62
- Howard, Donivan Richard '58
- Jicha, Albert John '52
- Kettering Jr., Floyd F. '63
- Lambert, Ralph Edward '68
- Livingston, Julian Richard '60
- Maloney, Eugene David '64
- Montgomery, Stephen T. '71
- Mosier Jr., Andrew C. '78
- Orr, Donald James '61
- Roth, Robert Howard '72
- Schwiesow, Ronald Lee '62
- Shaffer, Gerald Harley '74
- Shullaker, Edward Ray '72
- Sublette, Ivan Hugh '49
- Tirio, Mark Charles '73
- White, Stanley Archibald '57
- Williams, Kenneth William '73
- Yoder, Norman Everett '71
- IN B Graham, James Henry '72
- Noblitt, Niles Leonard '73
- Osburn, Richard Kimmell '67
- Rose, Willis Earl '44
- Rosenbarger, Donald G. '78
- Ruddick, Everett Lindley '64
- Waterman, Robert Carl '70
- IN Γ Fitzgerald, Edward John '86

Special Gifts

Special gifts were received from Ted I. Cruz Figueora, PR A '10, in honor of the Puerto Rico Alpha Chapter; and from Joseph A. Tompkins, WV A '77, in honor of the class of 1977.

Several gifts were received in honor of family and friends: Walter L. Dowdle, MS A '67, in honor of William M. Cobb Jr.; Deborah L. Grubbe, P.E., IN A '77, in honor of her husband, James B. Porter Jr., TN A '65; Henry M. Reed III, SC Γ '85, in honor of his grandfather, Henry M. Reed, The Citadel, class of 1933, and the legacy of the Citadel engineering in his family; Jerald J. Stratton Jr., TX Δ '86, in honor of Jerry Stratton; Fernando Valenzuela, CA AB '05, in honor of Roque Valenzuela.

Several gifts were made in memory of family members and friends: Robert V. Chou, IN Γ '61, in memory of Mr. & Mrs. James Chow Wakin; Daniel Doyle, in memory of Charles D. Simmons, MI Γ '50, through the Joyce & Charles Simmons Memorial Foundation; Birgit L. Haglund, IL Γ '82, in memory of Timothy A. Philpot, Ph.D., P.E., KY A '79; The family of Robert W. Hoffman, CA Θ '73, who passed away in July 2017; Elizabeth Holcomb in memory of her husband, Donald E. Holcomb Jr., CA E '73; Edward Kirkpatrick, NY E '02, in memory of Dr. Joseph P. Reynolds, his chemical engineering professor at Manhattan College; Dr. Jean Le Mee, NY I '59, in memory of Edward H. Griswold, MO B '26; Duncan J.S. MacMillan Jr., NJ A '66, in memory of Frank J. Gerard, NJ A '66; Charles A. Machemehl Jr., TX A '57, in memory of Bill Young; Betty McCarty in memory of her husband, James C. McCarty Jr., MI E '51; Mary M. Perry's gift is a memorial to her husband, Hal G. Perry, KY A '57, who passed away in May 2008; Margaret M. Russell in memory of her husband, Earl D. Russell, NH A '57, who passed away in 2014; Albert A. Salisz, MI A '75, in memory of his daughter, Emilienne Salisz, who passed away in September 2017.

The Heritage Society

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

- Aagaard, Ph.D., James S., *IL* '53
 † Alford, Henry M., *MS* A '27
 † Althouse, Ernest E., *PA* A '26
 † Anderson, Marshall, *MI* '32
 Anonymous, *IL* A '55
 Anonymous, *MA* B '66
 † Arm, David L., *PA* E '30
 † Banner, Charles E., *OH* '47
 † Barnes, Raymond H., *MI* '40
 Basta, Edward D., *OH* E '82
 Bateman, Terry S., *CA* '58
 Beans, Ph.D., E. William, *OH* '53
 † Bossert Jr., Warren H., *PA* B '45
 † Bratcher, Collen D., *KY* B '55
 † Brems Jr., John H., *MI* '46
 Brill, Arno W., *TX* A '71
 † Budd Jr., Col. Roger, USAF Ret., *IL* A '62
 † Burg, Stoddard S., *PA* B '51
 Burns, Carlisle V., *NY* A '50
 Campbell, P.E., Cleveland L., *IA* A '47
 Cancilla, Charles E., *CA* Z '59
 Chamberlain, Ph.D., P.E., Adrian R., *MI* A '51
 † Chatfield, Chales F., *NY* B '32
 Chute, Richard, *MI* H '49
 Colbry, Ph.D., Dirk J., *MI* A '06
 Colbry, Ph.D., Kathleen Luchini, *MI* A '99
 Cook, Norman L., *WY* A '79
 † Curtis, Ph.D., Richard A., *OH* A '64
 D'Avignon, Edward J., *NY* B '88
 † Donoghue, Leonard W., *MA* A '37
 Dooley, George H., *NH* A '53
 † Duenweg, Col. Louis, *IN* B '36
 † Dulles, John W.F., *AZ* A '43
 Feisel, Ph.D., P.E., Lyle D., *IA* A '61, & Dorothy
 Fellner, Kenneth M., *AZ* A '84
 Fisher, James E., *CO* A '78
 Fleming, John R., *IA* B '50
 † Forge, Charles O., *CA* '56
 † Forney, Robert C., *IN* A '47
 Forslund, Donald C., *NJ* A '60
 Froula, P.E., James D., *TN* A '67
 Fue, Harold, *IL* A '57
 Gendron, Roger J., *IL* B '55
 Gent, Michehl R., *TX* A '63
 Gomulinski, Curtis D., *MI* E '01
 Gomulinski, Tricia E., *SD* A '98
 † Hanley, Edward P., *IL* B '42
 † Hart, Jack B. & Arline I. (S2)
 Haynes, Ph.D., P.E., Charles D., *AL* B '62
 Herke Jr., Frederick P., *OH* A '54
 † Heymann Sr., Andrew P., *FL* A '39
 Hord, William E., *MO* B '59
 Jackel Jr., Henry E., *IN* B '57
 Jackewicz Jr., Joseph I., *IN* '75
 Jennings-King, Sherry D., *TN* A '93
 † Johnsen, Roy L., *MI* B '57
 Johnson Jr., James W., *NC* A '77
 † Jones, David S., *KS* A '49
 Kern, Jack C., *CA* K '71
 Kirschman, Ph.D., Randall K., *CA* A '66
 Kitchens, Philip H., *LA* '67
 Kogut, Ph.D., P.E., Kenneth J. *MI* A '71
 † Kolff Van Oosterwijk, H.L.J., *CA* A '50
 † Liggett, John A., *MI* A '43
 Luce, John W., *FL* '50
 † Luchini, Ph.D., P.E., John R., *MI* '71
 † Lucken, Ernest G., *NY* '42
 McDonald, Capers W., *NC* '74
 Maniscalco, DEN, Thomas L., *NY* E '67
 † Marks, Edwin M., *TX* A '49
 † Nelson, Thomas A., *CA* A '49
 Orkins, James E., *OH* '66
 Peterson, Charles C., *UT* A '68
 Pierce, Russell W., *WA* A '70
 † Ray, Frederick H., *OH* E '49
 † Reed, D.Sc., Charles E., *OH* A '34
 Regula, Ph.D., Donald W., *MI* E '63
 Reinhardt Jr., William H., *IA* A '48
 Sax, Franklin S., *MO* '55
 † Scheffler, P.E., Paul H., *PA* Z '48
 Schmoller, Ralph H., *OH* A '61
 † Scribner, A. Clayton, *NY* '29
 † Sickafoose, Robert D., *IL* B '50
 † Simmons, Charles D., *MI* '50
 Siller Jr., Ph.D., Curtis A., *TN* A '66
 † Skaggs, Glenn A., *MD* B '57
 Slafer, Loren I., *CA* A '68
 † Smith, Andrew L., *MS* A '48
 Smith Richard J., *IA* A '59
 Smith, Rodger F., *WI* A '64
 Soderberg, Peter H., *CT* A '68
 † Stechmeyer, John P., *OH* E '48
 Stella, P.E., Damien F., *AK* A '82
 † Strom Jr., George J., *CA* '56
 † Swalin, Ph.D., Richard A., *MN* A '52
 Swanson, P.E., Hilder S., *WA* A '76
 Swanson, Ph.D., John A., *NY* A '62
 Taber, Norma J., *MO* '80
 Tarwater, James P., *MO* B '51
 † Taylor, Paul D., *KS* A '58
 Tolson, Robert H., *VA* B '58
 Tydeman, Frederick J., *CA* A '73
 Tyson, Samuel E., *PA* B '48
 Weissman, Martin J., *NY* E '58
 Wetenhall, Paul D., *GA* A '73
 † White, Robert C., *IL* '56
 Widmann, Bradley H., *NY* A '69
 Williams, David C., *TX* B '47
 † Wilson, Charles N., *WA* A '70
 † Winkler, Albert H., *AZ* B '75
 † Wisner, Benjamin G., *CA* A '49
 † Zimmerman Jr., Marlin U., *MD* A '44
 Zuurber, George W., *IL* A '53
 († indicates that member is deceased)

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

CHI CLUB, CONTINUED

- | | | | | | | | | | | | | | | | | | | | | |
|------|--|------|---|------|--|------|------------------------|------|---|------|---|------|---|------|-----------------|------|--|---|--|--|
| LA A | Angelo Jr., Ernest '56
Brack, Ronnie Guenther '84
Compton, Kennie Ray '72
Payne, Howell Burnett '56
Smith, Stewart Van '73 | LA B | Buessinger, Robert Ford '78
Chaffe III, Black B H '55
Paul Jr., Howard Cochran '80
Perrin III, Shepard F. '83
Rogers, R. Bradford '79 | LA G | Ball Jr., Pete Gordon '61
Bertsch, Paul Jeffery '79
Bertsch, Susan A '80
Cox, Mickey Dale '77 | LA A | Young, Ronald Dale '66 | ME A | Atkinson III, Landy Guy '78
Degon, Robert John '66
Henderson, Wallace D. '58
Palmer, Gerald Milton '61
Plessat, Robert Jordan '81 | MD A | Becker, William Henry '65
DiGiorgio, Joseph Brun '54
Guzy, Jeffrey David '83
Tate, David Marshall '84
Winter, George William '48
Wiseman Jr., William J. '64
Zehner, James Warren '80 | MD B | Antony, Roger William '71
Cook, Gordon Douglas '81
Dinkle, Ralph Edward '65
Greville, Edgar Murdoch '67
Hardesty, Donald Roy '64
Iacangelo, Gerard Felix '80
Jansen, Russell Onas '74
Kirschbaum, Alan Ira '71
Lambrechts, James R. '73
Perkins, Michael Joseph '95
Rast, Robert Morgan '70
Rosen, Bill Jules '60
Sheen, Timothy Walter '72
Toemse, Robert Earle '76
Dickson, Brian Wayne '93
Quint, John H. '84 | MD A | Iamvzzi, Jo '96 | MA A | Bernacki, Stephen E. '70
Downs, Allen Gybbon '75
Bennett, Kenneth Harold '89
Brandes, Richard David '57 | Clark, Ronald Channing '56
Claus Jr., John Seebold '54
Dickey, Robert L. '74
Ditmeyer, Steven Roland '63
Hazen, Nathan Lord '56
Hladik, Karen Jean '77
Kornafel, Peter Robert '65
Maskrey, Robert Bryan '63
Patterson, John Bryan '68
Pershing Jr., John A. '75
Smallwood, Richard Dale '57
Smith, Alan Jay '71
Smoot, William Norris '56
Spradlin, Louis Woodson '57
Buffinton, Keith William '79
Cohen, Frederick Haas '69
DiPerna, Richard Arthur '66
Hildebrandt, Eric Michael '92
Kurkowski, James F. '84
Smeagin, Anthony Michael '76
Cedrone, Nicholas Jerry '52
Hayden, Thomas Lee '62
Lichtig, John Forrest '83
Marini, Robert Charles '54
Ridlon, Stephen Allan '66
Cain, John Francis '61
Flynn, John Callahan '59
Gusciora, Kenneth Henry '69
Kaplan, Allan Henry '74
Koch, Robert Franz '79
Moles, Peter A R '83
Whitley, Norman Lyle '75
Gregg, John Edward '84
Chaffee, Stanley Wendell '74
Griffin, Albert Walter '80
Houthoofd, Janet Marie '76
McIntosh, Carl L. '70
Santoro Jr., Thomas V. '66
Bohren, James Frederick '67
Pearson, Walter Clayton '62
Sandretto Jr., Peter P. '64
Skaugien, Borg '63
Vukovich, Robert James '83
Wacker, Don Herbert '52
Abrecht, Terry Erwin '67
Ardis, Robert Boyd '46
Daniel, Richard Irvine '48
Delgass, William Nicholas '64
Drago, Gary Alan '75 | Friess, John George '57
Goodell, Charles Edward '43
Grants, Valdis '64
Griffin, William Robert '77
Guttman, Richard T. '60
Hammond, Donal Dwight '52
Hand III, Mike J. '11
Hansen, Peter Ernest '61
Kasper, Alan R. '62
Kelly III, Clinton Wayne '59
Miller, Carol Jean '79
Lisiecki, Robert Joseph '78
Maier Jr., Edward L. '77
Maker, Pamela Allyn '81
Miller, Carol Jean '79
Miller, Stephen Scott '78
Nicols, George '85
Pendleton III, Winston K. '62
Poy, Alfred Lim '91
Prescott, Thomas J. '69
Reines, Jose '59
Scott, Richard A. '57
Sheets, Alan '81
Stagner, Charles Evan '86
Taylor, Mark Edward '74
Toliver, Christopher M. '74
Wentzel, Richard Dimert '60
Zechel, Gary Michael '62
Zuk, David Michael '70
Conti, Mark '76
Di Cicco, Dominic Armand '61
Elward, Robert M. '75
LaBella, Salvatore A. '63
Minnich, Katherine P. '78
Rutkowski, Paul John '69
Kellar, James Stephen '60
King, James Bartholomew '65
† McCarty Jr., James C. '31
Mutzelburg, Ronald E. '68
MI Z
Forker Jr., David Ernest '58
Lachele, Roger Eric '75
Scarlattelli, Michael George '76
Volpe, David Randall '74
MI H
Allmendinger, Paul F. '44
Collegegrove, Jon Kevin '80
Harder, Shawn Jay '80
Hill, Scott S. '83
Johncox, Robert Allen '83
Lundstrom, Richard Raye '64 | Pascany, Kenneth Michael '86
Zwally, C. Lee '41
MI O
Garrity, William Edwards '70
MN A
Ashley, Gary Charles '69
Bakke, Mark Alan '88
Benjamin, Harrison R. '57
Duscha, Lloyd Arthur '45
Hanson, Henry Arthur '66
Holm, John David '62
Loughlin, James Paul '85
McLeod, Gary Wayne '70
Stryk, Robert Anthony '60
Thompson, Richard Alvin '77
Tucker, Randolph Lewis '83
MS A
Cargile, James Donald '81
Hartmaker Jr., John W. '79
Hilbert, James Michael '71
Hodge, B. Keith '65
McDonald Jr., Harold R. '65
Mills, Marvin Leon '65
Yates, Karen '73
Yates, Michael Douglas '74
MS B
Miles Jr., John Hubert '71
MO A
Brownfield, David Lee '68
Crabbe, Emmanuel F. '81
Toliver, Christopher M. '74
Donaldson, Albert L. '75
Geers, Arthur Edward '48
Kehoe, Martin James '72
Myles, Thomas Daniel '82
Stiefermann, Michael C. '86
Zimmerman, Mary M. '75
MO B
Benson, William Alan '77
Bondi, James Oliver '71
Elliott, Joseph Oscar '71
Ernest, Terry Lee '82
Ferrell, C. Stuart '64
Feurer, John Alphonse '70
Jenkins, Glenn Willard '59
Miller, Michael John '74
Post, Robert James '79
Schmidt, Thomas Edward '70
Sedovic, Pete Stefan '82
Burgi, Charles Edwin '51
Byrne, Clare Theresa '78
Goldring, Stanley '64
Levy, Donald Jack '47
Patterson, James Glen '99
Wildermuth, Amy Joelle '94 |
|------|--|------|---|------|--|------|------------------------|------|---|------|---|------|---|------|-----------------|------|--|---|--|--|

CHI CLUB, CONTINUED

- MT A Courville, George Eugene '59
Egeland, Monte Dean '81
Osgard, Dennis M. '62
- MT B McDonnell, Kathleen G. '83
- NE A Doerr, Eric Arthur '88
Kaminski, Wayne Alan '79
Langford, Susan Kathleen '90
Martin, John Craig '85
Steube, Milan Ray '74
Stransky, David Wayne '92
Watson, Gene D. '59
- NV B Nieltling, John J. '90
Nott, James '09
- NH A Greene, Prescott '57
Littlefield, Raymond S. '73
Scharfe, Alan Charles '78
- NJ A Compton, Joanne B. '79
Ghosh, Subhendu '89
Greenip Jr., John Francis '66
Hughes, John Joseph '70
MacMillan Jr., Duncan J.S. '66
Murphy, Kevin Jay '78
Schell, Robert Dallas '74
Tirado, Daphne Christine '82
- NJ B Cohen, Robert Bruce '77
Herrmann, Eric Peter '69
Kaufman, Peter Andrew '84
Plant, Stephen Irving '65
Shalayda, Robert George '73
Wolf, David '65
Wollmann, Norman P. '81
- NJ G Angyal, Stephen '63
Castaldi, Frank James '69
Goodrich Jr., Robert R. '70
Husson III, Matthew A. '66
Pecca Jr., John Anthony '87
Pinto, Dick Cunha '56
Reitsma, David '65
Terry, Frederic Theodore '67
Vandemulebroeke, L.C. '89
- NJ A Lisle Jr., Thomas K. '69
Long, Steven Michael '68
Pruzzman, Robert Austin '72
Wolff, Richard John '72
- NM A Bradt, David Jay '81
James, Jonathan C. '97
- NM B Busch, Robert Douglas '72
- NY A Au, Peter Yuk Tak '93
Cohen, Adam Barrett '85
Selius, Albert O. '87
Silbert, Glenn Richard '75
Thomashower, William J. '70
Zimmerman, Robert W. '77
- NY B Baxter, Douglas Howard '83
Despirito, James '83
Fedoroff, Oleg Ysevolod '61
Landau, Louis Herbert '49
Leader, Jeffery James '85
Leader, Margaret Ellen '85
- Perkins, Richard Wilson '54
Spearot, James Anthony '67
Storrs, Edward Lee '81
- NY G Zastrow, Kenneth Donald '52
Blakeman II, Robert D. '89
Bornhorst, Bernard R. '60
Bruch, Charles Gregory '59
Butler, Charles William '50
Lequar, James Kay '87
Lynch, Karen Michelle '86
Pennis, Joseph Michael '89
Sacks, Alexei Hiram '90
Schultz, Stephen Parker '70
Stallman, Thomas Frank '59
Staudinger, James Robert '77
Walczak, Dennis James '76
Walter, Buff Arthur '60
Weader II, Richard J. '64
Weinberg, Richard S. '81
Zmroczek, Leon Anthony '78
- NY A Heineman, Duane Thayer '58
Jureller, Steven Francis '87
Matyas, Robert M. '52
McCloskey III, Charles C. '71
Teng, William L. '74
Winkle, Roger Allan '67
- NY E Kammenzind, Henry A. '50
McCaffrey, Ronald Walter '52
Rosen, Fredric Kenneth '62
Rubin, Lowell '61
Simmons Jr., Edward J. '66
- NY Z Lopinto, Robert Anthony '67
Sindel, Fred H. '59
Tuchband, Stuart Martin '63
- NY H Bergh, Gerald Kenneth '58
Beron, Michael '71
Minton, Evelyn Ann '73
Stoll, Eric Duane '61
Valcourt, Jean-Mary K. '85
- NY O Beckeman, William J. '79
McKenney, John Lee '62
- NY I Keevill, Gary Steven '79
Telesco, John Charles '69
- NY K Ablowitz, Mark Jay '67
Alcaro, Domenic John '87
Brown, George Albert '48
Coleman, Thomas G. '62
Dennis, William John '74
- NY A Ball, James Edward '75
Fillo, John Paul '74
Rigert, John Anthony '70
Silverman, Joel Stuart '74
- NY M Hansen, Jean Marshall '77
Montgomery, Michael Earl '75
- NY N Gluszak, Timothy John '88
Kocher, Lawrence Harold '67
LaRosa, Anthony Phillip '77
Morris, George Craig '63
- NY E Byrnes, Richard Dennis '83
- Haller, Marc Frederick '85
Mathews, Joseph R. '81
Rubano, Vincent Francis '73
- NY O Courter, Jeanne Lynn '75
Farrell, Timothy Michael '82
Hofmann, Linda '79
Putnims, Zigmunds Andis '78
DeVoe, Charles George '76
Drexel, Peter George '69
Frank, Ian Joseph '09
- NY P Curran, Paul Joseph '83
McBrien, William J. '87
Roldan, Mark Joseph '85
Solaski, Thomas P. '85
Wong, Wai Kin '85
- NY T Olenik, Anthony Michael '08
Torres, Peter '02
- NC A Baer, Richard Tobias '63
Burkart, Alex Raymond '72
Capps, Dickson Michael '75
Fitch Jr., Johnny Edward '76
Franke, Deborah A.L. '85
Hutcherson, Rodney Neal '82
Karesh, Lewis James '81
Maybee, Clarion Lee '77
Redano, Richard Theodore '78
Shelton, Monty Lee '84
Shepherd, Steven Olin '94
Skinner, James Orville '73
Wilson, Mark Philip '79
- NC G Ando, Robert Ryoichi '73
Bullard, John Carson '47
Chambers, William F. '60
Franks, Marla Jane '79
- NC A Hinkle, Mark Otis '96
- ND A Dahlin, Earl Charles '58
Herbold, Frederick Jon '69
Jacobsen, John W. '69
Sauvageau, Donald R. '70
Unzelman, Louis Richard '69
- OH A Ammar, Gregory Steven '81
Biery, Kurt Alan '85
Bondor, Paul Lawrence '63
Brichford, Thomas K. '55
Cross, Matthew David '05
Hamilton, Joshua J. '09
Klinich, Kathleen Ann '90
May, Ronald Alan '83
Tanaka, Gordon Yoshimi '76
Thro, Stuart W. '64
Weddell, James Kenneth '76
Zeis, John Frederick '62
- OH B Fazzioni, Gregory Francis '76
Hamilton, Edward L. '73
Robinette, Lisa Marie '03
- OH G Au, Ralph Daniel '71
Balthaser, James L. '71
Becher, Charles David '72
- Bouman, Robert William '60
Clum, James Avery '60
Condit, Dale O. '66
Feltz, John Francis '61
Guins, Thomas Sergei '69
Hohman, Charles Maurice '67
Hollenbaugh, Roger E. '71
Jester, Donald John '67
Orkins, James E. '66
Overmyer, Ray Arthur '73
- Anonymous '86
Pladars, Valts '56
Riedel, Nelson Andrew '67
Robinette Jr., William H. '68
Smith, Stephen D. '72
Stumbaugh, Gary Allen '66
Zeller, Hugh J. '66
- OH A Brown III, Claude M. '74
Miller, Trussell Charles '64
- OH E Cull, Ronald Carl '70
Evans, John Arthur '59
Konsevic, Walter Joseph '53
- OH Z Babula, Maria '89
Proctor, Margaret Pearl '82
- OH H Breuder, Andrew Joseph '70
Clarke III, DeFrance '81
Cole, Neil Richard '75
Kohlhaas, Richard L. '62
Leifeste, Sam Ernest '63
Nelson, James Ralph '65
Reid, James Henry '73
Sweeder, James '82
- OH O Doyle, James Thomas '65
Luhan, John Bernard '70
Rall, Richard Maurice '56
Walter, Kenneth Leo '63
- OH I Strausbaugh, Patrick D. '86
- OH K Billman, Randy William '82
Maki, Luke Richard '78
- OH A Gwin, Russel Willis '85
Murphy, Charles James '77
Nicalce, Richard Allan '76
- OK A Gibbs, Richard Russell '53
Lamp, Maurice Bernard '89
Leaman Jr., Gordon James '73
- OK B Collins, Michael Dean '92
Davis, Linda Rae '77
- OK G Basore, Paul Alan '78
Diggs, Robert Allen '74
- OR A Anderson, Joseph Russell '66
Beard, James Lewis '61
King, Warren Edward '69
Marsa, Arnold Ray '49
McCormick, Gary Allen '74
Robinson, Alan Hadley '56
- OR B Buchanan, Marlowe James '92
- OR F Tuttle, Neil James '09
- PA A Barndt, Ronald LaMar '58
- Bradley, Gordon Hoover '62
Brownlie, Thomas John '71
Fowler Jr., W. Beall '59
Granville Jr., Richard W. '55
Hernjak, James Gregory '96
Knorr, David Bruce '74
Hollenbaugh, Roger E. '71
Jester, Donald John '67
Orkins, James E. '66
Overmyer, Ray Arthur '73
- PA B Best, William Joseph '80
Bradt, Andrea '76
Ciuca, James Allen '72
Cohen, Bruce Alan '72
Dietz, Mark Steven '80
Dreibelbies, George Adam '55
Gasda, David Charles '70
Kivolosky Jr., John E. '92
Magnus, John C. '48
Ross, David Stanley '69
Thompson Jr., Frederick '63
Weston, Matthew Wayne '93
- PA G Chan, Allen Henry '82
Helfer Jr., Arleigh P. '67
Hoch, Orion Lindell '52
- PA A Hocker Jr., Robert Gerard '71
Sheker, Robert E. '91
Silvasi, Gabriel John '93
- PA E Clark, Gordon Beckwith '51
Kulicki, John Milton '65
Mansfield, Brian David '91
- PA Z Anderson, John A. '79
Ebner, Alan Martin '61
Kasoff, David '55
Sarraf, Steven Scott '84
Silvasi, John J. '70
Weggel, John Richard '64
- PA H Boldt, Charles Martin '73
Ellis Jr., Ira Thomas '56
Gilman, Thomas Carter '66
Hills, Frederick James '61
McDonnell, Robert W. '48
Reetz, Helen A. '78
Swartz, William Ewing '54
Hilditch, John Michael '83
Jacobs, Michael Harry '87
Meyer, James Leo '68
Russo, Richard Anthony '68
Volkay-Hilditch, Christine '83
Warczygłowa, Clarence A. '76
Woods Jr., Howard James '77
Schoenberger, Lewis R. '84
- PA K Beseler, Jan W. '88
- PA A Kondylis, Demetre E. '82
Musselman, Thomas A. '73

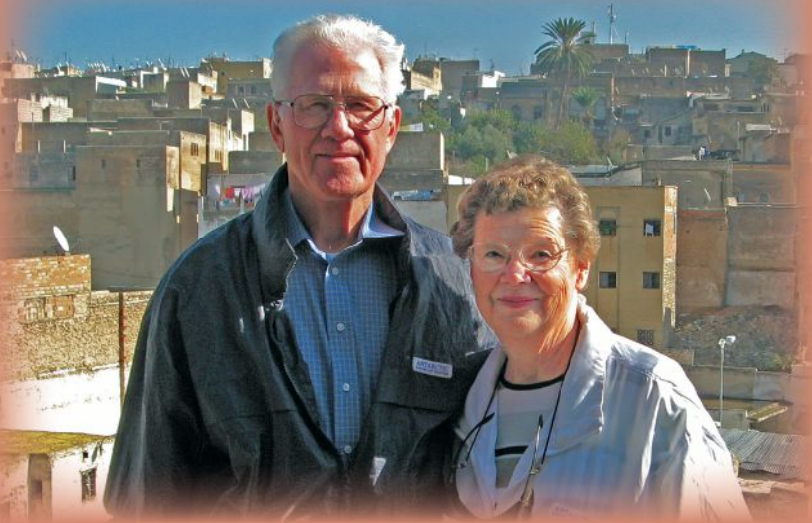
Lyle's Latest Law

the heritage society

The Heritage Society was created to recognize those who include Tau Beta Pi in their estate plans. Becoming a member can help the Association achieve its mission. For more information, call Pat McDaniel at 865-546-4578 or visit www.tbp.org/giving.cfm

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

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



Lyle and Dorothy during a visit to the ancient Moroccan city of Fez.

CHI CLUB, CONTINUED

	Reedy, Herman Earl '75		Danico, Francis Herbert '69	CA E	Beguwalla, Moiz '67		Guerin, Jim J. '92		Persinger Jr., Ardell Louis '71
PR A	Schurko, Robert John '78	VT B	Berkman, Richard Lewis '69		Forman, Barry Joel '60		Hansen, Christian Michael '88		Rush, David Grant '85
	Blasini, Francois Rene '82		Cobb, Eben Charles '77		Goodkin, Mitchell Arthur '68	FL Z	DeLaurentis, Daniel A. '92		Stammer, Russell Eden '79
	Hilerio Sanchez, Josuan '07	VA A	Anderson, Willie Corevis '75		Harvill, Lawrence Richard '58	GA A	Fricke, Steven Allen '93		Van Horn, David Alan '51
RI A	Sanchez, Hector Luis '76		DeYoung, John Howie '99		Hollar, Ray Randolph '78		Axon, Michael William '90	IA B	Veenstra Jr., Henry R. '71
	Fradkin, Henry Edward '68		Evans, Gary Kyle '77		Miller, Wendell Roger '80		Batts, Jiles Larry '48		Gozali, Paul '85
RI B	Saharian, Alexander '56		Garner, Patrick Lynn '72		Ryan, Harold B. '63		Brown Jr., Harry Jay '65		McSwigginn, Thomas G. '61
	Adamedes, Zoe '84		Matthews, Nancy N. '81		Ssuto, Louis '65		Drawdy, Jean Elizabeth '78		Priester, Henry Wyatt '83
	Brady III, William James '80		Price, Michael Glenn '74		Stein, Eugene P. '68		Leathers, James Crewe '81		Stevens, Stephen Arthur '77
	Hurdis, David Albert '62		Reesside Jr., William O. '77	CA Z	Vehrencamp, John E. '50		Lee, George Henry '70	KS A	Ashbrook, J. '66
SC A	Tetreault, David Edward '63	VA B	Bronze, Thomas Peter '79		Blaney, Timothy John '86		Lyons, Laura Christine '84		Brown Jr., Minter Edward '59
	Davenport Jr., Charles F. '79		Dawson, Herbert M. '61	CA Z	Egan, Thomas Vincent '88		Phillips, Edward Keith '74		Carvell, Lee Arthur '84
	Di Lapi, Christine Marie '87		Doughty, Gary Springer '77		Masada, Dante Angelo '75		Priest, Anthony James '88		Hayman, Layton Wayne '59
	Gray Jr., Blaine Edward '72		Lindvall, Scott Guthrie '80		McGuire, John Patrick '58		Russell, Richard C. '56		Hinton, Robert Allan '61
	Scherer, John Harry '65		Long, David A. '91		Sabbatini, Julian '63		Seay II, Charles T. '63		Struble, Philip William '79
	Speed, Penelope Ann '87		Nowotarski, Adam A. '91		Zwingman, Robert Leo '70		Smith, Stanley Cooper '56		Vigen, Paul '87
SC B	Bradey, Jeffery Ervin '85		Savage Jr., Thomas J. '61	CA H	Graber, Robert Nelson '58		Stuber, Donald Robelyn '71		Woelk, Darrell Wayne '71
	Harris, Raymond E. '87		Snidow III, Lyle Christian '74		Hestead, Raymond H. '71		Sullivan, Francis Joseph '86	KS B	Straka, James Lavern '89
	Prunty Jr., Robert Wayne '71	VA I	Mahaney, Jack Morris '82		Khalili, Azita M. '83		Taylor Jr., George Brown '75	KS I	Cutler, Verne Clifton '50
	Thomas Jr., Cunningham P. '58		McGowan, David Michael '89		Krusmager, Daniel T. '13		Uehling, Jeffrey Steven '79		Hightower, Ray E. '64
	Walden, Gary R. '81		Wood, Travis B. '83	CA O	Hoffman, Robert William '73	GA B	Jones, David Neal '92		Hohman, Jerrod Wayne '95
SC I	Baggett, Charlie Cleveland '63	VA A	Gee, Robert E. '54		Schuck, Charles Michael '65	ID A	Ahlschlager, Alan Douglas '87		Minks, Dan E. '83
	Davis III, Emmett Irwin '79		Cahill, Rob S. '72		Smith, John Mervin '70		Ketchum, Steven Lee '85		Roberts, Thomas Carrol '70
	Gustafson, Richard A. '63	WA A	Eastman, James Scoville '53	CA I	Wrigley, Chris J. '96	IL A	Allen, Charles Humphrey '66	KY A	Terrill, Scott Allen '04
	Mello, William James '97		Follett, Mark Samuel '74	CA K	Kern, Jack C. '71		Brown, Harold Thomas '68		Click, Randall Robert '00
	Pastrick, Harold Lee '58		Ogg, Daniel Grant '85		Monesko, George Edward '68		Dowden, Douglas Calhoun '73		Cook, Robert Henry '74
	Reed II, Henry McDavid '60		Oiye, Martin Yasuyuki '76	CA A	Treinen, Donald Joseph '83		Drolen, Bruce Lee '78		Lockhart Jr., Zane Duane '86
	Reed III, Henry McDavid '85		Orr, Peter Courtney '71		Orr, Peter Courtney '71		Ellis, Paul David '66	KY B	McIntosh, Rickey Darrell '75
SD A	Brass, Lorin Lee '75		Reichel, Jerel Dave '66	CA M	Reynolds, Hugh McGinnis '69		Graham, Joseph G. '51		Patton, Bradley Davison '76
SD B	Bocklund, Lori Sue '83		Rising, Jerry Joseph '61		Rising, Jerry Joseph '61		Hang, Kenneth Warren '66		Jodrie, Mary Clare '85
TN A	Chambers, George Philip '58		Rosen, Donald George '58		Saxberg, Bror V.H. '80		Hendron Jr., Alfred J. '59		Johnson, Alan Arthur '52
	Davis Jr., Fred Thomas '74		Saxberg, Bror V.H. '80	CA N	Beard, David Charles '91		Herring, Joel Gregory '69		Meyers, James Frank '69
	Ellis, Jeffrey Thomas '93		Smith, Jeffrey Francis '82		Chang, Fu-Lien '74		Kipp, Lyle Dean '86		Raderer, Thomas Kerry '73
	Hitch, Benjamin Franklin '67		Stieglar, Joseph Edward '58	CA N	Amirhosseini, Michael M. '90		Kuhn, Paul A. '54	LA A	Arman, Ara '55
	Hunt, Roy Joe '67	WA B	Hudspeth, James Charles '88		Armstrong, Lorry Ann '84		Kuske Jr., John Anthony '61		Chapoton Jr., Charles W. '60
	Jackson, Karen Elizabeth '81		Langley, Duane Douglas '55		Armstrong, Robert Alan '81		Lipinski, Paul Richard '60		Correa, Domingo Mateo '59
	Kaminsky, Lawrence V. '81		Opfer, Neil D. '76		Beardsley, Robert Frank '71		Marlowe, Lyle Harrison '65		Domino, Joseph Frank '70
	King, Gregory Tyler '93		Ray, Edwirth Lillard '48		Johnson, Michael Robert '86		Nadasdi, Kristof '00		Levert Jr., Freddie Joseph '62
	Layman, Ronald Terry '77	WV A	Scott, Norman Ray '58		Nadasi, Kristof '00		Quade, Robert Northrop '54		Miller, John S. '68
	Metzger, Robert James '66		Ray, Edwirth Lillard '48		Newberry, Conrad Floyd '57		Rosenthal, Mark Alan '81	LA B	Cloutare, Martyn Albert '81
	Miller, Freddy M. '79		Blackshaw, George L. '58		Pitzer, Alan Glen '66		Stutzman, Byron William '60		Garrido, Louis A. '57
	Sharp, Jason Wayne '02		Boggs, Mark Steven '80	CA E	Smith, Michael P. '84		Wallace, John Robert '61	LA F	Hausler, Thomas Folse '81
	Totten, Barry Nelson '82		Engle, Geoffrey Stuart '94		Baxley, Paul Alma '81		Wilhelm, Dale R. '80		Barron, Tim C. '83
	Welch, David Otis '60		Fleischer, Charles John '70		Foster, Carl George '74	IL B	Filetti, Edmund George '54		Clary, Dennis Michael '73
TN B	Bass, Jay Kevin '87		Gould, Marvin Burl '63		Nicoloff, Louise Therese '82		Knorovsky, Gerald Albert '70		Harvey, Irvin Mitchell '69
	Brown, George Arthur '55		McClung Jr., William D. '88	CA O	Nicoloff Jr., Nicholas '83		Kufta, Richard Walter '77		Owen, Mark Enoch '92
	Green Jr., Thomas Bagley '75	WV B	Hainer, Victor Keith '00		Montagna, Phyllis Ann '80		Schuler, Michael Steven '93		Raabe, Mark Todd '90
	Heflinger, Richard Scott '72		Raines, Linda N. '83	CA I	Nakauchi, Edward M. '69	IL I	Christopher, James Mosko '84	LA A	Stephenson, Jan Patrick '68
	Hodges Jr., Willie Erwin '67		Saultz, James Edward '50	CA P	Spencer, Michael Ray '80		Cohler, Edmund Usher '49		Garber, James Daniel '66
	Kepper III, James Henry '71	WI A	Thornton, James Richard '81		Mandrell, Nathan Keith '92		Derlacki, Walter R. '45	ME A	Hei Jr., Donald Joseph '67
	Pentecost, Gene Edgar '50		Guelker, Eric James '90	CA E	Motogawa, Bruce Joji '75		Gubisch, Roland Werner '64		Johnson, Philip Martin '55
	Petersen, Eric Scott '84		Lee, Jun Wai '68		Stillmaker, Kim Rose '08		Henze, Edward Durand '50		Jones Sr., Jeffrey A. '75
TN I	Britton, Thomas Carter '88		Lutz, Leroy Albert '60	CA E	Black, Stephen H. '85		Keables, Erin A. '84	MD A	Walker, Stanley Edson '62
	Crawford Jr., Walter Keith '62		Page, Chris Scott '90		Frankel, Craig Alan '86		Williams, Molly Wells '63		Hall, H. Thomas '56
	Steelman, James Taylor '71		Sieker, Frederick A. '70	CA T	Freneman, Kenneth Philip '89		Wright, Susan L. '74	MD B	LaBerge, Chuck Charles '74
TN E	Wilcox, Leslie M. '77		Wellauer, John Charles '65		Landis, George Foster '88		Zimmerman, Jerald R. '76		Leimbach, Wendell Byrd '71
TX A	Bain III, Carl '80		Wulf, Kurt H. '83	CA Y	Michaels, Philip George '91		Darling, Edwin Earl '68		Sniegowski, Gary Howard '78
	Cardwell, John Wesley '68		Wynelberg, Richard J. '77	CO A	Miks, Kathryn Fink '87	IL A	Gilles, James Edward '75		Bohse, Michael Edward '85
	Courtney Jr., Lonzo C. '58		Zemke, Wayne Phillip '64		Peterson, Steven Douglas '72		Kobiella, Anthony Robert '93		Cederman, Candace Ann '82
	Glasow, Brian Scott '99	WI B	Dschida, Linda Maria '82		Pinkham, Joe Neal '62	IL E	Finochio, Samuel D. '73		Galloway Jr., John Perrin '73
	Haschke, Chester Glen '50		Hughes, Philip Joseph '66	CO B	Wilson, Donald Earle '58		Alexander, John Albert '56		Jochum, Thomas Andrew '77
	Henry, Wesley Bert '51		Hutton, Teresa Jean '91		Ashwood, Edward Ross '75		Arakawa, Wallace J. '57		Kale, Linda T. '80
	Horton, Larry Earl '83		Jaye, Deborah Ann '03		Brooks Jr., Lowell Ward '62		Bach, Gary Robert '74		Lawrence III, Joseph P. '68
	Hurst, Terry Lee '76		Kleinvehn, Lynn Allen '65		Chapman, Terry Charles '69		Becker, Kenneth Alan '81		Mitchell, Reginald Henry '72
	Kueneman, Wesley Ben '59		Mooney, Thomas Joseph '79	WI I	Cole Jr., Charles Owen '61		Belter, Jerry Robert '77		Ormett, William Seymour '59
	Le Bleu, Robin Boyce '65		Panning, Martin Henry '49	WY A	Davis, Gregg Randall '77		Carpenter, Richard H. '54		Powell, Harry David '88
	Lyle Jr., Fred F. '62		Wick, Paula M. '81		Furman, Michael Lee '80		Cheesman, Mark William '81		Poultz, John Irvin '71
	Marshall, James L. '72		Simon, Karen Anne '83		Greene, Christopher S. '73		Clodfelter, Donald Glen '55		Taylor, Patrick Joseph '03
	Matlock, John Hudson '67		Cook, Norman L. '79		Johnson, Mark '91		Cripe, Duane Byron '82		Tracey, John Stanley '74
	Moorman, Charles Travis '59		Hand, Maureen '94		Joselyn, Jo Ann '65		Cross, Perry Gregory '74	MD I	Hauge, Todd Allen '83
	Parma, George Francis '85		Lester, Roger N. '87		Lafolette, Jack '59		Cundiff Jr., Bruce Taylor '65		Kolley, Chester Michael '85
	Peet, Ed '69		Scharton, Craig Allen '85		Richards, Lawrence G. '61		Cunny, Robert William '46	MA A	Auclair, Jared Robert '01
	Reese, Francis Edward '75				Sorensen, Chris David '79		Danner, David Lee '70		Lindquist, Richard W. '54
	Sweet, Paul Alan '70				Thayer, G. David '57		Flanigan, David Lawrence '66	MA B	Paul, Bruce Franklin '56
	Thompson Jr., Chaunce O. '53				Altman, Donald Clyde '57		Forster, Allen Vaan '72		Bangser Jr., William '48
	Turner, William Danny '61				Ferentchak, James Allen '77		Goette, William Edward '56		Braisted, Paul Evan '79
	Whitesides Jr., John L. '65				O'Fallon, Sean Emmett '95		Grubbe, Deborah Lynn '77		Ciaraglia, Frederick J. '69
TX B	Gilmer, Tracy F. '80				Briggs Jr., Roy Dubard '65		Hoshaw, John Edward '62		Deblange, Arthur D. '62
	Larkin, Rebecca J. '89				Crews, Mark Conrad '82		Jelbsen, Eric Richard '80		Dennis, Joseph E. '92
	Rossler, Steven Wayne '73				Bazin, Bradley Jay '80		Minni Jr., Robert Joseph '70		Dodson, John Orville '68
	Soules, James Gregory '79				Bugel, Robert Harry '45		Murphy, Thomas Frank '70		Ellison, William Theodore '68
	Stinson, John Michael '66				Cooper, Richard Craig '63		Noah, Max Wilbur '58		Goldman, Barry '76
	Uher, Edward L. '65				Feinman, David Mayor '49		Schmertzler, Alvin Louis '45		Johnson, Timothy Lee '68
	Williams, David Charles '47				Ljung, Michael Allen '92		Smith, H. Irvin '56		Margulis, John Reed '54
TX F	Fisher, John David '70				Conklin, James Charles '70		Sommers, Steven R. '78		Osterberg, Peter Maynard '78
	Hunter, David George '79				Grossman, Richard Larry '69		Southam, Robert E. '78		Robinson, Thomas Charles '58
	Johnson, Terry Robert '55				Hill, Dorian Evan '69		Stilger, Donald L. '81		Savage, John Edmund '71
TX A	Crosser, Robert Earl '50				Kramer, Steven M. '79		Ward, John B. '58		Schreiber, Robert Paul '65
	Dokos, Nick George '57				McKinstry, Robert J. '72		Weakley, Thomas Lionel '55		Seagle, John Peters '55
	Garner, Scott Jahrand '77				Sobol III, Anthony Joseph '70		Welch, Alan James '71		Shedd, Walter Milo '66
	Kasch, Vernon Ray '73				Whittlesey, Richard Allen '64		Wolf, Jay Ralian '48		Shepperd, Stan Wayne '70
	Madeley, Hulon Matthews '58				Bradley, Kevin Patrick '91	IN B	Johnson, William Barr '60		Smith, Kenneth Alan '58
	Mason Jr., John Michael '81				Halfen Jr., Charles Weldin '80		Klaus, R. Alan '53		Topolice, Claudio '76
	Mitchell, Melvin M. '52				Maloney, Francis George '73		Mandeville, Tom '71		Tou, Frederick Nelson '81
	Smith, Manning DeWitt '64				Seitzer, Kenneth E. '78		Raff, Barry Edward '67	MA A	Zukowski, Charles Albert '81
	Swink II, Marvin Neal '80				Amisial, Wilfrid Jean '71		Stant, George Robert '76		Adams, Randolph Keith '70
	Wilson Jr., Edmon Doak '57				Sharpe, Irene White '63		Harvey, Francis Joseph '65		Coppeta, David Anthony '91
	Zimmerman, Keith David '89				Burns, Richard Stephen '59	IN I	Hawes, William Michael '78		Iovanna, Paul Robert '78
TX E	Herrmann, Edwin Peter '67				Deena Jr., Basil Anthony '85		Hayes, Francis Joseph '65		Murch, Robert Emery '58
	Hillegeist, Reynold Ben '63				Whitham, Charles Lamont '61		Harris, Eric Richard '80		Savage, Paul David '77
TX H	Godwin, Albert Eugene '84				Charlton, John Dunaway '72		Quadrini, Mark L. '74	MA E	Sartres, Robert Elliott '55
	Guinn, Douglas Edward '78				Dehoff, Robert Thomas '55		Waugh, Richard Emmet '73		Chiodo, Richard Anthony '71
	Hoffman, Heather Janell '92				Miltello, Sam '61	IN A	Heidepriem, Heide E. '68		Hanky, James Joseph '69
	Mathews, Douglas Jay '81				Ohland, Matt William '96		Hessler, Glenn Brian '61		Johnson, David Norman '77
	Schaeper, Wilfred H. '76				Schnitzler, Bruce Gordon '69	IN E	Ali, Afzal '78		Jurczyk, Thomas W. '71
	Totten, Dwight Lee '66				Schoppman, Gregg M. '08		Lund, Stephen R. '80		Levesque Jr., George E. '70
TX O	Fong, Keith Batchelor '88				Shelton, Mark Robert '80	IA A	Brunk, James Everling '48		Madden, Val F. '78
	Fong, Maria D. '91				Tinsley, William Charles '77		Cerwick, Joel Alan '66		Payne, Robert Joseph '86
	Foster, Otis Charles '82				Walton, Ray '77		Cosgrove, John D. '56		Schlee, John Joseph '69
	Havo, Karen Patricia '86				Gatic, Rafael E. '80		Dick-Peddie, John Irvine '53		Swanton, Bruce David '85
	Quesada, Paul '72				Gonzalez, Cristina Maria '79		Hemken, Peter Charles '77		Thompson, John Woodruff '72
TX A	Coon, John W. '91	CA A	Hamilton III, Edsel P. '72		Routh, Andre Guy '89		Irvine, Alexander John '79		Travers, Harvey Charles '48
	Garcia, Danny '85		Judson, Paul '48		Meloy, Robert Merl '81		Maifield, Christopher J. '95	MA Z	Croper, Perry A. '62
	Perez, Romeo Rene '82		Koppamy, Charles Robert '63		Curtis, Fred Glenn '52		Olson, Scott E. '69		Cramer, Robert Alan '80
UT A	Dewey, William Alonzo '67		Oslick, Harvey Raymond '87				Owens, David Andrew '91		Lynch, David Peter '82
	Peterson, Charles Cooper '68		Rey, Daniel '66						Stumpf, Christian Reeve '82
	Spong, Robert Neil '58		Shields, David James '78						Walsh, James Edward '76
UT B	Enke, Glen Graham '62								
VT A	Butterfield, William F. '67								
	Cimonetti, William James '59								

SECOND CENTURY CLUB

SECOND CENTURY CLUB, CONTINUED

Wylie, Bruce K. '66	Myers, Kenneth Raymond '72	Newman, Mitchell James '81	OH Z Rober, Kenneth Jerome '68	Hilday, Charlene Marie '96
MA H Daniels, Susan Carol '81	Stevens, Robert E. '85	Schwind, Daniel Richard '76	OH H Duvall, David John '88	Lang, Christine Marie '80
MA @ Aubin, Paul Douglas '91	Wireker, Victor Francis '72	Tuttle, James Raymond '63	Hahn, Danny A. '83	SC I Barton Jr., Robert Harley '62
Bloom, David Richard '87	Zimmick Jr., Harold Edwin '64	Wesler, Philip '48	Jumper Jr., George Yount '66	Beckman, Michael A. '93
MI A Bayer, Dorothee Angela '83	MO I Apanel, Anna Maria '80	Zagrobely Jr., Thadeus J. '76	Menna, Richard Joseph '62	Burton, Kevin Lane '90
Golden Jr., August '66	Briner, Charles Dean '52	NY I Ahlman, Lars Thorsten '71	Merkle, Laurence Douglas '92	Sullivan, Jack Lavern '79
Hole, Kevin Michael '90	Galbierz, Robert William '64	Boehm, Robert Andrew '79	OH @ Berger, Norman Rudolf '68	SD A Beck, Carl William '83
Mates, Robert Edward '86	Klein, Milton '44	Cassella, Judith Ann '71	Crispino, David Joseph '80	Berggren, Mark Harry '76
Meckler, Carrie Lynn '98	Lum, Thomas '51	Gallo, Anthony Michael '76	Kelly, John Bernard '67	Bier, James John '84
Nastas III, George '66	Mills, Robert Allen '57	Kayton, Myron '55	Mikalaukas, George '86	TN A Blazier, Stephen Draper '74
Patterson, Garvin Wesley '69	Stephens, Mary Elizabeth '88	Lerner, Steven Larry '75	Miller, Michael Leo '78	Bowden, Bryant Baird '68
Ruhl, Scott Alan '83	Williamson, Ronald A. '65	McCutcheon, William John '66	OH K Bratoli, Mark A. '79	Diaz, Amy A. '96
Eyckman, Jim James '38	MT A Jellison, Gabe Lee '98	Orans, Robbin Marsha '71	Bumell, Robert Lee '76	Exum, Joe H. Edman '52
MI B Braem, Murray Peter G. '80	MT B Jackson, Darron Boyd '86	Oras, Gregory Joseph '79	Stimler, Jeff Joseph '84	Heathington, Kenneth W. '61
Greeneveld, Gerald A. '63	Montgomery III, Wayne '83	Weinberg, Aaron '69	Stimuler, William Edward '83	Jones, Michael Jonathan '68
Mansfield, Michael Guy '76	NE A Claar, Stephen Beryl '73	Zwilenberg, Melvin Leslie '60	Volosen, John '77	Lacey III, John William '69
McNeil, Michael Thomas '86	Fuchser, Fay Eugene '51	NY K Foote Jr., James Conklin '60	OH A Bikulege, Stanley Blaise '86	Long, William Pock '69
Pelletier, Douglas Peter '89	Hofer, Diane Sue '82	Hutchings, Donald W. '61	OH M Dull, Daniel D. '90	Peugeot, Richard Scott '60
Stone, David Garth '69	Nelson, Stuart Owen '50	Isaacson, Morton Sanford '66	OK A Kleinsteiber, S Warren '78	Porter Jr., James Bert '65
Whitman, Brian Edward '92	NV A Jones, Keith Alan '85	Levy, Cynthia Ann '80	OK B Hand, Ronald Wayne '72	Sarnaik, Jagadishcharand '81
MI I Andersland, Mark Steven '83	Van Horn, Michael David '76	NY A Monroe, Charles W. '53	Janowski, Susan Theresa '80	Sewell, John Ike '54
Anderson, Richard Walter '66	NH A Charron, Ronald Harvey '64	Passut, Charles Albert '67	Weston, Kenneth Clayton '55	White, Robert Stanley '48
Barr, William Robert '70	Major, Alfred Napoleon '50	NY M Check, Frank Thomas '66	OK I Lewis, William Jeffrey '84	Williamson, James Moore '79
Bern, Jeffrey William '63	NH B Price, Alexander Daniel '05	Di Cerbo, Jennifer Claire '91	Miani, Lino M. '86	Zimmerman, James L. '58
Bigelow, Wilbur Charles '44	NJ A Boardman, Thaddeus J. '52	Hurewitz, David Lewis '64	OR A Jarvis, Paul Edward '63	TN B Campbell Jr., Henry G. '59
Blair, David John '57	Chen, Kevin Emmanuel '06	McCarthy Jr., James J. '66	Loughmiller, Bert Edward '64	Hawkins, Kenneth E. '88
Bloomer, Craig D. '80	Ciccolella, Sergio A. '72	Sutter, Richard Randall '71	Rupe, Robert Charles '72	Lyle, Stephen Michael '79
Bloomer, Kristine M. 81	Ehrhardt, William C. '68	Wilcox, Robert E. '73	Wilt, Jay N. '74	Petersen, Stephanie Anne '84
Boettner, Donald William '62	Iapico, Jeffrey Allen '77	NY N Bender, David James '64	PA A Albright, Carl H. '55	Shireman, John Frederick '76
Brown, Marshall Joel '96	Reinhardt, Gregory C.J. '65	Davis, James Steven '70	Branting, Katrina Louise '80	Vaughn, Bruce Kevin '88
Bull, Joseph Saples '52	Sussman, Kenneth Philip '72	Deckro, Richard Floyd '72	Brunt, Thomas Barry '62	TN I Badru, Adejeji B. '79
Caminer, Morris Harold '50	Tensfeldt, Thomas George '81	Havro, Donald William '67	Clegg Jr., Lee Milton '59	Clevenger, Jerry A. '65
Duncan, T. Michael '75	Tompertini, Kenneth F. '65	Mann, Michael '77	Durdock, Robert Charles '57	Halle, Robert John '94
Earl, George Clayton '66	Trippka, Steven Joseph '66	Nuding, Theodore Glenn '75	Frey, Philip '51	Moyers, Robert Lewis '05
Elieff, Richard George '82	Wolosky, Irwin Stephen '68	Riehling, Robert William '60	Haisl, Randall Matthew '80	Murphy, Fred Anthony '71
Frantz, John Alexander '75	Adams, Frank George '53	Schaub Jr., Thomas F. '93	Hjorth, Beverly Ellen '79	Perigo, Donald Bruce '83
Gross, Paul Henry '89	NJ B Badgley Jr., Robert Henry '60	Tabaczynski, Rodney John '66	Leach, Jeffrey Daniel '77	TN A Peterson, Ralph C. '51
Hedding, Dale Paul '61	Brandenburg, Dan Saul '72	Tammellino, Paul Arthur '85	Marshall, Steven John '82	TN E Cook, Justin Doug '01
Hickcox, Timothy Earl '65	Bubenick, David Virgil '73	NY E Ball, Michael John '72	Melvin, William Larkin '89	Knight, Sandra Kay '79
Houghtby, William Earl '50	Emmons Jr., Harry LeR. '40	Drewitz, Edwin Walter '77	Parsons Jr., Donald F. '70	TN Z Carley, Terrence Magoun '56
Lambert, Thomas Joffre '77	Futehko, Frederick '55	Glynn, Sean Francis '92	Phelps, David Reeves '62	Pyle, Angela Diana '91
Lipford, Roque Edward '60	Nixon, Allen Mackenzie '62	Mercado, Anthony D. '76	Savage, Philip Kent '72	TX A Wildon, Matthew William '00
Lugten, John Butterfield '76	Palko, John R. '69	Miloy, Kevin John '78	PA B Ferenci, Jack Edward '75	Badgwell, Thomas Alan '92
Malloch, Charles Delridge '57	Regazzi, John Robert '76	Mohan, Anne Elizabeth '09	Matlack, James Lynn '84	Caudle, Brian Hall '77
McCormick, James Robert '58	Schear, David Paul '77	Rodriguez, Ernesto '85	Matthias, Tracey Dawn '89	Damek, Herman Andrew '97
Meilinger, Robert B. '94	Sharma, Bhavender P. '69	Steinle, Kathleen Susan '77	Naffin, Richard Keith '06	Floyd, F. Mike '63
Passman, Richard A. '44	Valk, Stephen B. '77	NY O Jahelka, Joseph Robert '76	Orosz, Matthew P. '02	Givens, Kent Barr '72
Pearl, John Christopher '61	NY I De Caprio, Vincent '72	Lamberg, Michael Jay '83	Pickenheim, Timothy R. '90	Hugger, Bodin Anthony '56
Propson, Thomas Peter '55	DeWaal, Johannes '70	Spitz, Glenn Steven '87	Walker, Kurt Melvin '77	Kumpf, David Kenneth '70
Rollinger, Martin Gerard '82	DiDomenico, Michael John '65	NY II Fluker, Jon L. '88	Zahora, Kenneth Richard '76	Macemehl Jr., Charles A. '57
Sagaser, Donald D. '48	Gagliardo, Reginald S. '70	Grosch, David A. '85	PA I Capone, Christopher D. '87	Meems, Steven Wayne '72
Sherman, Larry G. '66	Germain, Dorothy M. '73	Shakshober, Douglas John '85	Carter II, Woodard C. '56	Parent, Laurence Edward '81
Siewiorek, Daniel Paul '68	Kobylarz, Thaddeus John '58	NY P Colella, Donald Anthony '78	Cooley, Wils Lahugh '64	Wong, Lucas '84
Smith, Thomas Murray '72	Lipuma, Charles R. '53	POoran, Nakechand '90	Erwin, Jimell '73	TX B Gates, Robert Douglass '72
Stuart, John Kilgour '54	McWilliams, John Paul '65	Ramos, Dennis J. '03	Jourdain, John Michael '84	Koehler, Kerry Jon '92
Thomas, David Charles '56	Paone, Charles Joseph '66	NY E Smith, Jason Stephen '95	Marcus, Robert Louis '45	Moss, Michael William '83
Upham, Donald Lee '58	Rij, Jerry Jerome '72	NY T Chacko, Vinny James '09	Negri, Damon Joel '78	TX I Hobbs, William Edward '65
Weber, Michael Frederick '78	Sulzberger, Carl Lewis '62	NY I Venable, Richard Robert '95	Pierce, Amy Marie '80	Jackson, Alan Parker '64
MI A Dubois, Kenneth R. '88	Sulzberger, Virginia C. '62	NC A Bailey Jr., Charles R. '73	Wierzbicki, Jeanette M. '80	Sandmann Jr., Charles W. '82
Gallagher, James Anthony '68	Tabor, Vincent Joseph '75	NC A Baker, Fred Eugene '60	PA A Bartuskiak, R. Donald '77	Barksdale, Donald Lee '55
Hallahan, William Joseph '64	NJ A Aughenbaugh, Jason M. '01	Buckner, Harry Benjamin '92	Besser, Gilbert M. '49	Beedecker, Tom Jay '64
Kannellis, Pranciskus S. '69	Ma, Brian Bin-Ho '00	Galyon Jr., Luther Ellis '67	Blecherman, Barry Seth '82	Boutte, Jennifer Lynne '89
Lajeunesse, Robert Paul '74	Olsen Jr., George Walter '65	Helm, Chester Ethane '74	Cavallaro, Joseph R. '81	Caso, Gregory Scott '87
MI E Marino, Joseph Anthony '72	Stern, Hal Lawrence '84	Younts III, William E. '79	Sern, Stacey D. '86	Chaput, Armand Joseph '63
Renauer, Joseph Gerard '74	Weinmann, Winston E. '80	NY G Baxley, William Allison '55	Turner, Michael Bryan '89	Cox, Ralph Frank '54
MI E Billion, Godwin Paul '75	NY M Gollmer, Nicholas Alan '95	Davidson, Lindell Alf '49	PA E Batdorf, Harold Ansel '70	Crews, James Alvin '58
Mahanes Jr., Harold P. '65	NY A Blomberg, Richard David '67	Farst, Douglas Edson '79	Murgas, William Joseph '53	Dyson, Norman Kenneth '60
Mertz Jr., Harold J. '61	Feuerstein, Stewart Fred '80	Hustvedt, Kent Carlyle '75	Santo, William John '53	Fink, Tami Neal '91
Moses, Michael Joseph '00	Repetti, Ronald Victor '57	Moulton, Paul Rush '80	Schroeder, Karl Richard '49	Frank III, Henry G. '77
Paulson, James Marvin '47	Richter, Stephen L. '63	Thor, Philip Wayne '74	PA Z Andrichak, Christopher S. '95	Gerlich, Leon Horace '54
Sagert, Harold Henry '68	Seader, David '67	NC A Clark, Michael J. '75	De Maio, Michael '76	Gray, Foster Lee '53
Siepierski, Michael A. '80	White, Ralph Paul '51	ND E Dempsey, Gary Lee '82	Duda, George Elias '77	Jordan, Kirk Gerald '80
MI Z Godfrey, James E. '48	NY B Bolstad, Richard L. '80	NC E Craft, William J. '63	Hill Jr., Albert Meredith '67	Masset, Donald Allen '70
Grubbs, Ronald Dean '73	Dyre, Eddie Leonard '51	ND A Crowder, Harry Richard '60	Jastrzembiski, Joseph S. '64	McClellan III, W. Roy '74
Lenz, Ronald Lee '81	Monson, John Arthur '58	Fay, James Maurice '82	Rummler, William David '59	Murthy, Prahlad N. '92
Reardon, Robert Warren '74	Olson, John Frederick '64	McLaughlin, Jenny Louise '84	PA H Grier, Bruce Hood '77	Spahn, Rex Lee '80
Wozniak, Curtis Steven '78	Smith, Kelvin Curtis '55	Mittelsteadt, Steven J. '81	Noble, John William '72	Stratton Jr., Jerald Jay '86
MI H Cole Jr., James J. '78	NY I Brown Jr., Alfred Winsor '66	Nyhus, Orville Kenneth '63	Pedersen, Neil Jon '74	Sturrock, John Michael '72
Johnston, Richard '78	Covello, Joseph '63	Reiffschneider, Paul Henry '80	PA @ Addotta, Robert Frank '77	Sullivan Jr., Samuel Lane '57
Webster III, James B. '79	Diefenbacher, Robert H. '59	Vastag, Harold James '69	Barron, William Robert '60	Vaden III, Frank S. '56
MI @ Kaiser, Gerald Michael '76	Foust Jr., Tilton Harrison '68	ND B Jesh, Marjorie M. '83	Braun, James Francis '84	Wornat, Richard Oscar '49
Messer, Bryan James '98	Gordon, Benjamin James '97	OH A Allison, James Franklin '52	Grana, Peter Norman '73	TX Z Broussard, Lames '87
MI I Russel, Stephen Michael '84	Houle, Michael Emright '74	Fernbacher, John M. '82	Griffin, Michael Vincent '74	TX H Hightower, Janice M. '67
MI K Seymour Jr., Richard L. '97	Hruda, Prokop V. '83	Hartsell, Debra Lynn '90	McElheny, James E. '70	Johnson, Richard Leon '63
Ventimiglia, Melissa Ann '10	Ives, Jon Robert '61	Hartsell, Michael David '91	Orsatti, Louis George '66	Le, Ann '90
MN A Becker, Wren Dale '82	Lenney, Robert V. '62	Hecker, Siegfried S. '65	PA K Siddiqui, Faruq M. '76	Springer, William Thomas '75
Braaten, David Laverne '75	Lyden, Michael Joseph '78	Holloway, Walter Marion '67	PA A Andes, John Arthur '82	Witt III, Arthur William '68
Cavanagh, Stephen P. '89	Lynch, Michael Francis '87	Honiour, Robert Todd '89	Blackburn, Thomas A. '82	TX @ Goolsby, Tommy D. W. '84
Grill, Susan Marie '82	McAninch, Ian Matthew '02	Kimmel, Paul Robert '89	Domhoff, Edward Scott '91	Hippstiel, Ralph D. '72
Larson, Michael Lane '59	Natale, Michael Robert '02	Kirkland, Earl J. '75	Hays, James Charles '73	Van Reet, Leo Joseph '70
Loomis, Howard Burton '51	Niederer, Melvin Mark '82	Kowmack, Edward Joseph '67	Heinrich, Christine D. '86	TX I Maguire, Daniel Myron '81
Olson, Daniel J. '85	Rillings, James H. '64	Lund, Jeffrey William '69	Hovanec, Andrew Stephen '58	TX K Jolley, Lawyer Curtis '79
Olson, Gary Elden '64	White, Andrew Hamilton '71	Martens, John Douglas '93	Kaplan, Kenneth J. '84	TX A Wallace, Weldon Lee '74
Osen, John Walter '81	Williams IV, Carter N. '66	Whitney, Gina Marie '80	Kulik, David Benedict '83	UT A Olson, Kent Gustaf '65
Ronkainen, James William '85	NY A Elko, Michael Joseph '89	OH B Bach, Wayne Stephen '72	Leiss, Wayne Guy '76	Soss, David Albert '71
Schwartz, Gary Lynn '73	Gordon Jr., James Power '83	Ball, James Munro '69	PR A Cruz-Zeno, Elvin J. '88	UT B DeCarlo, Donald Dean '82
MS A Barnett, Kerney Luther '71	Hui, Eric C. '90	Bulcher, Thomas J. '76	Negron Rivera, Dennis A. '13	DeCraig, Armando '95
Corley, Katrina Lynn '89	Lampell, David Mark '73	Greene, Samuel Joseph '75	Perez, Luis A. '88	Hart, Robert Evan '73
Davidson, John Howlett '90	Law, John Singwai '79	Hart, Thomas Russel '66	Rivera, Fernando Osvaldo '68	Thompson, James Rowley '76
Dickson, Ronnie Dean '77	Price, Richard Henry '65	Lenz, Richard Ray '66	RI A Biddle, Justin Miller '56	VT A Bouchard, Donald Raoul '81
Dixon, Charles James '56	Sasso, Joseph Allen '70	Shields, John L. '75	Campbell, Neal Stone '68	Cook, Barbara Karen '84
George, Jim Fredrick '77	Waring, Michael Dana '65	OH I Facer, Roger Glen '57	Edgar, Richard Baxter '47	Garno, Douglas Thomas '58
Hotard, Daniel Gerard '76	Wiley, David R. '82	Hoover, Thomas Edwin '56	French, Harry Banks '47	Goddard, Eric Hapenny '86
Johnson, Roger Lee '77	NY E Jaasma, Edward George '59	Krmer-Prebe, Susan M. '85	Garrett, Scott Lee '57	Henry, Thomas Arthur '70
Sheldon, Kay D. '68	Lee, John H. '70	Kohls, Thomas Carl '81	Newman, Gary Robert '73	Szyrak, Steven Paul '77
Tisdale, Stanley Ray '78	Lombardi, Francis A. '70	Marsolo, Keith Allen '02	Olding, Duncan Robert '55	VA A Abraham, Ryan Thomas '09
MS B MacDonald, Glenn Eric '78	McConnell, Donald Patrick '71	Meredith, David B. '72	Ritter, Charles Joseph '73	Binder, Ronald William '74
MO A Brown, William Robert '74	Mletzko, Alfred Emil '64	Milder, Nelson Louis '59	RI B Bershtein, Margaret '85	Byers, Duane Michael '80
Fitzgibbons, Thomas J. '87	Pinnes, Edward Lawrence '71	O'Neal, Joe Edward '55	Fletcher, Gilbert Alan '68	Capron, Robert Stephen '80
Gardner, Roger William '63	NY Z Choma, Peter '73	Pierce, William Sellers '55	Karnes, Jeffrey S. '80	Coleman, George Whitney '45
Hardin, John Wesley '87	NY H Baginski, Alfred John '62	Sattler, Frank Joseph '62	Lebeau, Andrew Joseph '79	Colonna, James Lewis '65
Henderson, Betsy Lynn '84	Davidoff, Donald A. '72	Steenhoff, Mark S. '79	Oliva, Stephen Arthur '67	Cosby, James Gordon '61
Rodenberg, Gary Dale '77	Le, Phuong Dang '90	Vermillion, Thomas Ryan '80	Silva, Ronald Ernest '74	Fox, William Randolph '71
Salerno, Michael Joseph '84	Schlein, Robert George '72	Verner, William James '58	SC A Harley, John Price '78	Johnson-Payton, Lori R.
MO B Berkeley, Vernon Glessner '50	NY @ Free, Albert P. '78	Wiegand, Frederick G. '72	Harmon, Leon Carroll '71	Kostrzewski, Gregory John '85
Bodenhamer, Steven D. '75	Hamm, Jeffrey H. '74	Zupancic, Michael Alan '87	McCormac, Jack C. '48	Ring, Jesse Bane '69
Brockhaus, Douglas A. '68	Harris, Everette C. '76	OH A Felice, Conrad William '79	Moose, Thomas Caswell '72	Roesch III, Maurice Albert '78
Buenemann Jr., Morris '82	Hunt II, William Edward '59	Hild Jr., Wilbur Henry '82	Stecker, Marc Kevin '82	Wyant III, Thomas R. '71
Hall, Johnnie Everett '59	Lester, John Welch '52	OH E Brandes, Thomas Alan '72	Wayne, Hugh Swinton '49	VA B Blanton, John C. '76
Kopsky Jr., Raymond J. '84	Meyer, Bruce George '69	Henfing, Richard Norbert '84	SC B Bailey, Mickey James '82	Boward, Jill Kathleen '87

SECOND CENTURY CLUB, CONTINUED

Brockenbrough, Thomas '42	CA I	Au, James T. '61	Trickle, Chris Michael '13	Heinmiller, Wayne R. '80	Bunn, K. Wayne '67
Dalton Jr., Eddie Gene '86		Garcia, Rodrigo T. '72	Truax, Philip Park '54	Lipsitt, Harry Allan '52	Church Jr., Richard E. '84
Davidson Jr., Charles Ala '70		Kwong, Ray S. '65	Walker, Neil Renz '69	Pfeil, Richard John '54	Gounalis, Anthony John '81
Ernest Jr., Charles Lee '70	CA A	Hamilton, Shawn Marshall '96	Repp, Brent Thomas '88	Salisz, Albert Andrew '75	Kennedy, Edward Joseph '52
Haight, Roger Quentin '82		Miller, Richard Keith '71	Rose, Gerald Clinton '75	Dykema, Adrian Henry '44	Rubinstein, Ian Z. '69
Kern, David Paul '98	CA M	Empey, Daniel Martin '82	Chabon, Robert, Edward C. '71	Ila, Susan Bernice '77	NY I
Ray II, Robert E. L. '74		Imhoff, Tim A. '87	Charou, Vincent '61	Jung, Eric Peter '94	Beesley, Arthur Hal '75
Sloan, Forrest Eugene '83		Lightcap, William L. '86	Colleran, William Thomas '83	Kuhn, Jonathan L. '92	Chow, Francis M. '96
Wayne, Jennifer Susan '83		Robertson, David Wayne '74	Coolahan Jr., James E. '71	Peck, John Hudson '68	Kellis Jr., Robert Francis '78
VA I		Korte, John Julius '80	King, Robert Joseph '70	Sauer, Daniel Michael '05	Maichak, Thomas Henry '50
VA A		Carr, Dale Allen '77	Kuehn III, Nicholas H. '63	Schoof, Louis Walter '65	Patsos, Daniel Alexander '05
WA A		Davis, Beverly Ziegler '80	Lykins, David Rickett '96	Schulamant, Michael A. '91	Price, Robert Alfred '52
		Levin, Marc E. '80	Massey, Mary Cecilia '82	Bayer Jr., Charles M. '77	Schmidt, Richard Q. '56
		Miller, Stefan John '63	Romiczek, Peter Gerard '81	Carpenter, David Robert '08	Schrader, Frank William '66
		Pizzano, Robert Carl '80	Walsh, John Steinemann '80	Chick, Kenneth Martin '91	Timour, Sine E. V. '52
		Purdy, Catherine Patricia '72	Alvarez, Desi '75	Geib, Arthur J. '44	NY A
		Schwartz, Rick Allen '70	CA II	Hicks, Martha Kay '63	Beaubien, Robert Patrick '90
		CA P	Hosack, Mack B. D. '88	Jackson, Richard Homer '64	Brown, Matthew Alan '85
WA B		Comstock, Lori A. '78	Miller, Walter Preston '87	Kowal, Brian William '73	Gourgey, William Edwin S. '85
		Hyde, Gary M. '64	IA A	Lazaroff, Joseph Louis '62	Lazar, Dale S. '74
		Sarles Jr., Daniel A. '83	Brackett, Robert Chase '48	Lorts, Daniel Joseph '77	Munch, William Dexter '76
		Sarles, Vivian Beatrix '80	Dueker, Leonard LeRoy '55	McMullen, Christopher Th'13	Ng, Benjamin '81
		Turi, Michael Allen '07	Gallagher, Richard Ray '64	Schepis, Deborah Sharon '83	Pope, Daniel L. '53
		Williams, Harvey Ray '59	CO A	Smith Jr., William B. '47	Ramsdell, John Douglas '76
WA I		Brooks, Forest Clyde '70	Benjes III, Skip Henry H. '87	Stoughton, Herbert W. '73	NY E
		WV A	Benjes, Stephanie Ellen '86	Totten, Halden Curtiss '67	Einstein, Stephen E. '59
		Britton, Barry Kevin '85	Smith, Steven Duane '80	Zelenka, Jerry S. '58	Hauptman, Marvin How. '59
		Kacik, Richard J. '84	CO B	MI A	Lemp, Ronald Alan '73
		King, Staci Renee '96	Brown, Charles D. '56	MI E	Lokenberg, John A. '69
		Mongold Jr., Guy Earl '50	Chapra, Cynthia '90	MI A	Maglien, Robert Zachary '63
		Palmer, Charles Bennett '69	Morgan, James Irving '55	MI E	Regier, Raymond Andrew '63
		Pellegrin, John Daniel '73	Primeaux, Paul Rodney '67	NY Z	Choi, Stephen '73
		Rowe Jr., Eldridge Eugene '68	Strain, Robert Castle '50	MI Z	Hamm Jr., William L. '67
		Schuler, Arthur Kurt '71	CO I	MI Z	Sarcona, Roy Douglas '68
		Zimmerman Jr., Albert Ray '58	CO A	MI Z	Weschke, Rainer '67
		Bennett, Chris John '06	Longino, James L. '81	MI Z	NY H
		Harding, Thomas Wayne '86	CO Z	MI Z	Biesiadcki, Glenn Joseph '78
		Lorkowski, Timothy Walter '93	Wong, Douglas Wilson '16	MI Z	Boland, Peter Lewis '69
		WI A	CT A	MI H	Wolff, Murray '48
		Devoe, Michael James '78	Goldenkoff, Ralph Jordan '49	MI H	NY E
		Diedrich, Donald Leo '69	CT B	MI H	Adair, James Leonard '83
		Ellison, Henry Olaf '58	Glagowski, Terry Gene '69	MI H	Atkinson, William Clark '70
		Fahrback, David Roland '69	Perreault, Gregory Joseph '84	MI H	Bayock, Wesley John '55
		Frazier, Clive '66	DE A	MI H	Jacobson, Geoffrey Lee '76
		Haas, Brian Lee '86	Gardiner Jr., Francis E. '62	MI H	Young Jr., Lloyd William '66
		Jens, Barry Lee '64	Tybout, Richard Alton '43	MI H	NY I
		Johnson, Peter Andrew '64	DC A	MI H	Le Mée, Jean '59
		Nesbitt, John David '82	Grayson, Rodney Maurice '71	MI H	Ronan, Anne Elizabeth '83
		Niemeyer, John Alan '68	Rosen, Arye '63	MI H	Savatta, Domenico James '93
		Rozek, John Stanislaus '52	Rust Jr., William David '54	MI H	Serkes, Ira Mark '70
		Senty, James Anton '60	DC B	MI H	Schvehuk, George John '71
		WI B	Bonuccelli, Hugo Anthony '73	MI H	NY K
		Barone, Frank J. '62	Kosnik, Cristine Josephine '95	MI H	NY A
		Bella, Robert A. '65	DC I	MI H	Hems, Randall Keith '85
		Bergs, Mary Agnes '76	FL A	MI H	NY A
		Donovan, Dennis Michael '67	Adams, Donald W. '89	MI H	Leoni, Thomas S. '72
		Gawlak, Michal Andrew '14	Anonymus '00	MI H	Mizzi, John Vincent '63
		Lenz, Marsha Joann '86	Garmizo, David W. '89	MI H	Schirripa, Robert Rocco '70
		Lubinski, Paul John '87	Geiger, John Robert '77	MI H	Shelley, Harold Barthaun '67
		Oehler, Daniel Arthur '79	Huggins, Jason A. '96	MI H	NY M
		Pelt, Thomas Eugene '70	James, Matthew Leslie '80	MI H	NY N
		Peters, Steven P. '90	Talbot, Michael Thomas '71	MI H	Bunk, Donald Samuel '55
		Sommerville, Martin G. '94	FL B	MI H	Chen, Gordon Kow-C. '81
		Wentink, William Stewart '48	FL I	MI H	Frame, Barbara '80
		Wilhelm, James Joseph '69	Anderson, John Lowell '87	MI H	Greenzwerg, Daniel G. '82
		WV A	Miller, Joseph Raymond '73	MI H	Hammer, Mark Richard '81
		Hill, Janet Lynn '95	Faugh, Wayne Bruce '83	MI H	Handley, James R. '82
		Meacham, Scott Alan '88	FL E	MI H	Josefak, Glenn R. '01
		Simon, Ronald Wayne '81	Morales, George Jason '06	MI H	Lang, David John '80
			FL E	MI H	Le Van, David Oliver '77
			Leon, Felipe Antonio '99	MI H	Markunas, Justin Kenneth '01
			Prieto, Eduardo '04	MI H	Re, Kevin Peter '94
			GA A	MI H	Rosenthal, Jordan Charles '95
			Beeman II, Earl Ray '66	MI H	Wegman, Paul Martin '77
			Cleveland, Paul H. '82	MI H	NY E
			Daniel, John Kent '70	MI H	Brazzelli, Joseph Angelo '79
			Gannaway, George T. '61	MI H	Clary, Thomas F. '73
			Royer, Steven Lee '88	MI H	Engels, Joseph Gerard '75
			Weber, Eric Dean '87	MI H	Eschbacher, Robert M. '73
			Williamson, Michael Fred '79	MI H	Mohan, Marguerite Anne '04
			ID A	MI H	Perrotta, Thomas '82
			Dafeo, Kathryn Michelle '05	MI H	Vitulli Jr., Joseph Louis '80
			Reynolds, Gary Raymond '87	MI H	NY O
			IL A	MI H	Weiss, Robert Aaron '86
			Allison, Herman Dean '69	MI H	NY I
			Beach, Edward James '68	MI H	NY A
			Buboltz, Lisa Ann '01	MI H	Benge, G. Gregory '83
			Freeburg, James Gary '70	MI H	Borden, Laura H. '82
			Jansen, Mark Allen '85	MI H	Ingram, William Prentiss '70
			Koepke, Barry George '60	MI H	Keith, Alan Randall '82
			Reichert, Karl Lawrence '68	MI H	Noble, Robert Theodore '69
			Resman, John Boris '80	MI H	Noville, John Albert '58
			Ross Jr., William Charles '86	MI H	Poindexter, Richard C.
			Schneider, David Ray '72	MI H	NY C
			Strubman, Carl F. '82	MI H	Lemel, Page Howe '84
			Yarborough, Keith A. '55	MI H	NY C
			IL B	MI H	Johnson, James Kenneth '83
			Walters, Dominic James '07	MI H	Brown III, William T. '89
			Ziomek, Arkadiusz '10	MI H	Thompson, Renee C.D. '88
			IL I	MI H	NY D
			Barnett, Eric Renner '94	MI H	Hoffman, James Simon '55
			Bertinger, Paul C. '85	MI H	Horlacher Jr., Alfred E. '75
			Borden Jr., Roy H. '80	MI H	Koch, Robert Eugene '95
			Herman, Richard Neal '55	MI H	Schmidt, Wayne Joseph '50
			Ho, Benjamin '87	MI H	Schoot, Peter A. '85
			Nudd, Oliver R. '92	MI H	Solberg, Bruce Jerome '69
			Pector, Scott Walter '78	MI H	NY A
			CA A	MI H	Bogolin, Ronald Robert '56
			Chu, Jeffrey M. '82	MI H	Dale, Scott Allan '85
			Florez, Valerie Province '99	MI H	Herman, Zelek Seymour '67
			Hawkins, Parris C. '78	MI H	Hilberman, Dan '63
			Monismith, Carl Leroy '50	MI H	Proctor, David George '52
			CA B	MI H	Radke, Charles Edwin '55
			Manatt, Stanley Lawrence '55	MI H	Ricart, D. Glenn '71
			Sheiman, Arthur Elliott '81	MI H	Stephan, Charles E. '61
			CA I	MI H	Bolchak, Jeffrey E. '01
			Batemann, Terry Spencer '58	MI H	Cline, Darrin O. '89
			Clyne, Alisa Mors '96	MI H	Curless, Richard A. '68
			Fisher, Benjamin Paul '74	MI H	Hoff Jr., Russell Stratton '51
			Richardson, John Lloyd '56	MI H	Murray, Robert Edwin '83
			Viegas, John Robert '58	MI H	Schoo, Donald Clarence '60
			CA A	MI H	Wilke, Raymond Joseph '81
			Aldridge, Edward S. '81	MI H	Bartlett Jr., William P. '76
			Bolliger, James E. '79	MI H	Boggs, Kelly Jean '95
			Langford, Donald J. '79	MI H	Cory, Warren Eugene '76
			Schneider, Kenneth J. '58	MI H	Gruber, Keith Gordon '80
			Van Der Laan, William F. '62	MI H	Hashmi, Ahsan Abbas '00
			Woytsner, David Joseph '84	MI H	Keller, Philip S. '84
			CA E	MI H	Over, Ann Patricia '83
			Bienstock, Bernard Joel '68	MI H	NY B
			Riggert, Eric Floyd '91	MI H	Bernard, Jeffrey Lelan '50
			Satorius, Edgar Harry '70	MI H	Bugladi, Robert Joseph '79
			Obergfell, Mark Nicholas '80	MI H	
			Olin, David Burton '52	MI H	
			CA Z	MI H	
			Peak, Steve Charles '71	MI H	
			Over, Mark Joseph '75	MI H	
			Ovenby, John Kirkwood '77	MI H	
			CA H	MI H	
			Tang, Jimmy '07	MI H	
			Walsh, James Edward '59	MI H	
			CA O	MI H	
			Cook, John Richard '76	MI H	
			Young, Allen Paul '73	MI H	

FOUNDER'S CLUB, CONTINUED

- Kizlik, Lawrence James '90
- Shoemaker, Terry Ray '83
- OH E Bennett, William R. '80
- Harrold, James Leon '91
- Heckelman, James D. '62
- Houston, Joel Edward '68
- Kuczarski, Maria Ann '84
- Larson, N. Kenneth '61
- Shaniuk, Thomas Joseph '85
- OH Z Badik Jr., Thomas B. '85
- Kristie, Frank Martin '72
- Randolph, Brian Walter '82
- OH H Carlson, Lennie '07
- Christian Jr., Thomas F. '68
- Graham, Scott Robert '99
- Haritots, George K. '69
- Hartman, Dean H. '99
- Palazotto, Anthony N. '55
- Silkowski, Eric '90
- Tolliffe, Brin Arthur '85
- OH Θ Begovich, John Michael '74
- Keller, Robert Lee '63
- McMorrow, Andrew D.M. '09
- Meyerson, Clare Marie '81
- Mysona, Ronald Joseph '82
- Trogus, Frank Joseph '69
- OH I Trovato, Joseph Anthony '71
- Grice, Jacob Gregory '09
- Hurtig, Juliet Kay '91
- Hurtig, Michael Lee '91
- OH K McCarthy, Stephen J. '07
- OH A Repko, Raymond '77
- Ziemianski, John Joseph '82
- OH M Beck Sr., Clark E. '55
- Rathbun, Richard K. '58
- OK A Andrews, Jennifer Diana '96
- Greenberg, Charles M. '66
- OK B Camacho, Roger Anthony '82
- Petruska, Gregory James '80
- Strawser, Donald Eugene '71
- OR A O'Brien, Robert Merle '56
- Seid, Robert '52
- Sisk, Michael Andrew '66
- PA A Banks, Gary John '86
- Danner, Joseph Calvin '59
- Heffernan, Robert Booth '70
- MacAdams, Richard J. '46
- Matukonis, Edward S. '73
- Shapiro, Michael Henry '70
- Zacharias Jr., Edwin H. '66
- PA B Alstadt, Richard Harold '76
- Bonney, Stephen R. '75
- Fetchen, John Howard '69
- Gettle, David J. '82
- Godlesky, Mark Albert '87
- Harvey, John William '95
- Olinick, Stephen Andrew '71
- Pollock, Andrew Michael '72
- Strickler, Daniel Brubaker '57
- PA I Beitle Sr., Robert Richard '62
- Bloom, Jeremy Alan '73
- Carey, Michael J. '79
- Frison, Bradley Joseph '82
- Hasek, William Robert '49
- PA A Brenner, Donald '75
- Chun, Ping Sun '62
- Gross, Jeffrey B. '73
- Loy, James Kip '74
- Patrick, Herbert '70
- Seremetis, Constantine M. '81
- Werwa, Eric '92
- PA E Cook, Stanley C. '03
- Hartman Jr., Harold F. '56
- Stibitz, Mark Carl '87
- PA Z Boyle, Elmer Hugo '59
- Brecht, Howard Earle '63
- Brown, Kathleen Ann H. '85
- Daniels, Richard Edward '69
- Hrebien, Leonid '75
- Hunt, Thomas Robert '84
- Kopansky, Arkady '95
- Kuntz, Jason Paul '95
- Picukonis, Bruce A. '81
- Shaffer III, Thomas H. '68
- PA H Sheffer, Karnik Michael '79
- Waldner, Harold Eugene '58
- PA Θ Aschenbrenner, George T. '82
- Salvo, John P. '56
- Sawyer, Stephen Gerard '65
- PA I McClellan, Karl R. '80
- PA K Fink, Laurence Ian '76
- PA M Nicholas, Kathleen Sara '12
- PR A Brana-Mulero, Francisco '74
- RI A Salmon, Edward D. '66
- RI B Saro, Jun-Ichi '68
- Sirois, Herbert J. '71
- SC A Boudreaux, Anne Renee '86
- Edwards, Chad Reagan '87
- King, Charles Henry '66
- SC B Lesto, Kenneth Reed '58
- Steucler Jr., Edward M. '64
- Veldman, Stephen Todd '98
- SC I Barnes, Stuart Marshall '79
- Hass, Paul Henry '66
- Messervy, Thomas S. '00
- SD A Byg, Jerald Norman '72
- Fersdahl, Mark Curtis '02
- Fersdahl, Sarah Marie '04
- Keller, Debra Sue '78
- Pirner, Steven Mark '72
- SD B Quist, William Andrew '84
- TN A Cofer Jr., Joseph Arnold '63
- Dobrodziej, Kristen Lynn '08
- Icove, David Jay '71
- Masengill, Kimberly Lynn '88
- McConnell Jr., Oaklie K. '51
- Read, Thomas Joe '74
- Sinko, Robert John '85
- Wunderlich, Walter O. '56
- TN B Abrams, Karen Margaret '86

SUPPORT OUR STUDENTS

FUND A FELLOWSHIP OR SCHOLARSHIP

Ruth and Cleve, IA A '47, Campbell with TBII Scholars at our annual 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 TBII fellowship or scholarship, contact Patricia McDaniel, Director of Development (pat@tbp.org). Phone: 865-546-4578



- Adams, John R. '82
- Gilbert, George Roland '68
- WV I Wehrmeyer, Joseph Allan '90
- Alexander, Brian Scott '81
- Miller, Brian Charles '94
- Ross, Anthony Dwayne '72
- TN Δ Channess, Mark Franklin '77
- Reves, Benjamin Taylor '05
- TN E Thompson, David Andrew '00
- TN Z Brumley, Paul Edward '02
- TX A Bouchier, Joe Tom '67
- Boyle, Bruce William '79
- Felton, Charles Ronald '73
- Hopper, William Leonard '62
- Naas, Robert James '95
- Penley, Percy Alston '48
- Sener, Ilhan '67
- Wilson, Arthur Eugene '65
- TX B Albritton, Patrick Michael '96
- Baker Jr., Marvin Elroy '86
- MacCallum, Gregory J. '81
- TX I Reinking, Greg Franklin '84
- Johnson, Colleen Bea '97
- Marshall, Tom Stanely '76
- McCarty Jr., Fred C. '72
- Miller, Brian Charles '94
- O'Gwynn, David Charles '78
- TX Δ Baskin, Leland Burleson '74
- Beal, Patrick Val '88
- Beall, Joe Chilton '80
- Burk, Dannie O. '68
- Campbell, Thomas Mellor '55
- Casco, Andres Enrique '99
- Knutson, James LeRoy '50
- Masengale Jr., Levon '51
- McCord, Jimmy Delwyn '70
- McMullan, Charles Dewey '58
- Oliver, Howard Ross '49
- Pedachock, Ronald David '78
- Rothelml, Jeffrey Todd '94
- Schroeder, Scot Alan '81
- Szymczak, Edward J. '61
- Whitney, Herbert Ward '57
- TX E Klos, William Anton '63
- TX H Brewster, William H. '94
- Scully, Robert C. '97
- TX I Merrett, N. Rhys '77
- TX K Harness Jr., Jerry Wayne '03
- UT A Rhudy, Ralph H. '62
- Weaver, Kevan Dean '98
- UT I Bose, Tamal '82
- VT A Wilson, Adam Bertrand '89
- VT B Guerrerri, Carl N. '62
- Lauben, Robert William '60
- VA A Clem, Kenneth Ray '69
- Cunningham Jr., Harold '73
- VA B Obrien Jr., Walter Fenton '60
- Rhodes, Marvin Deavers '63
- Saucke, Debra Lynn '81
- Shaffer, James Alvin '49
- Siedlecki Jr., Walter F. '77
- Spangler, Edward Grant '79
- Tatum, Clyde B. '66
- WA A Thuchak Jr., Charles J. '61
- Allen, James F. '74
- Betts, Frank Patrick '90
- Danielson, Donald Hayden '54
- Doneen, Patrick Michael '84
- Meyerholtz, Steven Z. '85
- Strombach, Gail Michael '96
- Tanemura, Steve Ken '84
- WA B Anson, Jon Crawford '77
- Eyrich, Gerald Irwin '52
- Galligan, William L. '52
- Gimera, Michael '89

- Schmieman, Eric A. '97
- WV A Drazba, Randall Keith '68
- Johnston, John Walter '73
- Thompson, David Wayne '87
- WI A Ascott, Robert John '68
- Cress, David Roger '63
- Froh, David '74
- Thompson, Kenneth Gary '77
- Wilcox, Russ Phillips '77
- WI B Annen, Kurt Douglas '74

- Bell Jr., Robert Berhard '61
- Ertmierz, Roger Alan '63
- Hauser, Eric Donald '77
- Lancaster, John T. '61
- Schnabl, Val J. '67
- WI Δ Prescher, Matthew John '04
- WY A Muchmore, Royce A. '93
- Obenland, Rebecca R. '83
- Reed, Bret Joseph '89
- Reese, David Leland '81

In Grateful Appreciation of Member-Contributors

- AL A Burger, Larry H. '80
- Clary, Jacob Michael '14
- Davis, Glendon Stuart '00
- Laster, Marion Lynn '56
- Maxwell Jr., Clint '75
- Packard, James Donald '88
- Schulz, Ryan Michael '01
- AL B Bailey Jr., Boyd Lee '74
- Wallace, Alton Hamric '57
- AL I Breckenridge, Max C. '88
- Peters, Kenneth Cleon '80
- AL A LaBarge, Meredith H. '16
- AL E Harrison, Keith '77
- Lee, Chi H. '92
- Thigpen, Aaron Shay '12
- Vincent, Tiff '83
- AZ A Berry, Robert Lee '67
- Coldren, Amanda Jane '15
- Heibes, Daniel John '86
- Higbie, John Jacob '59
- Lenzeyki, Christopher T. '86
- Liu, Elson Yee-Hsin '01
- Lluria, Ligia '82
- Mooberry, David George '68
- Van Veghel, Stephen John '72
- AZ B Pratt, Gordon Philip '71
- Stewart, Richard James '92
- Yee, David '72
- AZ I French, Edana '10
- Crump, James Shaw '57
- Johnson, Cody '15
- MacChiarolo, David T. '84
- Mourot, Jordan Benjamin '05
- Pile, Stephen Cline '66
- CA A Carvalho, Chris Joseph '81
- Divine, James Robert '61
- Fretter, Ernest Fred '67
- McGinnis, Robert William '62
- Silva, Christopher Patrick '82
- Tran, Adeleine Jun '15
- Tse, Janet Man Yu '02
- CA B Alekseyev, Viktor Y. '01
- Munsil, Wesley Elwood '71
- CA I Guo, Minggang '07
- Herron, Howard Winston '60
- CA A Fung, Danny H. '87
- Klein, Jerry Alan '61
- CA E Gordon, Randall Charles '81
- Corsar, Matthew Sanders '81
- Green, Robert Charles '53
- Platus, David Lewis '53
- Schurr, Andrew Hiroshi '12
- Stufflebean, David Lee '73
- Tom, Holme F. '66
- Trask, Philip Arthur '70

- CA Z King, Judy Ann '84
- Lee, Mario John '79
- Smith, J. Philip '57
- CA H Coorey, Joseph Shanith '14
- Hogue, Don Alton '74
- Tewari, Ashok '84
- CA Θ Alonso, Francisco Javier '84
- Footo, David Alan '67
- Relich, Joseph A. '92
- CA I Doria, Robert Carl '89
- Thompson, Michael Young '71
- Villa, Warlito Posadas '97
- CA K Gero, Jason Leon '11
- Khachatorian, Roger R. '07
- Palacios, Ronald N. '96
- CA A Grathwell, Travis Jacob '06
- Jensen, Mark Christopher '93
- Kato, Hiroko '85
- Noderer, Heidi Ruth '89
- CA M Thomas, Arthur Louis '51
- CA N Baba, Steven Tenco '86
- Bristol, Joshua Spencer '13
- Jimenez, Ramon '95
- Tougas, Gary Francis '79
- Van Alst, Eric Richard '87
- CA I Ledbetter, Kenneth W. '68
- CA E Bennett, Russ '82
- Harper, Michelle Ore '87
- CA T Benedict, Jennifer Lee '79
- CA Y Alexander, Joseph W. '06
- Alexander, Rachel Kristin '15
- Radimsky, Anne-Louise. '63
- VIDRIO, Adrian David '16
- CA Φ Hasegawa, Robert S. '05
- CA X Gautam, Dipesh '16
- CA AB Valenzuela, Fernando '05
- CA AT Aw, Alex '14
- CA AA Mantey, Patrick E. '60
- Mesard, David J. '78
- O'Connor, Andrew Joseph '79
- Vallejo, Frances Marie '87
- CO B Carpenter, Nancy Jane '79
- Coffield, Paul Raymond '88
- Ellis, Donald Griffith '62
- Fox, Robert Harold '72
- Grasmick, Allen D. '74
- Mackin, Blake '45
- Malcolm, John Arden '82
- Melanson, John L. '74
- Schlag, Gerard Alan '62
- Trousdale, Robert J. '59
- Worden, Eric W. '10
- CO I Childs Jr., Roy F. '63
- CO Δ Gonzalez, Julio Jorge '91
- Longino, Barbara D. '80

- Thaemert, David Karl '89
- CO E LaSelle, Darick Walter '13
- CO Z Cosino, Kyle Philip '14
- Henry, Karen S. '79
- Jodeh, Nidal M. '98
- Weingart, Margaret E. '12
- Wetzig, John Marshal '13
- CT A Greiner, William Earl '66
- Tassoulas, John Lambros '76
- CT B Volpe, Helen '70
- Riley, Kristopher Michael '98
- DE A Dominy, Kenneth Stafford '90
- Gorman, Harry H. '59
- Stein Jr., Edwin Lee '07
- Walton, Eric Keller '86
- DC A Brown, Emya Aileen '88
- Clark, Charles Anthony '92
- Parham III, Johnny E. '91
- Powell, Juan Herschel '82
- DC I Koch, Paul Robert '84
- Reachinas, Tassos D. '05
- FL A Armstrong, Jay Joseph '11
- Brown, Shannon Bentley '14
- Burks, John Paul '13
- Ferrall-Fairbanks, Meghan '12
- Fifer, Richard Alan '68
- Grau II, Erwin F. '67
- Guerrero, Mario Ignacio '65
- Julian, Harold Vincent '74
- Schardt, Craig Russell '99
- Veith, Bryan Thomas '93
- FL B Colbert, John Edward '60
- Fernandez, Wilfredo M. '78
- Ferrante, Michael Anthony '75
- FL I Anzalone, Alessandro '03
- Anzalone Patricia Beatriz '03
- Kumar, Bhavna '06
- Lamaack, David Bradley '92
- Levins, Jess W. '74
- Roberts, Maureen Birtch '83
- Schnitzler, Paul '57
- FL A Morgan, Joann '63
- Palmer, Carla N. '87
- Schwartz, Michael Allen '96
- Yadi, Bert Anthony '95
- FL Z Ampomah, Oriana Obiri '04
- Crowe, Jeremy Mc.C. '07
- FL Θ Chicuri, Diana '10
- GA A Andrews, Harry William '70
- Benator, David Ross '82
- Dundervill, Walter E. '58
- Everett, Roger Newton '62
- Fairbanks, James Paul '16
- Gokcen, Serdar Nusret '92
- Hawkins, John Philip '67
- McClintock, Douglas John '71
- Newberg, George Edward '84
- Parker, Elton L. '47
- Warrington Jr., Charles S. '71
- IL A Bajt, Ronald Michael '66
- Benhabib, Jose '81
- Frank, Timothy Eric '03
- Houck, John David '71
- Mohler, Jeffrey Dean '77
- Rita, Robert Anthony '70
- Smith, Dale Clarence '48
- Toy, Mae Y. '75
- Variakojis, John '55
- Zelac, Ronald Edward '62
- IL B Burnley, Robert Todd '89
- Panchal, Jawahar J. '03
- Papas, Petros N. '55
- Rosen, Edward Marshall '52
- Saathoff, William Melvin '85
- Sahlstrom, Roy '45
- Staschke, Ralph Arthur '50
- Thompson, William A. '74
- Valent, Philip J. '63
- IL I Antane, Jennifer '16
- Bruns, Michael W. '87
- Greene, James Neal '57
- Juoppi, Norman Paul '79
- Keller, John Samuel '65
- Petterino, Rinaldo Carlo '83
- IL A Calhoun, Walter Allen '64
- Plouzek, John Michael '86
- Walczynski, Stanley A. '77
- IL E Probst, Rudy Kevin '10
- IL Z Beissert, Brian Helmut '90
- IN A Andrew, Stephen Peter '82
- Belsheim, Stephen T. '73
- Berman, Mitchell Leonard '74
- Boehnlein, Robert Carl '84
- Brosks, Christopher L. '74
- Cullins, Christina Allison '97
- Elijah, Darrel Lawrence '64
- Finnegan, Thomas Robert '80
- Gardner, Thomas Richard '63
- Gkritza, Nadia '06
- Harr, Calvin Dean '73
- Harrer, Robert Daniel '77
- Heyer, Harold William '55
- Jones Jr., Raymond J. '69
- King, Donald Gordon '84
- Longstreet, Robert Alan '67
- Ohrlich, Fredrick David '70
- Pogach, Kenneth Sherwin '72
- Powers, Joseph Robert '70
- Schaich, Paul C. '80
- Schilling, William Joseph '55
- Silarski, David F. '75
- Stamwood, Jay Wesley '52
- Wieland, Earl Randolph '52
- Willhoff, Thomas Lee '52
- IN B Grammel, Cassandra M. '10
- Morehead, Bruce Hutchins '51
- IN I Abot, Rosary C.T. '11
- Comness, Kent Michael '78
- IN A Sinko, Kenneth Michael '72

IN E	Ospov, Michael Anthony '84	MI	Worman, William Earl '66	OH Z	Herman, Madison R. '13	TN F	Sloan, Eric '15
IA A	Dotzler, Frederick Joseph '67	MI G	Balachander, R. S. '87		Steinmiller, Robert C. '67	TN A	Ventrice, Carl Alfred '56
	Garrett, Lisa Nicole '14		Banghart, Edmund K. '83		Walker, Edward P. '74	TN A	Eggers, Anthony D. '83
	Jochimsen, Ronald David '72		Brownell, Amy D. '85	OH H	Davis, H. Max '53	TN E	Reddick, Wilburn Eugene '87
	Kirby, Herb '61		Buller, Andrew Anthony '60		Freeborn, Andrew B. '08		Stubbs, Elizabeth Jane '92
	Little, John Alexander '07		De Boer, Douglas F. '78	OH E	Heil, Michael Lloyd '86	TN Z	Sweigard, Rick J. '75
	Lowe, Timothy Joe '65		Geck, Paul Emil '67		Jalics, Julie Jane '97	TN Z	Andrews, John Nicholas '10
	Schneider, Sara Dostart '83		Gustavson, Richard Eric '62		Kraft, David Christian '59	TX A	Albertson III, Charles L. '69
IA B	Van Dam, Noah Edwin '09		Herbst, Jay Arthur '65		Rose, Thomas John '56		Castiglione, Paul Alfred '70
	Abkowitz, Patricia Anne '86		Ivan, Larry '64	OH I	Duling, Ryan Robert '03		Eisenmann, Frederick G. '96
	Burda, Kenneth James '68		Kumbier, Timothy Jon '81		Laird, Laurie Kahl '86		Erzrumulu, H. Chik M. '57
	Madsen, Nels Howard '78		LeVine, David Michael '63	NY A	Speer, Jon Henry '87		Mahla, Curtis Harry '52
KS A	Tollefson, John Dietrich '16		Luceyslyn, Peter S. '56		Ward, Robert Lee '88		Moss, Edward R. '64
	Coudreyras, James C. '94		Majeske, Donald D. '54	OH K	Marsh, Michael Alan '84		Ribe, Fred Linden '44
	Cronemeyer, Donald C. '45		Milne, Scot Martin '74		Pritchard, Minnie C. '55		Thomas, Kurt Otto '79
	Hornier, J. Michael '70		Sanabria, David Anthony '90		Welsch, John Stephen '77	TX B	Turquist, Robert Bruce '80
	Isbell, Cletus Howard '58		Sklar, Jay Robbins '60	OH A	Stambolia, James Milos '96		Spears, David H. '78
	Kulp Jr., Carl Raymond '82		Swanson, Bruce Wayne '52	OH M	Rudd, Rahel Rene '05		Winder, Charles Franklin '12
	Lake, Orley Leon '61		TerBush, Jessica Renae '03	OK A	Enombo, Shirley-Luz '16	TX F	Ochoa Jr., Alfred Anthony '76
	Smith, Douglas Bruce '55	MI A	Janowiak, Ronald Joseph '77		Robbins III, George Earl '74		Zhu, Zheng '98
KS B	Stafford, Harold LeRoy '67		Kudlac, Gregory Alan '86	OK F	Clark III, Robert Allan '10	TX A	Hylland, Raylene K. '15
KS F	Peterson, Jon Howard '68		Kudlac, Maureen Theresa '86	OK A	Lindah Jr., Ernest R. '73		Lange, Lawrence K. '60
	Scholer, Charles Frey '56	MI E	Ciarelli, Diane Marie '81	OR B	McElmurry, Barry R. '59		Lock, Jack Allen '53
	Turner, Keith S. '74		Gutowski, Ronald R. '76	PA A	McLaren, James Malcolm '72		Mask, Russell Lane '71
KY A	Addison, David Glenn '78		Kinney, Archie Patrick '05		Kleine, Peter Edward '08		Moyers, Michael Eugene '80
	Foree, Edward Golden '64		Szomak, David Peter '77	NY E	Barnett, Robert Coulson '64		Nanner, Michelle '96
	Hill, Glenn Carter '65		Tracy, Shawn Lance '95	NY Z	Carnali, Joseph Oreste '78		Pensock Jr., Edward Peter '83
	Knight, Arthur Holt '65		Vultaggio, Andrew Peter '98	NY H	Carnali, Leslie '78		Shih, Edwin C. '96
	Martin, Laura Marie '14		Vultaggio, Noy Elena '99		Corbett III, Stanley Wells '55		Wagner, David Edward '88
	York Jr., Jimmie D. '56	MI Z	Wang, Leyi '78		Dreyer, Darlene Anne '97	TX E	Coneway Jr., Rick '73
KY B	Ferry, Glenn Alan '81		Drummond, Nathan D. '92		Grabner, Roy Walter '61		Nguyen, Khang An '99
	Kraher Pinto, Marguerite '85		Han, Patricia Jean '82	PA B	Walsh, Christopher D. '88	TX Z	Harris, Joe M. '70
	Kulaga, James Matthew '86		Reuter, David Fredrick '73		Hurley, Francis X. '68	TX H	Bhatt, Tamy Mahendra '05
LA A	Blum, Joseph Francis '65	MI H	Weimer, Kenneth Eugene '09	NY E	Johnson, Michael B. '03		Hammond, Walter E. '71
	Collier, Randall Herbert '78		Cook, Kenneth John '64	NY E	Law, Yuk Yu '08		Hoyos, Laureano Rene '91
	Eidt Jr., Clarence Martin '56		Lozier, Jacob David '02		McCormick, Joseph A. '86		Sorgee, Vernon Hylward '78
	England, Natalie Marie '08	MI E	Maki, Jean Marie '85		Mudrinich, Richard Todd '85		Suley, Eniola Oluwasola '14
	Hollier, Joseph Keith '79		Bazen, Aron David '01		Polifko, John Terrance '70	TX E	Barron, Salvador '82
	Hutchinson, Jeffrey T. '68	MI A	Goldstein, Richard J. '48		Sandala, Richard A. '84		Perez, Sergio J. '84
	Reed Jr., Thomas Patrick '81	MN A	Lenke, John D. '88		Satrom, Steven Bruce '69	TX I	McFearn, Lee Dobson '89
	Shoemaker, Harry L. '69		Morrison, Stephen David '73		Sonstebly, Jon Michael '95		Sindeuce, Judy Frances '86
	Tumay, Mehmet Tamer '59		Schasker, Philip Wayne '60	NY I	Stough, Matthew Alan '92	UT A	Olson, Mark E. '80
	Vora, Suresh M. '73		Yu, William J. '12		Tate, Duane Charles '67	UT B	Glasset, Joel Ames '77
LA B	Quarve, Eric Bryce '94	MS A	Barton, Michael Wade '12	NY K	Zamrik, Sam Y. '64		Pittard, Keri Lynn '02
	Seals, Keith James '79		Brasher, Cecil Keith '59		Menzies, Katherine Laura '08		Pittard, Matt Thurlow '01
LA F	Elmore, John B. '07		Burton, Joseph Stan '79	NY A	Niccolai, Nilo Anthony '62		Serrano, L. Alberto '02
	Ezell, George Dale '60		McKay, Walter Jasper '65	NY A	Silvey, Jeffrey David '96		Tullis, Richard Lamond '84
	Nugent, Larry Edward '61		Shelton, Roy Conley '66	NY N	Whiting, Bruce Raymond '71	VT A	Berryman, Frederick W. '54
	Walker, Donny Ray '69	MS B	Crull, Michelle Marie '82		Lehner, John Roland '66	VT B	Morrissey, Timothy J. '76
LA A	Dupuis, Miles Bradford '72		Richardson, Joseph David '88	NY E	Marsh, Elbert Lynn '59		Klinger, Lloyd Edwin '57
	Randazzo, Bert J. '92		Schaal, Corey Douglas '15		Weeks Jr., Edwin Stevens '63	VT A	Cohen Jr., George Lemuel '70
LA E	Suarez, Jose Eduardo '10	MO A	Bade, Darrell Dean '73		Beera, John Peter '70		Colen, Rodney Beyer '83
ME A	Goodell, Trener Franklin '91		Bui, True Phan Thanh '10	PA E	Inqui, Dena D. '13		LeBeau, Ray Paul '90
	Goodwin, Alice Margaret '00		Goolsby, Jerry Dale '91		Johnson, Floyd Charles '49		Owen, William Rodney '69
	Sweet, Lauren Jane '04		Schaper, Justine Emily '14	NY O	Blumrich, Mattias A. '86	PA Z	Reid, Robert Erskine '64
	Walker, Eugene Allen '75		Schapper, Gerald Arthur '67		Felberbaum, Gary Louis '73		Rosen, Mitchell Charles '82
MD A	Dexter, Frederick J. '84		Weber, Arthur Rudolph '47	NY O	Leu, Derek Hue-Keng '06	VA B	Elliot Jr., Marion B. '53
	Ling, Bill '16		Woods, John Walton '70	NY I	Langkamp, Richard E. '83		Fink, Richard Gerard '82
	Nemhauser, George L. '58	MO B	Johler, Craig Bauer '67		Hicks, Kyle Kaku '10		Hall, Charles Devane '70
	Stiegler Jr., George Henry '49		Kern, John H. '60	NY P	Lanzarone, John Richard '78		Powell Jr., Robert Curtis '13
MD B	Aberg, John Robert '75		Stuart, Robert Lee '64		Rogan, Jason '92	PA H	Pusey, Robert Hollis '57
	Bloom, Seymour '59		Underwood, Mark Lee '91	NY S	McCauley, James W. '61		Sroka, Kristin Elaine '02
	Donigian, Carl Drafts '78	MO G	Berger, Roger Lee '56		Lui, Jennifer '13	VA F	Sulesko, Aaron Andrae '68
	Flewelling, Arthur Samuel '69		Burns, Steven Michael '81	NY T	Saia, Sheila Marie '07		Camp, George H. '85
	Griboff, Yoni Eliezer '16		Goldenthal, Isaac Lee '15		Weimer, Kirstie T. '11	PA E	Cowen, Kenneth R. '90
	Guess, Arthur Lawrence '49		Peters, Christopher John '09	NC A	Beatty, Derek Lee '85		Farrow, Felicia Tyyan '09
	Ingling, Allen Lloyd '63		Reeves, Barry Lucas '56		Bjarnason, Elsie Victoria '14		Galtress, George H. '78
	Saams, John Richard '85	MT A	Schmitt, Mark Alan '93		Bullard, Charles Michael '84	VA A	Youssif, Menatoallah M. '04
	Scurlock Jr., Arch Chilton '69		Bullard, Lisa Carol '86		Burton Jr., William E. '62		Brinkley, Anthony L. '92
	Uricheck, Andrew Robert '64		Burton Jr., William E. '62		Calderone, Matthew J. '05	VA E	Radford Jr., Norman D. '65
MD F	Gallander, Tyson James '90		Corcoran, Kermit C. '04	PA A	Gidney Jr., Robert Sarratt '61		Conrad, Theodore Judson '02
	Johnson, Holly Michelle '92	MT B	Hine, David Eugene '80		Hine, David Eugene '80	WA B	Filler, Robert Douglas '08
	Scioli, Blaise E. '84		Hine, David Eugene '80	NE A	Perry, Matthew Howard '80		Roxer Jr., Kenneth John '71
MD A	Astar, William '94		Shurford Jr., G. E. '65		Ballard, William Ed '52	WA A	Baxter, Donald Wallace '74
	Malloy, Katherine Anne '99		Clement, Stephen Martin '13	NC F	Kayagil, Turan Altay '07		Beck, Paul Gary '65
	Parks, Michael Brian '03		Kayagil, Turan Altay '07		Leung, Scott Eugene '79		Gille, Joanna Lyn '03
	Rothman, Neil S. '78	NV A	Battista, Jacimaria R. '87		Neecham, William D. '72	PR A	Shealy Jr., Alexander N. '60
MA A	Hoffman, Allen Herbert '63		Perlovski, John Stephen '56		Wine, Charles Joseph '59		Wilbur, Joel Edwin '98
	Skliutas, John Paul '79	NH A	Goller, Karl Richard '52		Asquini, John Robert '93	PR A	Miyata, George Kenneth '10
MA B	Chen, Arthur C. '61		Menafra, Dominic B. '04	NC E	Miller, Victoria Lyn '11		Anderson, Arthur '74
	Edelson, Robert Ellis '63	NJ B	Covell, Daniela Maria Ana '90		Braun, Odell Edward '60	WV B	Stricklin, Charles Edward '63
	Fynsk, Arthur William '50		Osborne, William I. '79	ND A	Gandrud, Merlin Howard '64		Harper, Wendy Ann '00
	Gootenberg, Jonathan S. '13		Vorndran, Ronald Noel '61		King, Robert Donald '63	WI A	Meck, William Harry '73
	Herrick, Groves Eckley '63	NJ F	Afolabi, Afolawemi '09		Clask, Roger Henry '65		Anderson, Eric Scott '77
	Hu, James V. '72		Canter, Jeffrey B. '95		Meyer, Lawrence Lester '56		Boehm, William George '65
	Kim, Gina '02		Catalan, Jose Artemio J. '96	OH A	Rector, Ned D. '86		Dorsey, Andrew David '00
	Knibbe, Todd Eric '91		Daniello, George Thomas '68		Reistad, Morris James '67	SC A	Guelker, Marshall F. '61
	Ku, Richard Tse-Min '70		Gomez Jr., Ernest '71		Delanis, Richard John '72		Jirtle, Randy L. '70
	Larsen, James Lavrits '65		Kraft, Gregory Charles '73	OH B	Oliphant, Robert Walter '64	SC B	Thirtle, Randal '02
	Lippitt, A. Warren '72		Krajewski, Alex Conrad '16		Valentine, Russell Wayne '02		Tabbs, Dennis Howard '86
	Lumsdaine, AJ '85		Loney, Norman W. '77	OH B	Engle, Charles Robert '92	SC F	Webster, James L. '72
	Nathanson, Josef '63		Natale, Patrick James '70		Fried, Joel R. '71		Colasanti, Regis Joseph '65
	Reitman, Maureen T. '90		Pais, Frank Andrew '71		Jones, Shelli E. '09	WI F	Donovan, John Charles '58
	Schmidt, Robert Max '58		Saito, Scott Kazuo '05		Knapp, Gregory Warner '81		Novak, David A. '77
	Wiegner, Allen Walter '69		Stevens, Barry Arnold '67	SD A	Rouse, James Alan '58	WI F	Vebber, William O. '57
MA A	Fogel, Arlene Beck '77		Bolling, Joseph C. '15		Smith, George Edwin '63		Dunn, Jeffrey William '81
MA E	Blecha, Mark Alan '85		Fisch, Adam Joshua '15		Wessels, Robert Paul '78	WI E	Court, Nick M. '16
	Lerner, Herbert Arthur '50		Han, Chien-Jih '80	OH F	Bryman, Courtney Kieta '10	WY A	Bowen, Douglas Glenn '75
MA Z	Hathaway, Wayne H. '70		Sanabria, JoAnna Lee '06		Hall, Susan Elizabeth '84		Canestrini, Gregory James '13
	Liau, Irene '82		Woods, Robert Octavious '62		Hammersmith, Paul A. '85		Gillespie, Malcolm John '87
	Richardson, Alan M. L. '70	NJ E	Moore III, Dave E. '15		Lowther, Roger '62		Larson, Lisa Jean '00
	Robinson, Donald Arthur '84		McCready, Kem E. '80		Riddiford, Bryan Peter '87		Schneider, Keith Lee '13
MA H	Pratt, Bruce Gregory '69	NM A	Walwood Jr., Gordon A. '75		Seipel, Frank Edward '93		
MA E	Kelley Jr., Timothy James '01		Ashwill, Thomas David '75		Setzler, Eric John '03		
	Tartaglione, Louis Charles '56	NM B	Burnett, Brian Gardner '78		Swanson, Richard Marker '69		
	Vasilos, Thomas '50		Austin, Russell Kevin '92		Wigginton, Mark Allen '80		
MI A	Berg, Dale Evan '67		Herman, Mark Norman '63	OH A	Logan, Lauren H. '10		
	Cameron, John Howard '68		Morrison, Jeffrey Steven '68		Shearer, Richard Paul '68		
	Hunt, Dayton Allen '52		Zhai, Eric Xiaoyuan '03	OH E	Heege, Frank '72		
	Knop, Ralph J. '67	NY B	Chamberlain, Steven C. '68		Isabella, Christopher A. '15	TN B	Lawrence, Jefferson Lee '83
	Koppelman, Donald W. '54		Hunte, Brian F. '09		Isabella, Christopher A. '15		Myles, Jennifer Lee '94
	Maier, Dirk E. '87		Kulpa, Theodore Andrew '62		Maxon, Boyd Scott '54		Thomas, Sandy Anderson '64
	Papiel, Robert Alan '70	NY F	Campbell, Edwin Herbert '64		Shields, Calvin Kenneth '53		Williams, Alison J. '16
	Potvin, Deborah L. '91		De Lorey, Patrick S. '80				
	Single, Charles Hollister '49						
	Vannice, Merlin Albert '64						
MI B	Brandt, C. Andrew '81						
	Campbell, Edwin Herbert '64						
	De Lorey, Patrick S. '80						
	Shields, Calvin Kenneth '53						



IN THE COLLEGES

SPOTLIGHT

Computer Ethics Moves

Universities that have trained technology leaders throughout the rise of Silicon Valley “are hustling to bring a more medicine-like morality to computer science,” said *The New York Times*.

The *Times* noted that both “Harvard University and the Massachusetts Institute of Technology are jointly offering a new course on the ethics and regulation of artificial intelligence,” while “the University of Texas at Austin just introduced a course titled ‘Ethical Foundations of Computer Science’ — with the idea of eventually requiring it for all computer science majors.”

The notion behind this is to train the technologists and policymakers to consider the ramifications of innovations like autonomous weapons or self-driving cars.

Tuition Surcharge Plan

The AP reported that the University of Delaware planned to impose a tuition surcharge for students at its engineering, nursing, and business schools. This was part of a broader plan to increase enrollment and hire more than 500 faculty over the next five to seven years.

The report added that next fall, all three schools will implement a \$1,000 yearly tuition surcharge. By the fall of 2020, the surcharge will rise to \$1,500 for nursing, \$2,500 for business, and \$4,000 for engineering.

PEOPLE

Anantha P. Chandrakasan, Ph.D., *California Alpha '89*, has become dean of MIT's school of engineering. He was head of the department of electrical engineering



and computer science there for six years, having joined the faculty in 1996. Chandrakasan produced a significant research focused largely on making electronic circuits more energy efficient.

He succeeded **Ian A. Waitz, Ph.D.,** *Pennsylvania Beta '86*, who became MIT's vice chancellor after six years as engineering dean.



He developed and implemented the school's strategic plan, focusing on people, education, and innovation.

Randy H. Katz, Ph.D., *California Alpha '76*, is the new vice chancellor for research at the University of California, Berkeley, where he joined the faculty in 1983. Katz is well-known in the computer industry for his development of RAID storage systems in the 1980s. He joined the UC Berkeley faculty in 1983 and was recently inducted into the Silicon Valley Engineering Hall of Fame.



Patrick J. Wolfe, Ph.D., *Illinois Alpha '97*, has become dean of the college of science at Purdue University. He is an internationally acknowledged data science leader and had been professor of statistics and computer science and EPSRC Established Career Fellow in the mathematical sciences at University College London since 2012. Wolfe, a native of the Midwest, earlier taught at Cambridge and then Harvard.



and computer science there for six years, having joined the faculty in 1996. Chandrakasan produced a significant research focused largely on making electronic circuits more energy efficient.

FACILITIES

New York University's Tandon School of Engineering has moved and completed a \$350 million renovation of the 13-story former Metropolitan Transportation Authority building in downtown Brooklyn.

Crain's New York Business said the move “signals NYU's emergence as a potential tech powerhouse more than four decades after it shut down its engineering school in the midst of a financial crisis.”

The school is hiring 40 new faculty members and renovating its civil, chemical, and mechanical engineering labs on its MetroTech Center campus—across the street from 370 Jay St.—as part of NYU's overall \$900 million investment in the Brooklyn location.

Rochester Institute of Technology is receiving a \$50 million gift, its largest donation ever, from alum Austin McChord, founder of data protection company Datto.

The *Rochester Democrat & Chronicle* said \$17.5 million will be used to create a maker library and innovation learning complex. The remainder will go to programs in entrepreneurship, cybersecurity and artificial intelligence, including facilities and endowments.

University of Washington has opened its Institute for Nano-Engineered Systems, or NanoES, in the new \$87.8 million nano engineering and sciences building. It will focus on nanoscale frontiers in energy, materials science, computation and medicine.

UW's other nano initiatives include its molecular engineering materials center, which recently received a \$15.6 million federal grant; and the Washington nanofabrication facility, which recently completed a three-year, \$37 million upgrade.



Brain Ticklers

RESULTS FROM FALL

Perfect

*Bohdan, Timothy E.	IN	Γ	'85
*Celestino, James R.	NJ	B	'00
*Eanes, Robert Sterling	TX	Γ	'67
*Gerken, Gary M.	CA	H	'11
*Griggs Jr., James L.	OH	A	'56
*Gulian, Franklin J.	DE	A	'83
Gulian, Joseph D.	Son of member		
Harvey, Arthur J.	OH	A	'83
*Heske III, Theodore	PA	A	'86
Janssen, James R.	CA	Γ	'82
Johnson, Mark C.	IL	A	'00
Marks, Lawrence B.	NY	I	'81
Marks, Benjamin	Son of member		
*Norris, Thomas G.	OK	A	'56
Richards, John R.	NJ	B	'76
Riedesel, Jeremy M.	OH	B	'96
*Sarasohn, Max A.	NJ	B	'17
Schmidt, V. Hugo	WA	B	'51
*Slegel, Timothy J.	PA	A	'80

Other

Aron, Gert	IA	B	'58
*Celani, Paul E.	MD	Γ	'97
Chamness, Mark F.	TN	Δ	'77
*Couillard, J. Gregory	IL	A	'89
*Gaston, Charles A.	PA	B	'61
Handley, Vernon K.	GA	A	'86
Johnson, Roger W.	MN	A	'79
Jones, John F.	WI	A	'59
Jones, Jeffrey C.	Son of member		
Lalinsky, Mark A.	MI	Γ	'77
*Mayer, Michael A.	IL	A	'89
Quan, Richard	CA	X	'01
Rao, Sandesh S.	MI	B	'17
Rentz, Mark	Son of member		
Spong, Robert N.	UT	A	'58
*Voellinger, Edward J.	Non-member		

*Denotes correct bonus solution

FALL REVIEW

The Fall column appears to have been an easy one, as all five regular problems had better than 80% correct answers, while the Bonus had almost 60% correct answers. We received more Perfect than Other scores.

WINTER ANSWERS

1 SLEET + SNOW = FROSTY translates into $98552 + 9374 = 107926$. By inspection, there must be a carry of one into the ten thousands place to ensure FROSTY has six digits, so it follows directly that S=9, R=0 and F=1. Since there cannot be a carry into the thousands place, L cannot be 2. L can therefore potentially be any number from 3 to 8, inclusive (and $O = L-1$), and E+N must equal either 8 or 9 based on the carry in the hundreds place. Assume $L=3$,

so $O=2$. This forces E and N to be 4 and 5 in some order and there can be no carry in the hundreds place. This implies T is 6 or 7 with no carry in the tens place, but this is not possible given the valid values remaining for W and Y. Assume $L=4$, so $O=3$. Two pairs of possibilities exist for E and N. If $E=2$ and $N=7$, this implies T is 5 with no carry in the tens place, but this is not possible given the valid values remaining for W and Y. If $E=6$ and $N=2$, no valid T can be found. Assume $L=5$, so $O=4$. Three pairs of possibilities exist for E and N. If $E=2$ and $N=7$, this implies $T=6$ and if $E=3$ and $N=6$, this implies $T=7$, both with no carry in the tens place. Neither is viable given the valid values remaining for W and Y. Assume $L=6$, so $O=5$. This forces $E=2$ and $N=7$, and then $T=8$ with a carry needed in the tens place. No valid solutions remain for W and Y. Assume $L=7$, so $O=6$. This forces $E=5$ and $N=3$, and then $T=2$ with a carry needed in the tens place. So it must be that $L=8$ and $O=7$. If $E=3$ and $N=6$ with no carry in the hundreds place, there is no solution for T. Similarly, if $E=6$ and $N=2$ with a carry in the hundreds place, there is no viable solution for the T, W, Y values amongst the remaining digits 3, 4 and 5. So it must be that $E=5$ and $N=3$, with a carry in the hundreds place. It follows that $T=2$ with no carry in the tens place, and $W=4$ and $Y=6$.

2 The solution is given in the following table:

Student	Color Worn	Toy Made	No. Toys
Gail	Mauve	End tables	6
Hal	Navy	Chairs	3
Irene	Lilac	Beds	5
Jill	Purple	Lamps	9
Kyle	Orange	Desks	7

We know that the sum of the toys was 30, the minimum possible number of toys made by an individual was 3, one of the numbers must be a 5, there must be three consecutive numbers represented, and one of the numbers is a third of another number. The only possible combinations of number that fit these constraints are 3,4,5,6,12 and 3,5,6,7,9. For the first combination, it follows that Jill made 12 toys (lamps) and that the student who wore navy made 4. It must be Gail that made

4 toys, and the student who wore lilac made 3 toys, and there were 5 desks made (by Irene). Kyle (wearing orange) could only have made 7 toys, so Hal made 3 chairs. Unfortunately, there is no way for mauve end tables to be constructed in this scenario. So the number of different toys made must be distributed 3,5,6,7,9. It follows that Jill made 9 toys (lamps) and that the student who wore navy made 3. It must be Gail that made 6 toys, and the student who made 5 toys (Irene) wore lilac. Kyle (wearing orange) could only have made 7 toys (desks), so Hal made 3 chairs, and Irene must have made beds. The mauve-wearing student who made end tables must have been Gail, and Jill must have worn purple.

3 $f(x) = e^{(3-\sqrt{5})x/2}$. Consider a function of the form $f(x) = ce^{ax}$. Given the initial condition that $f(0) = 1$, $c = 1$. Plugging $f(x) = e^{ax}$ into the differential equation gives: $f' = af + 2a^2f + 3a^3f + 4a^4f + \dots$. Dividing by f gives: $1 = a + 2a^2 + 3a^3 + 4a^4 + \dots = a(1 + a + a^2 + a^3 + a^4 + \dots) + a^2(1 + a + a^2 + a^3 + a^4 + \dots) + a^3(1 + a + a^2 + a^3 + \dots) + \dots = (a + a^2 + a^3 + a^4 + \dots)(1 + a + a^2 + a^3 + a^4 + \dots) = [a/(1-a)][1/(1-a)] = a/(1-a)^2$. With the condition that $|a| < 1$, this gives: $1 - a/(1-a)^2 = 0$. Rearranging yields the quadratic: $a^2 - 3a + 1 = 0$. Of its roots, only $a = (3-\sqrt{5})/2$ has an absolute value less than 1, leading to $f(x) = e^{(3-\sqrt{5})x/2}$.

4 The product of the $n-1$ chords is n . One approach is to consider the n points as representing the n th roots of 1 on the unit circle in the complex plane. Consider the identity $z^n - 1 = (z-r_1)(z-r_2)\dots(z-r_n)$, where the r 's are the n th roots of 1. Let $r_1 = 1$, which is the first of the n th roots of 1. Replacing z with $z+1$ and r_1 with 1, the identity can be written as $(z+1)^n - 1 = (z+1-1)(z+1-r_2)\dots(z+1-r_n)$. The binomial expansion of the left side gives: $z^n + nz^{n-1} + n(n-1)z^{n-2}/2 + \dots + nz + 1 - 1 = z(z+1-r_2)\dots(z+1-r_n)$. After dividing both sides by z , this simplifies to: $z^{n-1} + n z^{n-2} + n(n-1)z^{n-3}/2 + \dots + n = (z+1-r_2)\dots(z+1-r_n)$. Since this identity holds for all values of z , picking $z=0$ results in $n = (1-r_2)\dots(1-r_n)$. Since $|1-r_n|$ signifies the distance in the complex plane between the point $r_1 = 1$ and the

point r_i (i.e., the chord length between vertices in the polygon), it follows directly that the product of all chords with one end fixed at a given vertex is simply n . An alternative approach is to use the law of cosines to calculate the chord lengths between point 1 and the other points. Consider the triangle formed by radii from the center of the unit circle to points 1 and i and the chord between these points. The law of cosines gives $c^2 = 2 - 2\cos\theta$, or $c = \sqrt{2(1 - \cos\theta)} = 2\sqrt{(1 - \cos\theta)/2} = 2\sin(\theta/2)$, where $\theta = 2\pi/n$. Then the product, $P = 2^{n-1}\sin(\theta/2)\sin(2\theta/2)\sin(3\theta/2)\dots$. From a table of products, we find that $\prod_{k=1}^{n-1}\sin(k\theta/n) = n/2^{n-1}$. Then, the product of the chords equals $2^{n-1}(n/2^{n-1}) = n$.

5 It takes Brother Adrian, using the following sequence, a minimum of 28 moves to visit the Chapel: **L-K-I-H-F-E-C-B-A-B-C-A-E-F-H-A-I-K-L-A-L-K-I-H-F-E-C-B**.

Bonus The probability of the players winning is $103/429$. Consider the dealer's cards as she completes her hand. She will continue to draw until she either has a count between 17 and 21 (she wins) or goes over 21 (she loses). Note that an ace drawn as the first card will have a value of 11 (a win with 20), but other times has a value of 1. A little thought and a lot of careful counting will show that the possible sequences of draws can be organized into groups, a group consisting of all the sequences that are identical except for the final card. For example, one possibility is 6-A-2, and another is 6-A-4. These two would be in the same group, since they differ only in the last card. There are 28 such groups, but the number can be reduced somewhat by noting, for example, that 4-3- and 3-4- are essentially the same and can be placed in the same group. Depending on how you combine the sequences, you can have 18 to 28 groups. It doesn't matter as long as you keep your accounting straight. The following table is one way of assigning groups. The table shows the various (win for dealer) sequences. Cards in parentheses are used only one a time. Thus, 5-(3,4,6,7) stands for four sequences: 5-3; 5-4; 5-6; and 5-7. The second column shows the probability

of the dealer's winning with the indicated hand, where $P_{13} = 1/13$; $P_{12} = 1/12$; $P_{11} = 1/11$; and $P_{10} = 1/10$. A common denominator for all the probabilities is $13 \times 12 \times 11 \times 10 = 17,160$. The last column gives the numerators of all the probabilities adjusted to the common denominator; the total is 13,040, so the probability of the dealer winning is $13,040/17,160 = 326/429$, and the probability of your winning is $1 - (326/429) = 103/429$.

Values of Cards Drawn	Prob. win by dealer	No. of 17,160ths
(A,8,9,10,J,Q,K)	$7P_{13}$	9,240
7-(A,2,3,4,5)	$5P_{13}P_{12}$	550
6-(2,3,4,5)	$4P_{13}P_{12}$	440
6-A-(2,3,4,5)	$4P_{13}P_{12}P_{11}$	40
5-(3,4,6,7)	$4P_{13}P_{12}$	440
5-A-(2,3,4,6)	$4P_{13}P_{12}P_{11}$	40
(5,2)-(2,5)-(A,3,4)	$2 \times 3P_{13}P_{12}P_{11}$	60
4-(5,6,7,8)	$4P_{13}P_{12}$	440
(4,2)-(2,4)-(3,5,6)	$2 \times 3P_{13}P_{12}P_{11}$	60
(4,3)-(3,4)-(A,2,5)	$2 \times 3P_{13}P_{12}P_{11}$	60
4-A-(3,5,6,7)	$4P_{13}P_{12}P_{11}$	40
4-(A,2)-(2,A)-(3,5)	$2 \times 2P_{13}P_{12}P_{11}P_{10}$	4
2-(A,4)-(4,A)-(3,5)	$2 \times 2P_{13}P_{12}P_{11}P_{10}$	4
3-(5,6,7,8,9)	$5P_{13}P_{12}$	550
3-A-(4,5,6,7,8)	$5P_{13}P_{12}P_{11}$	50
(3,2)-(2,3)-A-(4,5,6)	$2 \times 3P_{13}P_{12}P_{11}P_{10}$	6
3-(A,2)-(2,A)-(4,5,6)	$2 \times 3P_{13}P_{12}P_{11}P_{10}$	6
(3,2)-(2,3)-(4,5,6,7)	$2 \times 4P_{13}P_{12}P_{11}$	80
2-(6,7,8,9,10,J,Q,K)	$8P_{13}P_{12}$	880
2-A-(5,6,7,8,9)	$5P_{13}P_{12}P_{11}$	50
	Total	13,040

Double Bonus The missing mascot is **Joe Miner, of Missouri University of Science and Technology (MO Beta)**. To solve this problem, first find the school and (as the problem alluded to) the associated mascot based on the logos provided. The schools are in alphabetical order which may help to facilitate identification. The



reference to "Greek" in the problem statement should have keyed you into the specific TBP chapters for each school. Intriguingly, every Greek letter from alpha to nu is uniquely represented by the thirteen schools. This should suggest arranging the schools in alphabetical order by their TBP Greek chapter designations (see table). The numbers under the logos are indexes to the letters in the names of the schools' mascots. Selecting the indexed letter from each mascot's name reveals: HAS A SLIDE RULE, and the only slide rule totin' mascot is none other than **Joe Miner, MO B**. Astute puzzlers may know that the slide rule was referenced in the original TBP yell, adopted in 1908!

Letter	School	Mascot	Index	Letter
Alpha	Lehigh Univ.	CLUTCH	6	H
Beta	Michigan Tech	BLIZZARD	6	A
Gamma	Ohio State Univ.	BRUTUS	6	S
Delta	University of S. California	TRAVELER	3	A
Epsilon	Trine	STORM	1	S
Zeta	Kettering Univ.	GENERAL DETERMINATION	7	L
Eta	City College of NY	BENNIE	5	I
Theta	Univ. of Mass., Lowell	ROWDY	4	D
Iota	S. Methodist Univ.	PERUNA	2	E
Kappa	W. Michigan Univ.	BUSTER	6	R
Lambda	Univ. of CA, Davis	GUNROCK	2	U
Mu	Penn State, Erie	NITTANY LION	8	L
Nu	Univ. at Buffalo	VICTOR E BULL	7	E

NEW SPRING PROBLEMS

1 I have found five nine-digit integers such that, among them, the digit 1 appears once, the digit 2 appears twice, 3 appears three times, and so forth to 9 which appears nine times. The first and second integers, both of which are exact fifth powers, between them, contain all nine different digits. The third integer is an exact fourth power. The fourth integer, which consists of only two different digits, is a palindrome divisible by 33 and 111. The digits of

the fifth integer form an increasing sequence in which each digit is equal to, or greater than, the preceding digit. What are the five nine-digit integers?

—Adapted from an Enigma by Adrian Somerfield in *New Scientist*

2 At a recent bridge game, Don thought his luck couldn't get any worse, until he was dealt a hand that not only didn't have any aces or face cards, but included exactly two 2's, three 3's, and four 4's. What is the exact probability of being dealt such a hand? A bridge hand consists of 13 cards dealt from a well shuffled standard deck of 52 cards.

—Don A. Dechman, *TX A '58*

3 At Sam's Soup, Salad & Sandwich Deli, patrons can order from a menu consisting of ten different items. They can order as many different items as they wish, but they can order at most two of any given item. To minimize data entry, Sam has devised an approach that requires sending only one number per order to the kitchen. He did this by assigning a code number consisting of a positive integer to each item on the menu. The waiter then enters only the sum of the codes for the items ordered. (If two of the same item are ordered, the item's code is added twice.) If the codes have been chosen so that every possible order results in a unique number, what is a simple set of codes for the ten items on the menu?

—Adapted from *Doctor Ecco's Cyberpuzzles* by Dennis E. Shasha

4 In the famous Tower of Hanoi puzzle, you start with three pegs (P_1 , P_2 , and P_3). On P_1 are n discs of different sizes, increasing in diameter from the smallest at the top to the largest at the bottom. The objective is, in as few moves as possible, to transfer the stack from P_1 to P_3 by moving the discs, one at a time, from peg to peg to peg while observing the rule that no disc can ever be placed on top of a smaller disc. For three pegs and n discs, the process takes $2^n - 1$ moves. For example with three pegs and $n = 4$, 15 moves are required; and three pegs with $n = 18$ requires 262,143 moves and (at a rate of one move per second) requires 72 hr, 49 min, and 3 sec. For Super-Hanoi, you

can have more than three pegs. For p pegs, the objective is to transfer an n disc stack from P_1 to P_p in the fewest possible moves. For example, with 4 pegs, 4 discs can be transferred in 9 moves instead of 15. What is the minimum number of pegs needed to be able to transfer 18 discs from P_1 to P_p in a minute or less at the rate of one move per second? Also, what is the arrangement of discs on the pegs immediately before the largest disc is moved from P_1 to P_p ? Transferring a single disc from one peg to another constitutes a move.

—An Enigma by Stephen Ainley in *New Scientist*

5 In a right triangle, inscribe a semicircular arc, such that the arc is tangent to both legs of the right triangle, and the center of the semicircle and its two endpoints lie on the hypotenuse of the triangle. These three points divide the hypotenuse into four segments. Starting at one end of the hypotenuse and moving toward the other end, the lengths of these segments are x cm, 120 cm, 120 cm, and y cm. Given that x and y are integers, what are the maximum and minimum lengths the hypotenuse can have?

—Adapted from *The Wall Street Journal* by Robert W. Schweitzer, *NY Z '52*

Bonus Suppose that, in a distant galaxy, there is a solar system in which, instead of being spheres, the planets are right circular cones (with heights equal to the diameters of their bases). Suppose one of these planets has the same total volume and mass as our Earth, but a uniform density; what would be the gravitational acceleration on a person standing in the center of the circular base, and what would be the gravitational acceleration on a person standing at the apex? Assume the Earth is a

perfect sphere with a radius of 6,370 km and an average density of 5,518 kg/m³. Use a value of 6.673×10^{-11} N m²/kg² for G . Express your answers correct to three significant figures.

—*Higher Mathematics for Engineers and Physicists* by I.S. ans E.S. Skolonikoff

Double Bonus Solve the following cryptic addition in base 13.

HOWIE
FRED
CHUCK
JEFF
JUDGE

Although the base is an unlucky number, the following circumstances negate this. The panel of JUDGEs is, of course, prime, as are FRED, CHUCK, and JEFF, while HOWIE is the product of 7 (lucky number), not necessarily different, primes. The usual rules apply. Use a, b, and c to represent the digits 10, 11, and 12.

—H.G. McIlvried, III, *PA Γ '53*

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

H.G. McIlvried, III, PA Γ '53

"THE BEST PEOPLE" ENGINEERING JOB BOARD

Tau Beta Pi is proud to offer a job board for students and alumni. Members can post resumes, browse over 4,500 engineering jobs, faculty positions, and internships, and employers may browse resumes.

New opportunities are posted on our home page daily and a full list of openings are available by visiting www.tbp.org/memb/jobBoard.cfm



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 '43 **Bloom, Gene Luther**; June 16, 2005.
 '45 **Drewry, Robert Murice**; October 20, 2013.
 '49 **Hester, Gaston Tapley**; March 27, 2000.
 '53 **Oliver, Calvin Willis**; May 20, 1993.
- AL B '48 **Adams, Frederick Austin**; March 12, 2013.
 '48 **Hovater, Louis Richard**; September 11, 2008.
 '76 **Hendrix, David Edward**; January 25, 2018.
- AL Γ '43 **Jones Jr., Truman Ross**; December 7, 1993.
 '48 **Alley, James Thomas**; September 28, 2007.
- AZ A '46 **Gerdin, Harold Eugene**; January 13, 2018.
 '55 **Anklam, James Richard**; January 30, 2017.
 '57 **Berge, Craig Merion**; December 7, 2017.
- CA A '41 **Olson Jr., Carl Alexius**; April 22, 1998.
 '50 **Bassett, James Harold**; June 27, 2017.
- CA Γ '48 **Mendel, John Thomas**; February 8, 2014.
 '52 **Aspinwall, Dennis McKinley**; August 25, 2006.
 '58 **Johnson, Frank Martin**; February 27, 2017.
- CA Δ '50 **Howard, Robert Charles**; November 9, 2016.
 '56 **Strickland, Henry Ewell**; December 20, 2012.
 '58 **Bullock, Thomas Eugene**; May 4, 2017.
 '61 **Barbera, Frank Joseph**; March 29, 2015.
 '62 **Moretti, Vincent Carlos**; April 15, 2017.
- CA E '48 **Estrin, Thelma A.**; February 15, 2014.
 '51 **Reed Jr., George Wilbur**; July 14, 2017.
 '58 **Wagner, William Richard**; September 12, 2017.
 '67 **Lineberry, Michael Jay**; March 6, 2014.
- CA Θ '73 **Hoffman, Robert William**; July 5, 2017.
- CA Λ '76 **Hewett, Scott William**; April 14, 2014.
- CA E '73 **Holcomb Jr., Donald Ewart**; September 21, 2017.
- CO B '43 **Roukema, Ralph William**; May 19, 2012.
 '44 **De Vore, Robert William**; January 24, 2014.
 '44 **Kabell, Jack**; March 2, 2003.
 '45 **Gruber, Kenneth Carl**; November 17, 2017.
 '48 **Vanderwilt, William K.**; March 13, 2017.
 '49 **Smith, Don Keller**; November 19, 2007.
 '50 **Turner, Edward Wayne**; November 26, 2017.
- CO Γ '52 **Cloyd, Keith Austin**; January 22, 2018.
 '52 **Henrikson, Alan Earl**; March 10, 2006.
- CT A '41 **Penney Jr., John Stevens**; April 17, 2017.
 '45 **Fisher, Edwin Henry**; June 8, 2017.
- CT B '38 **Hawkins, John Edward**; October 27, 2017.
 '48 **Fierberg, Isaac Martin**; October 6, 2012.
 '48 **Rogan, Peter Walter**; January 31, 2014.
 '51 **O'Brien, Donald Joseph**; October 26, 2017.
 '51 **Stevens, Stiles Frederick**; December 3, 2017.
 '53 **Knapp, Charles Harris**; November 23, 2017.
 '57 **Wortman, Robert Hilton**; July 25, 2015.
 '63 **Gustafson, William Roy**; November 26, 2017.
- DE A '48 **Kiddoo, Richard C.**; December 10, 1999.
- DC Γ '48 **Colony, David Carl**; February 15, 2003.
- FL A '48 **Hazen, Robert Douglas**; March 2, 2017.
 '50 **Barnes, Casper William**; March 26, 2013.
- GA A '38 **Pendergrast Jr., John Brittain**; September 22, 2016.
 '41 **Schmitter, Bernard Millard**; September 23, 2004.
 '42 **Overstreet III, Edward Kinchley**; April 10, 2006.
 '43 **Lewis Jr., Oliver Kenneth**; November 10, 2015.
 '44 **Roush Jr., Chester Adam**; January 4, 2007.
 '47 **Dixon, Frederick**; September 28, 2013.
 '48 **Gersch, Harold Arthur**; April 14, 1995.
 '50 **Strickland, Kenneth Thomas**; May 25, 1988.
 '52 **Young, John Watts**; January 5, 2018.
 '54 **Feiertag, Bruce Adams**; December 8, 2017.
- IL A '41 **Hanley, Bernard Cahill**; March 31, 2015.
 '46 **Mosborg, Robert John**; December 6, 2017.
 '48 **Lally, Robert William**; January 21, 2018.
 '49 **Hunter, Richard Reid**; July 7, 2017.
 '49 **Logan, Stanley Elmer**; February 3, 2017.
 '49 **Prendergast, James Drummer**; December 14, 2017.
 '58 **Dipert, Arnold William**; December 23, 2017.
- IL B '48 **Roy, Paul Henri**; May 7, 2006.
 '49 **Koe, George Albert**; March 20, 2005.
 '65 **Thomopoulos, Nick T.**; December 23, 2017.
- IL Γ '48 **Carson, Robert Raymond**; February 6, 2000.
- IN A '42 **Dodson Jr., Gilbert C.**; August 19, 2004.
 '46 **Feldmeier, Wilmer Otto**; February 15, 2013.
 '48 **Banner, Donald W.**; January 29, 2006.
 '48 **Eklind, Howard Allen**; July 20, 2013.
 '48 **Herbert, Nelson J.**; December 14, 2004.
 '48 **Kropf, Robert William**; March 20, 2017.
 '48 **Mercker, Andrew Joseph**; April 28, 2004.
 '48 **O'Hern, Eugene Arthur**; January 23, 2015.
 '48 **Sagata, Juro**; April 23, 1997.
 '48 **Scheflow, Oliver Waller**; August 21, 2016.
 '48 **Wollock, Martin**; January 11, 2001.
 '49 **Blough, Edwin A.**; July 12, 2011.
 '49 **Carlson, Ward Stillman**; September 25, 2000.
 '49 **Moore, Frank Arthur**; March 6, 1998.
 '49 **Peticolas, Richard Phillip**; May 30, 1997.
 '49 **Robertson, Kenneth Wayne**; December 7, 2017.
 '49 **Scarlett, Harold Owen**; February 19, 1997.
 '49 **Tengdin, John Theodore**; December 28, 2017.
 '49 **Worth, Daniel Pharr**; January 1, 2006.
 '49 **Zeltwanger, Earl Dean**; October 1, 2017.
 '51 **Nishimura, Katsuyoshi**; January 25, 2012.
 '56 **Kettlewell, John**; August 3, 2017.
 '59 **Byrne, David Allen**; June 15, 2017.
 '59 **Gorakhpurwalla, Homi**; July 16, 2017.
 '61 **Friehe, Carl Alan**; September 1, 2011.
- IN B '42 **Hess, Eugene Elmer**; no details.
 '48 **Yee, Alfred Alphonse**; April 21, 2017.
 '51 **Powell, Robert Lowell**; August 17, 2017.
- IN Γ '51 **Kohn, James Paul**; May 26, 2003.
 '61 **Duspiva, Walter Stephen**; November 11, 2017.
- IN Δ '58 **Hibbs, Duane Ray**; November 10, 2017.
- IA A '43 **Weisemann, Gert Hans**; January 31, 2012.
 '44 **Bentzinger, Harlan Albert**; October 21, 2015.
 '45 **Stewart Jr., Robert Murray**; April 11, 2017.
 '48 **Graham, Frederick M.**; November 28, 1991.
 '48 **Haney, Carl Leonard**; August 7, 1999.
 '48 **Sullivan, Jack Bernard**; December 4, 1998.
 '49 **Leverett Jr., James Reynolds**; January 19, 2018.
 '49 **Potter, William George**; August 12, 2009.
 '49 **Tillwick, Frederick Herman**; May 26, 2005.
 '50 **Fouad, Abdel-Aziz A.**; October 21, 2017.
 '51 **Parsons, Robert Earl**; August 19, 1992.
 '53 **Bauerle, Richard Carl**; November 18, 2017.
 '55 **Stanley, Richard H.**; November 17, 2017.
- IA B '48 **Doty, Robert Landels**; March 13, 2012.
 '60 **Kendall, David Rinden**; May 29, 2016.
- KS A '44 **Bloomer, Oscar Theodore**; April 21, 1990.
 '48 **Finney, Richard Hastings**; April 27, 2005.
 '49 **Oram, James Edward**; March 13, 2016.
 '53 **Imming, Gerald Louis**; November 22, 2006.
 '55 **Malinowsky, Harold Robert**; August 16, 2014.
 '58 **Lembke, John Roger**; October 16, 2017.
 '62 **Wicke, Dallas Clyde**; April 16, 2017.

- '70 King, Joseph Elwood; August 19, 2016.
'73 Merrion, Albert Stanley; January 13, 2018.
- KS Γ '12 Spiess, Samuel Evan; March 16, 2013.
- KY A '49 Crawford, John McClellan; June 23, 2003.
'49 Wallace Jr., Roy Alexander; December 23, 2017.
'50 Kappa, William Gay; August 20, 2013.
- KY B '43 Horlander Jr., Leo A.; June 8, 2006.
- KY Γ '13 Mahan, Cody Alan; February 15, 2015.
- LA A '48 Harvey, Robert Hughes; September 19, 2011.
'48 Jones, William Reid; November 24, 2005.
'48 Meyer, Merlyn Isidore; July 21, 1996.
'59 Ward, Thomas Eugene; December 31, 2017.
'61 Hodapp Jr., Albert Emmet; March 8, 2017.
- LA B '56 Cowin, Stephen Corteen; October 19, 2016.
- LA Γ '48 Bufkin, Isaac David; December 5, 2017.
'48 Dyson, Leslie Marion; October 19, 2003.
- ME A '59 Ramsdell, Earl Weston; November 19, 2017.
- MD A '48 Bailey, Howard Cromwell; September 11, 2013.
'48 Ellis Jr., Benjamin Clement; December 28, 2000.
'48 Holdefer, George William; March 10, 2011.
'56 Kelly Jr., Edward Joseph; May 8, 2015.
- MA A '46 Funk, Edward Ross; December 4, 2002.
'47 Marvin, Frederick Wilson; October 14, 2012.
'50 McMahan Jr., Richard Hargrave; April 3, 2017.
- MA B '45 Luce, Robert Duncan; August 11, 2012.
'46 Maier, Henry Gert; June 5, 2017.
'50 Garvin, Robert Victor; June 27, 2017.
'50 Reed, Sherman Clarke; November 25, 2014.
'52 Olson, Albert Oscar; May 10, 2014.
'56 Rasmussen, John Elmer; May 20, 2016.
'70 Kaminski, Charles Anthony; April 22, 2017.
- MA Δ '42 Wellington, C. Burleigh; November 21, 2009.
'45 Sussman, Martin Victor; April 13, 2005.
- MA E '43 Preti, Leo Leon; September 11, 2007.
'47 Lippa, Leo Mark; December 18, 2017.
'48 Freeman, Albert Paul; August 20, 2002.
'48 Kalman, Albert Louis; April 19, 2003.
'48 Raemer, Harold Roy; January 20, 2007.
'55 Adair Jr., Roger Putnam; February 4, 2011.
'73 Keating, Daniel William; May 28, 2013.
- MI A '49 Flaum, Isidor T.; December 11, 2017.
'50 Siefert, William Herman; January 12, 2013.
- MI B '40 Stone, James Behrens; October 30, 2006.
'42 Hansen Jr., Henry J.; August 21, 2017.
'49 Matheson, Robert Rudolph; November 25, 2011.
'53 Michel, Philip Raymond; December 27, 2011.
- MI Γ '39 Young, John Graham; August 25, 2015.
'42 Wilson, Richard Christian; January 12, 2017.
'44 Bard, Richard James; May 1, 2016.
'44 Warner, Caleb; August 24, 2017.
'47 Moon, Edward Ellis; December 9, 2010.
'48 Oberlin, David Wright; July 29, 2009.
'48 Schmidtke, Richard Allen; March 27, 2017.
'49 Weyant, David Edward; October 1, 2012.
'51 Hodges Jr., Paul David; September 16, 2017.
'54 Holmes, James Paul; no details.
'65 Rowzee III, Edward Francis; December 23, 2016.
'80 Moskwa, John Joseph; June 3, 2017.
- MI Δ '49 Stocker Jr., Joseph William; December 8, 2011.
- MI E '41 Wood, William George; November 29, 2003.
'46 Green, Frank Walter; January 19, 2018.
'48 Zobel, Edward Charles; October 27, 2005.
'51 McCarty Jr., James Campbell; May 25, 2016.
- MI Z '48 Malott, Richard Clayton; March 15, 1999.
- MI H '42 Horton, Emmett Joseph; January 31, 1996.
'92 Polizzi, Sam G.; March 6, 2017.
- MN A '45 Borry, John Vincent; June 27, 2007.
'49 Bekkedahl, James Lewis; May 18, 2017.
'50 Gustafson, Harry Anton; June 12, 2009.
'53 Bloom, Kenton Thomas; January 8, 1991.
- MS A '48 Smith, Andrew Lee; May 25, 2017.
'63 Marble, Charles Edward; March 2, 2003.
- '81 Holeman, James Michael Wade; December 19, 2017.
- MO A '44 Roney, Robert Kenneth; August 4, 2017.
'50 Peret, Warren Scott; October 28, 2017.
'61 Norris, Thomas Herbert; November 9, 2017.
- MO B '45 Boyd, Roy Henderson; December 31, 1994.
'07 Jolly, James Wilson; January 16, 2015.
- MO Γ '42 Bailey Jr., John Joseph; November 6, 2009.
'47 Dmytryszyn, Myron; March 8, 2013.
'47 Ostrodka, Leon Stephan; May 8, 2017.
'48 Busche, Robert Marion; February 2, 2013.
'61 Bowerman, Harold H.; January 28, 2018.
- MT A '43 Rosness, George Edward; June 23, 2017.
'44 Parsons Jr., Arthur Carroll; January 31, 2001.
'48 Christian, Caleb; no details.
'60 Myers, John David; May 6, 2016.
- NV A '47 Slemmons, David Burton; May 4, 2017.
- NH A '56 Josephson, Paul Richard; November 24, 2017.
'57 Russell, Earl David; March 24, 2014.
'58 Merchant, Kenneth Everett; February 15, 2017.
- NJ A '44 Rider, Bernard; May 27, 2012.
'48 Feltham Jr., Charles Foster; May 19, 2006.
'48 Mason, Stuart Anderson; August 30, 2002.
- NJ B '40 Dittman, Frank Willard; May 5, 2017.
'65 Plant, Stephen Irving; January 2, 2018.
'77 Berical, William Michael; November 6, 2016.
- NJ Γ '62 Gilbert, Stephen Marc; December 2, 2017.
- NJ Δ '47 Gosnell, Frank Laurence; February 4, 2017.
- NY A '42 Zadeh, Lotfi Asker; September 6, 2017.
'43 Bergemann Jr., Robert John; March 24, 2010.
- NY B '49 Hammond, George Alan; August 24, 1997.
'49 Peebles, Stuart Alonzo; March 10, 2017.
'49 Siciliano, Michael Joseph; February 16, 2004.
- NY Γ '37 Brudereck, William Charles; November 26, 2017.
'43 Herbert, Richard Joseph; March 24, 1995.
'43 Paulovich, Kenneth F.; February 16, 2017.
'44 Sageman, Robert Edward; June 20, 2016.
'46 Corbo, Vincent Blase; February 5, 2008.
'49 Geismar, Richard Lee; July 10, 2010.
'49 Kupfer Jr., Walker Steward; no details.
'49 Low, Daniel Jenness; March 29, 1997.
'50 Reilly, William James; October 4, 2017.
'56 Hasbrouck, Edward Joseph; November 20, 2017.
'60 Kruse Jr., Richard Kareth; November 30, 2017.
- NY Δ '40 Haller, Robert F.; September 27, 2005.
'50 Stephan, Frederick Paul; November 15, 2017.
'88 Malicky, David Matthew; February 22, 2017.
- NY E '50 Ellis, Charles Benson; March 13, 1998.
- NY Z '55 Neumann, Leopold; June 4, 2006.
- NY H '43 Young, Sol; no details.
'44 Bergen, Arthur Russell; July 19, 2014.
'46 Seide, Paul; February 7, 2014.
'47 Berger Sr., Christian Dean; June 13, 2010.
'49 Immarco, Anthony Edward; August 10, 2015.
- NY Θ '51 Olson, Allen Frederick; September 1, 2016.
'54 Cohen, Bernard; October 2, 2017.
- NY I '41 Lax, Benjamin; April 21, 2015.
'47 Brooks, Maurice Edward; January 4, 2018.
- NY M '38 Panlilio, Filadelfo; July 24, 2017.
'48 Urquhart, John Alexander; August 22, 2014.
- NY Ξ '43 McElligott, John Edward; May 30, 2014.
'49 Radzivila, Raymond; January 26, 2018.
- NY P '81 Els, William Henry; December 26, 2016.
- NC A '41 Halsted, Bruce Cushman; December 5, 2006.
'41 Morris, William Flaude; December 28, 2017.
'42 Lambe, Thomas William; March 6, 2017.
'49 Lawrence, John Louis; November 30, 2016.
'50 Stephens, John Mack; February 25, 2016.
'54 Oliver, Billy Barnes; July 29, 2010.
'59 Beasley, Robert Earle; December 30, 2017.
- NC Γ '59 Austin, David William; December 11, 2017.
- ND A '89 Nordstrom, James Richard; November 27, 2017.

- OH A '46 Spear, Robert Evans; January 4, 2017.
'49 Grombka, Walter John; February 24, 2007.
'49 Pelino, William; no details.
- OH B '48 Swabb Jr., Lawrence Edward; April 15, 2017.
- OH Γ '42 Sampson, John David; December 23, 2017.
'44 Olson, Benjamin Farr; May 9, 2007.
'46 Hang, Richard Irvin; October 2, 2006.
'47 Tilberry, James H.; no details.
'48 Reeg, Cloyd P.; January 11, 2010.
'52 Behnfeldt, Marvin John; August 13, 2017.
'58 Booker, Stanley Robert; December 21, 2017.
'61 Skinn, Charles Woodrow; December 10, 2017.
- OH E '34 Miller, William Robert; April 21, 2008.
'48 Springer, Charles Havice; September 1, 2010.
'50 Thompson, Jack Frederick; August 10, 2017.
'81 Gracyk, June E.; October 17, 2017.
- OH H '69 Fisher, Jack Dexter; November 8, 2017.
- OH Θ '48 Freeh, Edward James; September 16, 2009.
- OK A '44 Strickland, Harry Neil; July 4, 1979.
'45 Alexander, Stephen Holt; November 12, 2017.
'45 Meek, Frank Brooks; April 14, 1990.
'48 Brady, Harold Judson; October 28, 2016.
'48 Thacker Jr., Ike Hardin; August 22, 1993.
'51 Harnish, James Ranck; December 12, 2017.
'52 Knight, Robert Lee; September 7, 2016.
- OR A '50 Wicks, Charles Edward; July 29, 2010.
'61 Bennett, Edward Grant; January 7, 2018.
- PA A '41 Bedell, Donald Warner; December 29, 2014.
'48 Palmer, Charles Bernard; August 30, 2017.
'55 Brady, Charles Eugene; December 23, 2015.
- PA B '43 Kovach, Karl; October 10, 2015.
'54 McCormick, Barnes W.; October 29, 2017.
'54 Reich, Richard Lee; February 29, 2016.
'65 Johnson, Philip M.; June 15, 2017.
- PA Γ '42 Trautman Jr., DeForest Lloyd; August 18, 2016.
'49 Bloom, Ray Albert; January 4, 2012.
'54 Broome Jr., Paul Wallace; January 11, 2018.
- PA E '49 Javis, Albert Louis; February 28, 2015.
'58 Felsenheld Jr., Robert Arthur; June 20, 2015.
- PA Z '41 Hudson Jr., William Burchell; November 4, 2015.
'45 Lathlaen, Robert Frank; May 31, 2017.
'48 Dehuff, William Henry; March 23, 2008.
'48 Okada, Robert Harry; October 11, 2008.
- PA H '59 Drexinger, Robert Martin; November 19, 2017.
'62 Shultz, Robbin Craig; July 13, 2016.
- PR A '48 Huyke-Colon, Hector J.; May 30, 2016.
- RI A '50 Branagan, Lyle Edward; October 7, 2002.
'51 Gustafson, Alvan Knute; November 14, 2009.
- RI B '51 Rizzi, Peter Americo; December 31, 2017.
- SC A '40 Harper, John Joseph; May 28, 1998.
'43 Adams, Leonard Caldwell; October 3, 2017.
'49 Elrod, Alvon Creighton; January 9, 2018.
'50 Rogers, Ralph Lee; August 25, 2015.
'52 Kimberling, Charles Lindbergh; June 15, 2017.
- SC B '49 Moore, Hal Ivan; January 10, 2002.
- SC Γ '48 Warren, John Armstrong; August 29, 2009.
'96 Kennemer, Edric Charles; October 9, 2007.
- SD A '49 Bierwirth, Henry Christian; September 14, 2002.
'51 Boyd, Darrel Wayne; December 1, 2015.
'54 Peterson, Dean McCormack; June 14, 2004.
'73 Mickelson Jr., John Chester; January 17, 2013.
'74 Larson, Donald Chris; April 17, 1999.
'76 Stearns, Warren Russell; August 6, 2017.
'77 Biegler, Susan Katherine; September 23, 2008.
'77 Meyer, Thomas Orin; May 26, 2016.
'77 Waldman, Henry; January 9, 2015.
'79 Chord, Casey A.; August 7, 2014.
'79 Clausen Jr., Robert Dale; October 3, 2016.
'79 Van Goor, David Jon; July 27, 2013.
'82 Otte, Frederick Eugene; November 18, 2015.
'87 Murphy, Kevin John; April 13, 2006.
- '89 Mettler, Larry Milton; March 21, 2017.
'90 Mann III, James Edward; December 29, 2015.
'00 Elkins, Seth Russell; April 11, 2015.
'03 Skaug, Vivian Johnson; April 14, 2015.
'04 Lipp, Darrin Andrew; July 25, 2009.
'07 Klausen, Seth Andrew; December 8, 2017.
- TN A '45 Goldstein, Buford Jack; July 24, 2005.
'49 Roth, Martin Eugene; March 18, 2005.
- TN B '42 Nellums, Robert Overman; January 2, 2018.
- TX A '47 Dalley, Joseph Winthrop; September 22, 2013.
'48 Bryant Jr., Frank Grant; May 17, 2006.
'48 Noble Jr., Joseph A.; December 18, 1995.
'49 Chambers, John Douglas; July 16, 2015.
'49 Reed, John Charles; July 18, 2016.
'53 Cox, Kenneth Jackson; February 27, 2017.
- TX B '47 Ellis, Calvin Lee; December 22, 1998.
'48 Hassell, Thomas Wood; June 3, 1985.
'48 Pace Jr., John Caperton; April 25, 2009.
'50 Hancock Jr., Kenneth Moran; January 6, 2018.
'92 Finley, Garth Alan; August 10, 2016.
- TX Γ '45 Gerhardt, Manfred William; April 25, 2002.
'48 Kane Jr., George Voorhees; January 22, 2018.
- TX Δ '48 Corey Jr., John Burhyte Wilmo; March 9, 2004.
'50 Knight Jr., John Edward; October 1, 1996.
'59 New, Jeff Whitton; December 26, 2017.
- TX H '75 Springer, William Thomas; November 27, 2017.
- UT A '48 Grow, Richard William; June 8, 2011.
'48 Sakamoto, James R.; December 15, 2004.
'49 Knight, Kenneth Young; June 5, 1999.
'57 Reid, Ronald Ted; December 22, 2017.
- UT B '48 Polve, James Herschal; October 14, 2011.
- VT A '70 Sweeny, Gregory Nelson; April 15, 2014.
- VA A '44 Winsbro, Robert Berkeley; October 31, 2017.
- VA B '41 Brown, Charles Saville; December 9, 2017.
'43 Thacker, Earnest Lee; April 1, 2005.
'44 Kearns Jr., Howard Charlton; June 20, 2017.
'47 Bronaugh, John Reeder; July 11, 2015.
'47 Herbert Jr., Vernon Dabney; September 20, 2003.
'47 Parsons Jr., Oliver Jerome; December 23, 2014.
'48 Massie Jr., Edgar Franklin; December 16, 2004.
'50 Oliver, Douglas Stewart; March 14, 2011.
'54 Strickland, Norman Scott; July 16, 2006.
'56 Parrish, Harold Emerson; January 10, 2018.
'56 Turner Jr., James Edwin; December 27, 2017.
'60 Roberson, Charles Leslie; August 8, 2017.
'62 Wright, David Wells; March 11, 2017.
'63 Keckler, Claude Raymond; August 17, 2015.
- VA Δ '45 Pusey Jr., Elmer McMaster; August 29, 2008.
- WAA '39 Hage, Robert Evans; no details.
'41 Oliver, Ellis William; October 28, 1997.
'44 Oliver, Earl Davis; September 6, 2000.
'48 Mack, Donald Roy; November 4, 2010.
'49 St Germain, Robert Patrick; January 31, 2011.
'51 Brown Jr., Daniel Harvey; November 15, 2017.
'56 Jensen, Dale Lawrence; November 27, 2015.
- WAB '42 Knight, Kenneth K.; May 3, 1995.
'43 Tibbals, Hal Dean; February 10, 2015.
'44 Lafferty, James Lyle; April 24, 2017.
'48 Behlke, Charles E.; October 16, 2000.
'48 Winter, Edwin Ronald; January 20, 2004.
'51 Emery, Frederic Philip; January 4, 2018.
'65 Shaw, Robert William; March 1, 2017.
- WVA '48 Chaddock, Jack Bartley; May 5, 2015.
'49 Griffith, Robert Ross; February 4, 2016.
- WI A '48 Nieman, Henry Robert; January 5, 1992.
'49 Sagen, Robert James; March 26, 1990.
'49 Zarris, Walter Anton; November 18, 2005.
'52 Smith, William Clark; no details.
- WI B '48 Larsen, William Lawrence; April 25, 2011.
'50 O'Brien, Daniel Eugene; January 25, 2009.
'63 Dillon, Leo Glenn; December 12, 2015.



FAMILIES

Bi-Spousal

We welcome more TBI couples to this most popular category.

Joseph W. Alexander, *CA Y '06*
Rachel K. Alexander, *CA Y '15*

Khabeer Salaam, *DC A '14*
Kistine M. Andall, *DC A '14*

Alessandro Anzalone, *FL Γ '03*
Patricia B. Anzalone, *FL Γ '03*



Kwame J. Marshall, MD E '12

Martha A. Bruce, *CO Δ '79*
Steven R. Bruce, *CA Δ '78*

Justin W. Garvin, *IA B '01*
Mona K. Garvin, *IA B '03*

Jorn E. Halle, *CA M '88*
Mary D. Halle, *CA M '88*

David E. Herman, *CA E '89*
†Katalin N. Herman, *CO B '91*

Derik W. Trowler, *AR A '08*
Christina N. Trowler, *AR A '08*

Kenneth E. Weimer, *MI Z '09*
Kirstie T. Weimer, *NY T '11*

Gary B. Holcomb, *MT B '84*
Silvet S. Holcomb, *MT B '85*

John F. Kutcher, Jr., *MD A '86*
Susan W. Kutcher, *MD A '89*

Aileen S. Matta, *DC B '78*
Antonio J. Matta, *DC B '78*

Bi-Spousal

Robert A. Meyer, *TX Γ '69*
Susan E. Conry, *TX Γ '75*

Carey L. Russell, *CO A '83*
Melanie H. Russell, *LA A '93*

John B. Schneider, *LA B '83*
Shira L. Broschat, *WA A '82*

David C. Skouby, *MO B '84*
Diana M. Skouby, *NY E '90*

Christina N. Trowler, *AR A '08*
Derik W. Trowler, *AR A '08*

Kenneth E. Weimer, *MI Z '09*
Kirstie T. Weimer, *NY T '11*

Centenarians

We add the names of five members who have reached their second century and are recognized in *The Bent*. The full list is available at www.tbp.org?tbp100

Kenneth E. Robinson, *MI A '69*
b. 1913
d. June 20, 2014

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

Harry W. Davis, *SC B '37*
b. November 7, 1915
d. April 26, 2017

Frank E. Pavlis, *MI B '38*
b. October 29, 1916



Ralph Rose, *OH Γ '42*
b. December 27, 1917
(above image)

Multi-Generation

The following are families with at least two generations of Tau Bates.

The Balloun Family
James S., *IA A '60*
John M., *NJ Δ '88*

The Barczynski Family
John L., *PA A '78*
John E., *PA B '18*

The Blanchard Family
†Ralph S., Jr., *NH A '50*
Jeffrey J., *MA E '86*

The Buenemann Family
Morris C.F., Jr., *MO B '82*
Allison C., *IN A '15*
Eric C., *MO A '18*

The Busot Family
J. Carlos, *FL Γ '62*
Francisco L., *FL Γ '90*

The Bussett Family
Gary, *CA E '83*
Neal T., *CA E '09*

The Carroll Family
John T., *WI B '53*
John T., *NC A '82*

The Cayll Family
David R., *GA A '80*
Magna R., *LA E '84*
David R., *AZ B '17*

The Charlebois Family
Steven E., *NY Π '84*
Chantel M., *NY Π '17*

The Cease Family
†John E., *OK Γ '48*
Michael E., *OK B '76*

The Cichon Family
Scott A., *MI H '85*
Alexa L., *MI Γ '17*

The Cobb Family
James C., *VT A '64*
Peter J., *NH B '98*

The Cochran Family
Robert J., *LA A '55* (grandfather)
Shelly D., *NC A '12*

Multi-Generation

The Cochrane-Kankelborg Family
 †Gordon S., PA Z '52
 Carol C. Kankelborg, PA A '86

The Cozzarelli Family
 †Francis A., NJ A '55
 Joseph, NJ Γ '85

The Curtis Family
 †Robert B., PA A '45
 Susan R., OH Γ '80
 Walter B., OH Γ '82
 Alan P., OH Γ '83

The Dage Family
 John C., MI H '86 (uncle)
 David A., MI H '88 (uncle)
 Stephen, MI H '09
 Bryan D., MI H '11

The Daniels Family
 Deborah S., PA A '89
 Joshua L., NC A '20

The Davini Family
 Ted E., CA Y '92
 Marisa E., CA AA '18

The Demitrack Family
 †George, NY H '47
 Thomas, NY E '80

The Dephelps Family
 Michael J., WA B '87
 Bailee R., WA B '16

The Desautels Family
 Linda J., CA A '78
 Daniel M., CA A '07
 Thomas A., CA A '08
 Cory A., CA E '14
 (nephew)

The Dietzman Family
 William B., NM A '71
 Thomas W., TX Δ '08

The Duffett Family
 †Charles W., Jr., PA Γ '48
 William R., PA H '77

The Dunn Family
 Michael T., AL B '86
 Michael R., AL B '17

The Englar-Morihiro Family
 †Kenneth G., NY A '43 (father-in-law)
 Steve Morihiro, CA A '79

The Fishel Family
 †Robert R., CO B '40 (grandfather)
 Jeremy A., CA Θ '05
 Ryan L., LA B '17

The Fojo Family
 †Frank R., NY Γ '53
 Dean F., RI A '81

The Frederick Family
 Donald R., IL Γ '62
 Donald J., IL Z '08
 Jennifer M., IL Z '08 (wife)

The Froechtenigt Family
 Margaret E., OH Θ '83
 Brian J., CO A '18

The Gabriele Family
 Gary A., VT B '73
 Jennifer A. Currey, NY Γ '00
 Anthony D., VT B '76



The Galipeau Family
 David W., RI B '71
 James, SD B '07

The Gibbons Family
 Thomas L., Jr., OHE '59 (grandfather)
 Zachary T., AZ Δ '18

The Haberkorn Family
 John J., WI B '82
 Cody M., WI B '17
 Luke M., WI B '18
 William C., VA A '87 (cousin)

The Haehl Family
 Clayton W., MI Z '69
 Kevin L., IN A '89
 Kristin E., IN A '17

The Harbourt Family
 Cyrus O., LA A '52
 Cyrus D., MO A '77

The Hauser-McCain Family
 Mike R., AL B '59 (grandfather)
 Kaylor A. McCain, AL A '10

The Herder Family
 Charles H., TX Δ '71
 Charles H., MA B '09

The Heronemus Family
 Daryl L., KS Γ '77
 Seth M., KS Γ '16
 Evan J., KS Γ '19

The Horst Family
 Robert L., PA B '58
 Gayle E. Plecha, MI Γ '83
 David A. Plecha, MI Γ '83

The Howald Family
 William C., MT B '84
 (great uncle)
 Kevin M., NY Δ '16

The Huie Family
 Howard, MD B '70
 Kara G., MD B '18

The Josefiak Family
 †Leonard J., CT B '65
 Glenn R., NY N '91
 Lucian W., II, CT B '91
 (nephew)

The Kaiser Family
 Joseph A., Jr., MD B '79
 Ashley L., MA Z '17

The Knoblauch Family
 Randal C., MO A '75
 Ryan C., MO A '04

The Kordas Family (Center Image)
 John J., IL A '86
 Leslie R., IL A '88
 Alexander J., IL A '15
 Paige M., IL A '18

The Kovach Family
 Ronald M., OH Γ '59
 Karl D., OH Γ '85

The Lady Family
 †Edward R., MI Γ '47 (grandfather)
 Kyle A., MI Γ '10



The Lahiff Family (Above Image)
Christopher P., *FL* Γ '93
Christina-Anne K., *FL* Γ '15

The Lahm Family
†Frank J., *MO* Γ '49
Maria J. Yaeger, *MO* B '89

The Latham Family
Philip B., *KY* A '75
Grant F. Boggess, *KY* A '17
(nephew)

The Liske Family
Robert A., *OH* H '66 (grandfather)
Amanda N., *CA* X '17

The Longwell Family
Harry J., Jr., *LA* A '63
Paxton J., *LA* A '86
Madison E., *LA* A '17

The Luebbe Family
David V., *IA* A '88
Matthew J., *IA* A '18

The MacDougall Family
†Donald A., *PA* E '34
†Frederick A., *OH* Γ '49
Donald A., Jr., *OH* Γ '53

The MacGregor-Jackson Family
†Charles A., *WA* B '44 (grandfather)
Robert M. Jackson, IV, *OR* B '06

The Marrone Family
James I., *IN* A '61
James D., *IN* A '87

The McAfee Family
Leo C., *MI* Γ '66
LaRuth C., *MI* Γ '99
Lawrence C., *MI* Γ '06
Vanessa R., *MI* Γ '06
(daughter-in-law)

The Meggie Family
†Peter E., *MA* B '47
Dorothy J., *MA* Δ '81

The Meis Family
Philip J., *IA* A '83
Clifford R., *MT* B '12
Catherine M., *IA* A '16 (niece)

The Midkiff Family
Paul A., *AL* B '83
Travis A., *AL* B '12
Rachel E., *AL* B '15

The Modavis Family
†Fred A., *PA* Γ '50
Robert A., *NY* K '81

The Niccum Family
Thomas M., *MN* A '90 (great uncle)
Darrick L., *MN* A '88 (uncle)
Shannon T., *WI* Γ '86
Kayla C., *NY* Δ '18

The Norris Family
Thomas G., *OK* A '56
Thomas G., Jr., *PA* Γ '79

The Paxson Family
Daniel E., *TN* B '84
Derek E., *NY* Δ '14

The Pinkston Family
Tim E., *AL* A '85
Jessica N., *AL* A '18

The Pudleiner Family
James D., *PA* E '76
Burl K., *PA* B '82
Joshua D., *PA* B '08
(Final Image, pg. 47)

The Quinn Family
Jesse J., Jr., *MS* A '55
Jesse J., III, *MS* A '81

The Reed Family
Henry M., II, *SC* Γ '60
Henry M., III, *SC* Γ '85

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

The Ricks Family
Richard L., *UT* B '68
Ronald D., *UT* B '82
Daniel J., *UT* B '08 (nephew)

The Salaam Family
Khabeer, *DC* A '14
Kistine M. Andall, *DC* A '14
Cesa, *DC* A '18 (brother)

The Schnitzler Family
Paul, *FL* Γ '57
Raymond A., *MA* B '84

The Schreiber Family
†Otmar P., *NJ* Γ '49
Robert P., *MA* B '75

The Shames Family
†Oscar, *PA* Z '48
Raanan J., *PA* Δ '71

The Skorina Family
Frank K., *NY* M '83
Erik H., *NY* M '12

The Slykhouse Family
Roger A., *MI* Γ '50
Roger A., *MI* Γ '82

The Soneda Family
†Shinji, *IN* B '49
†Cynthia T., *CA* Γ '81

The Srail Family
†Raymond C., *OH* A '56
Kenneth B., *OH* Γ '87

The Stephan Family
Elizabeth A., *OH* K '93
Johnathan B., *SC* A '19

The Susdorf-Stucka Family
Robert A. Susdorf, *WI* A '52
Joan E., *IN* A '80
Stephen E. Stucka, *CO* B '75
Natalie A., *CA* A '19

The Sweat Family
†Robert H., Sr., *AL* B '50
Robert H., Jr., *TX* A '72

The Sykes Family
Robert F., *PA* H '47
William C., *AZ* B '82

The Talbot-Pate Family
†Thomas F. Talbot, *MN* A 1918
Thomas F., *AL* A '52 (grandfather)
Matthew C. Pate, *AL* B '16
Sarah G. Pate, *AL* B '18

The Tanemura Family
Ted K., *WA* A '51
Steve K., *WA* A '84

The Teuscher Family
Lynn H., *UT* B '64
Kevin L., *UT* B '90

The Threefoot Family
Philip S., *CA* A '60
Mark E., *NJ* B '95
Matthew J., *NJ* B '01

The Tsakos-Lemberos Family
Steven, *DC* Γ '61 (grandfather)
Irene N. Lemberos, *MD* *B* '16

The Upshaw Family
Wayne S., *KY* *A* '65
Timothy A., *KY* *A* '80
Benjamin J., *KY* *A* '00

The Vaden Family
John T., *NC* *A* '56
Michael T., *NC* *A* '72

The Vanderbilt Family
†Vern C., Jr., *IN* *A* '42
Vern C., III, *IN* *A* '67

The Verschelden Family
Mark G., *KS* Γ '86
Thomas N., *OK* Γ '15
Lucas G., *KS* Γ '17

The Way Family
Kyle J., *CO* *B* '84
Dylan J., *CO* *B* '15

The Weikel Family
Scott J., *NC* *A* '73
Ross R., *NC* *A* '01

The Wilhelmi-Hagedorn Family
James J., *WI* *B* '69
Laura M. Hagedorn, *TX* Δ '94

The Wischhusen Family
Michael I., *NY* *K* '79
Mark A., *SC* *B* '17

The Zinecker Family
Joseph R., *TX* *E* '82 (uncle)
Garrick, *MO* Δ '18

The Zwahlen Family
†Helmut T., *OH* Δ '62 (great uncle)
Zachary J., *OH* Δ '15

Siblings

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

The Agostinelli Brothers
Victor M., Jr., *LA* *A* '88
Christopher M., *LA* *A* '97

The Alvis Twins
Timothy, *NM* *A* '18
Tyler R., *NM* *A* '18

The Barberio Sisters
Sandy D., *NJ* *B* '83
Yvonne L., *NJ* *B* '83

The Behrendt Brothers
Benjamin J., *IA* *B* '12
Zachary J., *IA* *B* '16
Jacob M., *IA* *B* '18
(Image to Right)

The Belchak Siblings
Sarah, *NM* Γ '17
Jacob T., *NM* Γ '18
Caleb M., *NM* Γ '19

The Bieryla Twins
Ben M., *CT* Γ '19
Max J., *CT* Γ '19

The Boedecker Brothers
†Ray F., *PA* *B* '49
†Robert C., *PA* *B* '49

The Boland Brothers
Luke A., *SC* *A* '18
Paul R., *SC* *A* '18

The Bordeman Brothers
†Kenneth M., *NY* Γ '47
†Arthur M., *NY* Γ '48

The Bottlik Brothers
Geza P., *NY* Ξ '60
Ivan P., *NY* Γ '62

The Brown Twins
Colin W., *WA* Δ '17
Alex D., *WA* Δ '17

The Burbules Sisters
Katie M., *PA* *M* '15
Mary B., *PA* *M* '17

The Burgett Siblings
Kimberly D., *TX* Δ '90
Kerry D., *TX* Δ '92

The Chutinuntanakul Siblings
Patarapol, *CA* *E* '15
Thunyathorn, *CA* Ψ '17

The Ciattei Twins
Julia C., *MD* Δ '19
Anna, *MD* Δ '19

The Colarusso Brothers
Vincent E., *NJ* *B* '80
Remo J. Jr., *NJ* *B* '83

The Consoliver Brothers
Christopher A., *WY* *A* '17
Trevor J., *WY* *A* '17



The Diliddo Brothers
†Andrew J., *MI* Δ '52
Bart A., *OH* *E* '54

The Dinkelspiel Brothers
Tyler S., *MO* *E* '14
Jack, *CA* *Z* '17

The Do Siblings
Thao Uyen L., *FL* Γ '16
Hung L., *FL* Γ '17

The Dobbertien Brothers
Ryan P., *NC* Γ '08
Matthew F., *IN* Γ '10

The Donaldson Brothers
David A., *WV* *A* '17
Brian W., *WV* *A* '19

The Eichorn Brothers
David M., *OH* Λ '99
Daniel S., *OH* Λ '99

The Fairchild Twins
Rebeckah J., *KY* *A* '17
Rachelle J., *KY* *A* '19

The Fanourakis Siblings
Marios A., *IL* *Z* '11
Sofia K., *MI* Λ '17

The Florio Sisters
Laurie A., *NJ* Γ '97
Catherine S., *NJ* *B* '99

The Gawlik Siblings
Michal A., *WI* *B* '14
Natalia I., *OH* *A* '18

The Gee Sisters
Shirley J., *CA* Δ '85
Sheila L., *CA* Θ '88

The Gertrudes Brothers
Michael J., *RI B '01*
Mark D., *RI B '03*

The Gillen Brothers
Levi J., *OK B '97*
Lucas J., *KS Γ '01*

The Godrej Brothers
Adi B., *MA B '63*
Nadir B., *MA B '73*

The Gubbins Siblings
Mitchell, *CA A '16*
Elise M., *CT A '18*

The Guidi Azarola Siblings
Carla, *FL A '17*
Gianni, *FL A '17*

The Haider Siblings
Bilal, *NY O '17*
Amna, *NY O '18*

The Hayes Twins
Austin C., *NY Π '18*
Brandon S., *NY Π '18*

The Hinshaw Brothers
Steve M., *TN A '76*
Thornton N., *TN A '81*

The Hollar Sisters
Courtney E., *ID Γ '13*
Katherine A., *ID Γ '17*

The Hoppas Brothers
Jeremy B., *KS Γ '94*
Justin B., *KS Γ '97*

The Horathai Brothers
Jasper, *PA A '77*
Jain, *PA A '84*

The Kandell Sisters
Rebecca M., *CA M '17*
Jennifer S., *CA M '19*

The Katrib Siblings
Kamal, *VA Γ '17*
Kinda, *VA Γ '17*

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

The Keyser Brothers
Brian A., *CO B '89*
Matthew A., *CO B '91*

The Koehn Brothers
Thaddeus E., *RI B '07*
Zachary A., *RI B '10*

The Kolze Brothers
Vernon W., Jr., *MO B '75*
Thomas J., *MO B '78*

The Kuhl Sisters
Sarah A., *IL A '15*
Hannah M., *IL A '18*

The Kuhnke Brothers
Alexander T., *CA N '15*
Andrew C., *CA Y '17*

The LaFollette Siblings
Theresa A., *KS A '05*
Bridget C., center, *KS A '10*
Mark R., *KS A '17*
(Image Below)



The Lai Twins
Alyssa S., *NV B '18*
Alysson S., *NV B '18*

The Lee Brothers
Chi-Chien, *TX Δ '91*
Chi-Ann, *MN A '94*

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

The McBryde Brothers
Lee D., *VA A '81*
Lamar G., *VA A '84*

The Mallinger Brothers
Michael J., *IA A '66*
Thomas J., *IA A '75*

The Martin Siblings
Laura M., *KY A '14*
Doug R., *KY A '18*

The Martinez Brothers
David P., *CA P '18*
Randy M., *CA P '18*

The Messer Brothers
Westin C., *VA Γ '18*
Bryce A., *VA Γ '19*

The Mitzelfeld Brothers
†Marvin W., *MI A '44*
Thomas H., *MI A '47*

The Moir Twins
Logan F., *ND A '17*
Spencer G., *ND A '17*

The Narahara Brothers
Norman T., *TX Δ '78*
Gene M., *TX Δ '81*

The Nelms Siblings
Robert M., *AL A '80*
Kathryn E. Roberts, *AL A '87*

The Nieboer Brothers
Scott R., *MT A '84*
Gary B., *MT A '92*

The Niemann Brothers
Jeffrey A., *NE A '91*
David D., *NE A '97*

The Norouzi Brothers
Aurian, *TX E '18*
Aurash, *TX E '19*

The Paul Twins
Brandon, *CA T '19*
Brian, *CA T '19*

The Palmer Twins
David, *TN E '17*
James E., *TN E '17*

The Patel Twins
Pavan D., *PA Z '19*
Prem D., *PA Z '19*

The Pavlik Siblings
Timothy D., *MA Δ '04*
Elizabeth C., *VT A '07*

The Pellegrini Twins
Sabrina L., *PA B '19*
Sydney A., *PA B '19*

The Plaisance Brothers
Matthew P., *LA Γ '13*
David C., *LA Γ '17*

The Poplawski Brothers
Michael E., *MI Γ '90*
James E., *MI Γ '93*

The Reuter Brothers
James V., *LA B '78*
Bryan C., *LA B '85*

The Ricca Sisters
Joyce E., *IN A '82*
Joanne M., *IN A '86*

The Ridings Siblings
Lynda K. O'Bryan, *TN A '62*
James L., *TN A '64*

The Roswurm Brothers
Jesse E., *OK A '12*
Seth M., *OK A '12*
Jacob S., *OK A '17*
Stephen J., *OK A '17*

The Russon Brothers
Verlin G., *UT B '78*
Virgil K., *UT B '79*

The Sauve Twins
Jessica M., *NY Γ '18*
Danielle R., *NY Γ '18*

The Schwartzbard Brothers
David L., *IL Γ '91*
Gary J., *MI Γ '97*

The Sebok Brothers
David A., *OH K '76*
Thomas J., *OH K '78*
Dale R., *OH K '80*

The Seisdedos Siblings
Carlota, *FL Θ '18*
Gonzalo, *FL Θ '18*

The Sellaro Sisters
Erica A., *WV A '10*
Rachel M., *WV A '12*

The Sha Twins
Divya R., *FL B '17*
Somya R., *FL B '17*

The Shenoy Brothers
Nikhil R., *NJ B '16*
Vineet R., *NJ B '18*

The Sprow Twins
Brian T., *MS A '18*
Samuel M., *MS A '18*

The Spychalski Siblings
Madison T., *OH Γ '14*
Griffin B., *OH Γ '18*

The Stefanovski Siblings
Steven N., *MI I '18*
Amy N., *MI I '19*

The Stratmoen Brothers
Todd N., *IA A '88*
Shane R., *IA A '91*

The Trabert Sisters
Susan L., *OH K '92*
Pattie M., *OH K '99*

The Tweedie Twins
Robert H., *CT B '83*
William D., *CT B '83*

The Woish Twins
Logan M., *CO A '16*
Mason M., *CO A '16*

The Wojeski Twins
Brooke, *MA E '19*
Chelsea, *MA E '19*

The Wurst Twins
Jonathan D., *AL A '17*
Jessica L., *AL A '18*

The Zamin Siblings
Syed A., *LA A '11*
Abbas S., *LA A '16*
Saiyada Z., *LA A '18*
Syed A., *LA A '20*

The Ziegler Twins
Hannah, *KY B '20*
Sarah M., *KY B '20*

The Zumwalt Brothers
Joe P., *TX Δ '50*
Robert E., *TX Δ '55*



(left to right) James D. Pudleiner, *PA E '76*, and son Joshua D. Pudleiner, *PA B '08*, at Lehigh University.

CHANGE OF ADDRESS ✎ THE BENT

Name _____ Chapter _____ Class _____

New Address _____ Effective date of new address _____

New City _____ State _____ Zip _____ Email _____

Email information to: member.update@tbp.org

Or complete this form and mail to: *Tau Beta Pi / P.O. Box 2697 / Knoxville, TN 37901-2697*



ALUMNI NOTES

California Gamma

Frank E. Scherkenbach, '86, has been named by the *National Law Journal* as a “litigation trailblazer” for the “remarkable successes” as one of the top patent litigators in the country. Scherkenbach is a principal with Fish & Richardson (California) specializing in complex high technology litigation, with particular expertise in computer software, semiconductors, and medical devices. His bachelor’s degree is in mechanical engineering.



Delaware Alpha

Charles T. Johnson-Bey, Ph.D., '93, has received the 2018 Black Engineer of the Year Award for career achievement in industry. He is director, engineering and technology, of the cyber center for excellence at Lockheed Martin. He joined the company in 2003.



Georgia Alpha

Gabriel A. Rincón-Mora, Ph.D., '94, is an electrical engineering professor at Georgia Tech and has been elected a fellow of the U.S. National Academy of Inventors. His research has been on the development of microchips and microsystems that draw and condition power from tiny batteries, fuel cells, and generators. These harness ambient energy from motion, light, temperature, and radiation to supply mobile, portable, and self-sustaining devices.



Maryland Alpha

Douglas M. Blough, Ph.D., '84, has been appointed as the associate chair for faculty development at the Georgia Tech school of electrical and computer engineering. He joined Tech’s ECE faculty as a full professor in 1999 and also holds a courtesy appointment in the School of Computer Science. Before that, he was an assistant professor and associate professor at the University of California, Irvine, for 11 years. Blough’s research is in the areas of wireless networks and dependability and security of distributed systems.



Michigan Alpha

Elizabeth A. Buschlen Unger, '61, had a building named after her at Kansas State University, where she was associate director of the computing center, on her retirement after 48 years’ service. Earlier posts included instructor of mathematics, professor of computer science, associate dean of the graduate school, vice provost of academic services and technology, and dean of continuing education.



Michigan Eta

Jeffrey M. Roman, P.E., '01, has been appointed as a partner at international architecture and design firm Little. He is the firm’s national director of engineering, leading mechanical, electrical, and structural engineering teams across the country. Roman



has an M.B.A. from the University of Florida.

Michigan Theta

Eric L. Burnett, '94, received the 2018 Black Engineer of the Year Edward Welburn Legacy Award made by *U.S. Black Engineer & Information Technology* magazine. He is the automatic transmission chief engineer at FCA US LLC (Fiat Chrysler), where he has worked for more than 23 years. The award recognizes “high merit, impact on people, and value to the community and society.”



Missouri Gamma

Philip C. Munro, Ph.D., '60, retired his position at Youngstown State University’s department of electrical and computer engineering after being on the faculty for 43 years. He went there after earning an M.S. in electrical engineering at Washington University in St. Louis and a Ph.D. at Purdue.



New Hampshire Alpha

Derek T. Long, P.E., '12, has been promoted to senior project engineer with Sanborn, Head & Associates Inc. Long, of Billerica, MA, joined the technical consulting firm, serving private and public sector clients in the industrial, solid waste, development, and energy markets, in 2014.



North Carolina Epsilon

Randall A. Harris, P.E., '86, has joined Gannett Fleming, Inc., as the Virginia area transportation manager. Harris has 30 years of professional experience and is responsible for managing large-scale client projects across the Commonwealth with a focus on roadway, bridge, and toll plaza planning and design. He has extensive experience of leading projects for the Virginia Department of Transportation and municipalities.



Oklahoma Alpha

Bryan A. Norman, Ph.D., '86, is professor and department chair of industrial, manufacturing, and systems engineering at Texas Tech University. He joined Tech last year after 21 years of teaching at the University



of Pittsburgh. Norman's primary research interests include logistics and the application of operations research models to production and logistics systems. He works with both theoretical developments and issues concerning the practical application of operations research models.

Oregon Gamma

Nathan C. Crater, P.E., '02, has been promoted to city engineer for the city of Astoria, OR. He had been assistant city engineer for the past six years. Crater joined the city of public works department in 2011. He has led numerous infrastructure and capital improvement projects and assisted with several bridge replacements and CSO projects. Prior to working with the city, Crater was a project engineer at HLB Otak in Gearhart, OR.

Tennessee Alpha

David E. Womble, '82, has become artificial intelligence program director at the Department of Energy's Oak Ridge National Laboratory in Tennessee. He previously spent 30 years at Sandia National Labora-



tories, where he served as a senior manager and program deputy for advanced simulation and computing (ASC). The ASC program is responsible for developing and deploying modeling and simulation capabilities, including hardware and software, in support of Sandia's nuclear weapons program.

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!

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

SEND us your best captions for this snapshot from Tau Beta Pi's photo archives. If yours is judged one of the best, we will send you a TBPI t-shirt of your choice!

The photo at right, which appeared in the Winter 1974 issue of *The Bent*, shows delegates at the 1973 Convention queued up to register for their rooms at the Flagler Inn in Gainesville, Florida. Kindly submit your entries to pat@tbp.org or mail them to HQ by Monday, May 7, 2018.

The Winter Caption Contest photo, far right, appeared in the Winter 1987 issue of *The Bent* and shows members of the Maryland Beta Chapter "keeping on top of things" as hosts of the 1986 Convention in College Park. The judges were overwhelmed by 44 captions submitted by 31 Tau Bates. There was a three-way tie



for first place and the following will receive a t-shirt for their clever captions:

"Well . . . that would be how many engineers it takes to change a light bulb!"—Richard R. Roll, *IN B '81*

"Women climbing the corporal ladder."—Roger J. Bourdelais, *MA Z '60*, and

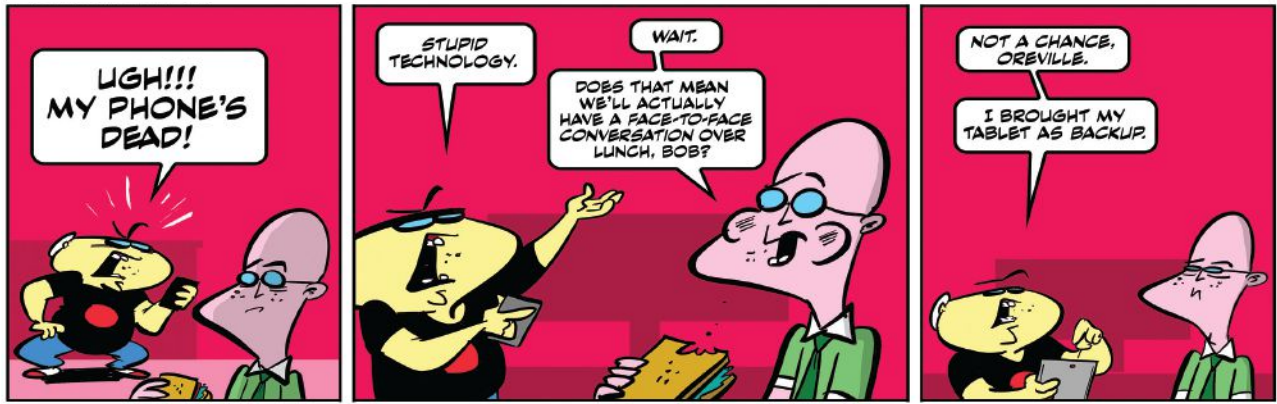
"Laboratory exercise for Structural Engineering course 101: Human Centered Design."—Mackenzie L. Carlson, *NH B '17*.

The first runner up caption is: "Thanks guys! With help from a few more of you, I'll be able to reach that glass ceiling."—Sarah E. Jordan, *OH I '99*.

Congratulations to our winners and thanks again to all of you who have participated in the contests and for proving that engineers do have a sense of humor!



The PC Weenies



WWW.PCWEENIES.COM

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

Advertiser Index

ADVERTISER	WEB ADDRESS	PAGE NO.
Lincoln Labs	www.ll.mit.edu/employment	3

Member Benefits

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

- **GEICO**—additional discounts on automobile insurance.
- **LinkedIn**—join 26,000 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.
- **TBP4Life**—a private community mobile app and web platform for mentoring & networking opportunities [tbp.vineup.com/].
- **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 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 4 TO 6 WEEKS FOR DELIVERY OF JEWELRY & CERTIFICATES & 10 WEEKS FOR DELIVERY OF CUSTOM-MADE RINGS.

TAU BATES...

Show your Commitment to Excellence.

10k Gold \$168/169



Gold finish \$29/30

OFFICIAL ENGRAVED BENT CHARM/PIN


10k Gold \$94/95



Gold finish \$27/28

SMALL BENT CHARM/PIN

10k Gold \$95



Gold finish \$25

TIE TACK/ RECOGNITION BUTTON

\$607



SIGNET RING 10K YELLOW GOLD

\$551



SEAL RING 10K YELLOW or WHITE GOLD

\$9.50



BENT FLAT CASTING

\$16.50



BRONZE PAPER-WEIGHT CASTING

\$47



STERLING SILVER TIE TACK

\$29



GRADUATION STOLE

\$16




HONOR CORD

3 for \$5



INK PENS BLUE/BLACK

\$99



CROSS PEN

3 for \$30 and 4 for \$37



CERAMIC MUGS (\$13 per mug)

\$13



MEMBER CERTIFICATE

\$5



USB CAR CHARGER W/ TBI IMPRINT

\$41



\$50 add \$2

GOLF SHIRTS (GREG NORMAN)

\$25



INSIGNIA LICENSE PLATE FRAMES

\$16



STAINLESS STEEL TRAVEL MUG

\$16



ENGINEER SHIRT 12 COLORS (XXL-\$18)

\$28



HOODIES (2XL-\$33) 14 COLORS

\$15

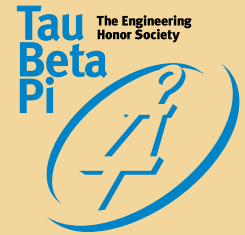


STRUCTURED CAP

Order Your TAU BETA PI
Official Insignia

AT WWW.TBP.ORG (PAYPAL) OR CALL (865-546-4578) FOR CREDIT CARD ORDER.

Teamwork Can Take You Out of This World...



ABOARD SPACE SHUTTLE COLUMBIA, STS-109 Mission Commander Capt. Scott D. Altman, USN, *IL A '81*, helps Mission Specialist Michael J. Massimino, Ph.D., *NY A '84*, with suit-donning prior to Mike's spacewalk during the Hubble Space Telescope's fourth servicing mission. Astronauts Massimino and James H. Newman went on to install the new Advanced Camera for Surveys (ACS) on Hubble. Some 70 Tau Bates have worked together as astronauts since the inception of the space program, and many more have served in the space agency and contractor teams that trained the astronauts, built their unique tools, put them into orbit, kept them there, and brought them safely home. (Photo: NASA)

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

Learn to share your ideas and create tomorrow.

TBPi Engineering Futures ...make the difference

