

Spring 2017

Spring 2017

Echoes Staff

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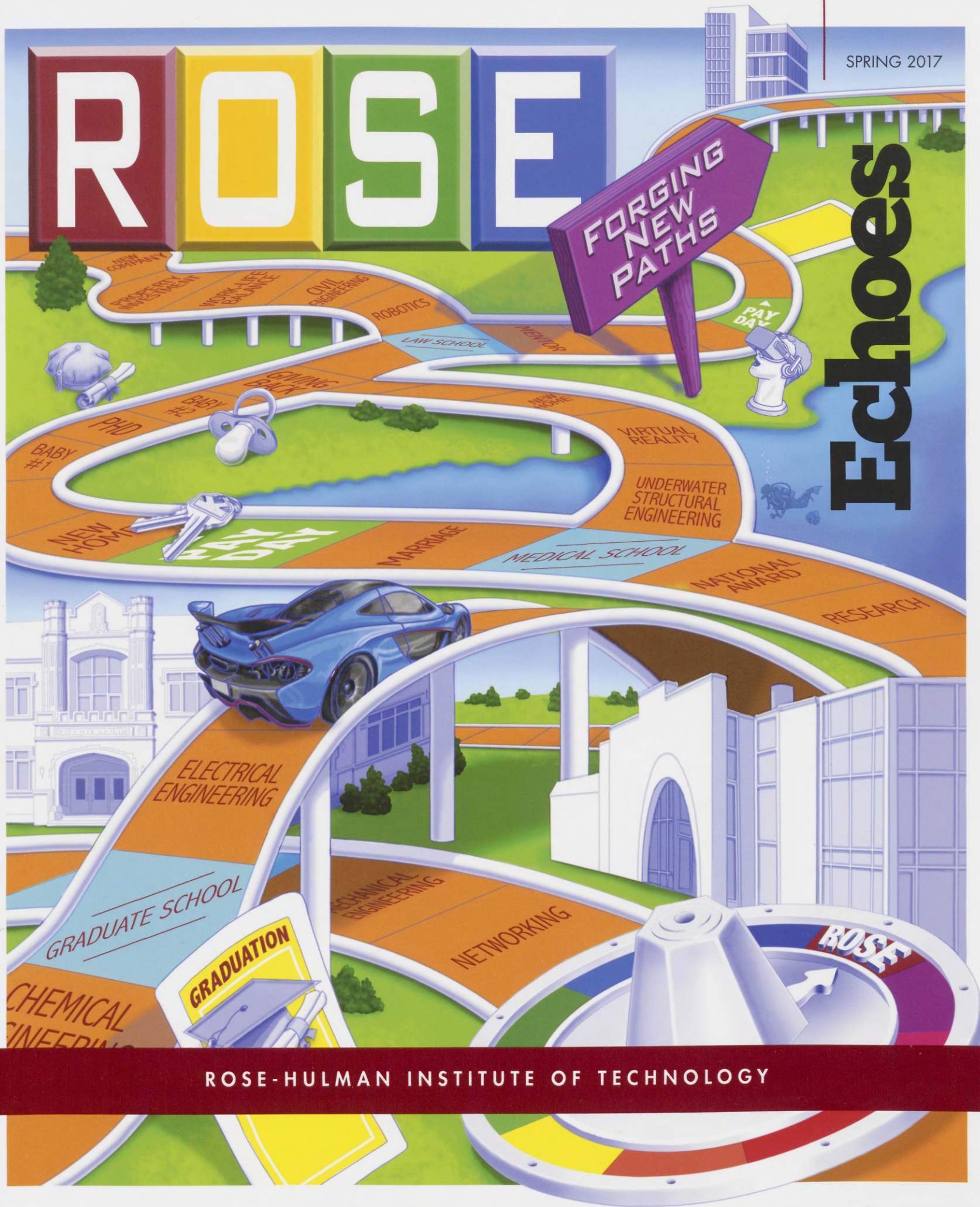
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SPRING 2017

ROSE

FORGING
NEW
PATHS

Echoes



ROSE-HULMAN INSTITUTE OF TECHNOLOGY

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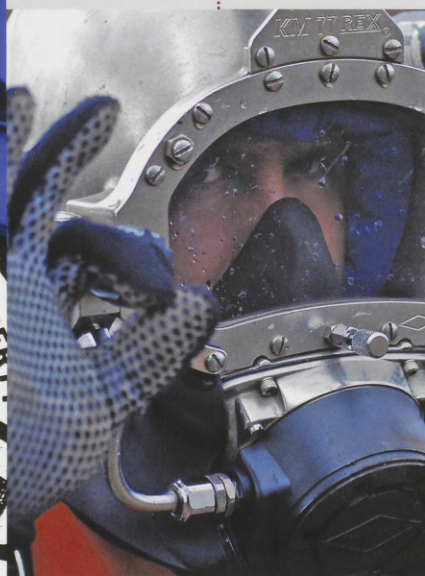
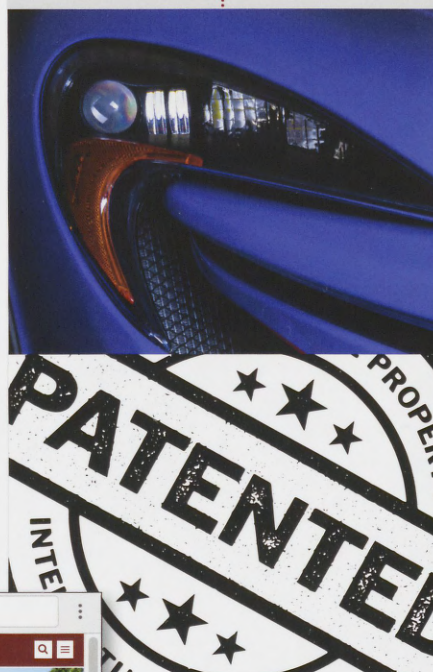
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ROSE-HULMAN
INSTITUTE OF TECHNOLOGY

LET YOUR IDEAS COME ALIVE

RIGHT NOW @ ROSE-HULMAN

RIGHT NOW @RH IN THE FIELD ON CAMPUS NEWS FROM THE LAB

ALUMNI +

Supporting Our Mission

Every gift to Rose-Hulman is a seed that sprouts dramatic results in many directions. With your help, future alumni will continue the proud legacy of Rose-Hulman for decades to come.

ALUMNI +

Stay up-to-date with news, find out about upcoming

FROM THE LAB

RIGHT NOW @RH

ROSE-HULMAN.EDU HAS FRESH LOOK, IS MOBILE FRIENDLY

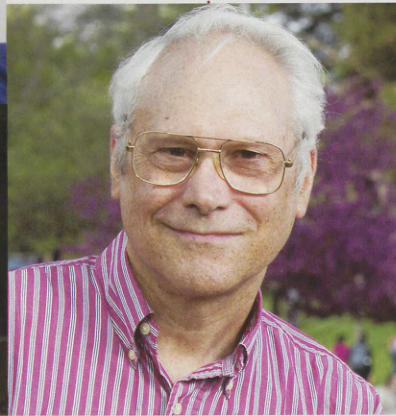
June 1 marked the launch of Rose-Hulman's upgraded rose-hulman.edu website. With responsive and intuitive features, the site structure and design enhance the institute's ability to showcase activities and achievements for a worldwide audience. The new website also is mobile responsive, and has fluid navigation and a vigorous search function. We hope you enjoy the fresh look, and find new opportunities to engage with your alma mater.

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PUBLICATION CREDITS

Vice President for Communications & Marketing: Mary Wade Atteberry

Vice President for Institutional Advancement: Steven P. Brady

Alumni Association President: Dedric A. Day, Class of 2003

Office of Alumni Relations: Ben Paolillo, Executive Director; Lauren L. Jackson, Associate Director; Emma Campbell, Coordinator

Office of Communications and Marketing: Bryan Cantwell, Photographer; Hyung-Jung Chang, Graphic Designer; Arthur Foulkes, Writer; Shaun Hussey, Social Media & Email Marketing Manager; Hayley Kuepers, Internal Communications Manager; Dale Long, Executive Editor and Director of Media Relations; Stacey Muncie, Senior Storyteller & Editor; Traci Nelson-Albertson, Creative Director; Paul Shepherd, Senior Director of Communications & Marketing; Alia Shuck, Senior Project Manager; Steve Voltmer, Web Manager; Majel Wells, Coordinator

Executive Editor: Dale Long

Contact E-mail: Dale.Long@rose-hulman.edu

Contributing Writers: Herb Bailey, Scott Hall, Steve Koelble, Susan Hoskins Miller, John Thomas and Valerie Wahlstrom

Photographers: American Society of Quality, Baylor College of Medicine, Bryan Cantwell, James Garber, Mark Hardyman, Indiana Michigan Power, Doug Kapustin, Rachel Keyes, Hoyoung Lee, Osburn Consulting, Snyder Morgan LLP, Chris Somadevilla/Getty Images, Shawn Spence/Spence Photography, SparkFun Electronics, ThermalTech Engineering and Steve Vorderman

Cover Illustration: Becky Hochhalter

Designer: Chris Denison

Class Notes/Alumni News Contact:

Send alumni news and address updates to alumni@rose-hulman.edu

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**ROSE-HULMAN
INSTITUTE OF TECHNOLOGY**

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It is the policy of Rose-Hulman Institute of Technology to admit students on the basis of their academic ability. Rose-Hulman Institute of Technology does not discriminate based on race, religion, color, national origin, sex, age, citizenship status, disability, veteran status, or sexual orientation.

When I talk to prospective parents and students about Rose-Hulman, I'm dismayed when their first questions are about jobs and salaries after graduation. Not that those aren't relevant questions. But the truth is, all engineering schools in this day and age should be placing students in great jobs with strong starting salaries.

What I would rather the conversation be about are all of the intangible elements that make a Rose-Hulman education so exceptionally valuable.

As the cover of this issue of Echoes illustrates, our graduates move through life well equipped to maneuver through the twists and turns they encounter on life's journey, navigating past



BY **JIM CONWELL**,
PRESIDENT
conwell@rose-hulman.edu

roadblocks, changing career direction, if desired, and even blazing new paths through invention and research. The foundation has been

laid for you to follow whatever route you choose.

As each of you discovered, Rose-Hulman students get prepared for life—not just for a job—through rigorous courses that don't simply build knowledge, but also teach the rewards that come from hard work. Those lessons are broadened through faculty mentoring and guidance that encourage students to look for creative approaches to problems, take intellectual risks, and pursue unconventional lines of inquiry.

The rich variety of curricular and co-curricular experiences offered at Rose-Hulman, including service projects and study abroad opportunities, instill time management and discipline as they provide important professional growth and enrichment.

And then there is the incredible value of networking. Between the relationships faculty members have developed with industry professionals and the ongoing involvement of our alumni, coupled with career development services that are available beginning in the first year, students have many opportunities to grow their skills and connections over the course of four years.

It is difficult to explain these qualities to prospective students and parents in just a few minutes. That's especially true of the immense value added by alumni who share their time and expertise speaking to classes, advising competition teams and clubs, leading or assisting on Engineers Without Borders projects, and recruiting students for internships and jobs—to name just a few of the substantive, personal interactions that don't happen elsewhere to the degree they occur here.

The opportunity to network with professionals is, of course, valuable when it comes to securing a position after graduation, but significant personal interactions along the way help students make critical connections between their education at Rose-Hulman and its practical application. Working alongside professionals further helps students learn appropriate professional behavior, etiquette and dress. Internships, co-op experiences, volunteer service, competitions and senior projects are just a few of the myriad opportunities to absorb important interpersonal and leadership skills that aren't taught in a classroom.

You might call all of these factors I've just enumerated Rose-Hulman's "olio of opportunity." Whatever you call it, it is a very special mix that helps Rose-Hulman students become successful alumni, even when they steer away from their chosen path in engineering, science or math to pursue a new professional direction.

Whatever road you are traveling today and whatever detour you take in the future, I hope each of you continues to find great pleasure and reward along the way, and that from time to time you return to Rose-Hulman to say hello and connect with this special place where your journey began.

Overheard on Social Media: A SAMPLING OF COMMENTS FROM OUR SOCIAL MEDIA FEEDS.

AbdulrahmanJamalalla @arabknightabdul
Feb 26
@RoseHulman Go Rose! @ Indianapolis' airport



Nick Birch @BirchStartups
Apr 22
Dr. Berry, @RoseHulman professor speaking about science and engineering #marchforscience



Ashvin Lad @ashvinlad
Mar 19
Ahhh, the awesomeness of, @RoseHulman @ RoseHulmanalums @kramerica @ mattindner @nasickler @rowdiesdotcom



KAILEE @kaileeharrison
Dec 13, 2016
Got accepted to Rose Hulman!! This is a huge honor! #RoseHulman #rosehulmaninstituteoftechnology #acceptanceletter #glasses #me #rosehulmangetsme #awesome



Michael Riddle @mridle2013
Apr 30 • Rose-Hulman Institute of Technology
What 4 years of engineering school looks like. #RoseHulman



Coming soon to the Student Union-WE WISH!

Rose-Hulman doesn't take itself too seriously. That was apparent on April 1 when the Office of Communications & Marketing distributed a tongue-in-cheek April Fool's video that showcased fantastic (but totally fabricated) features of the expanded and renovated Hulman Memorial Student Union project. (The renovation part is true.)

A big thanks to Rose-Hulman Ventures' Brian Daugherty (BSEE, 1993; MSEM, 1999) for the techno-babble and Barry Davignon (BSME, 1990; MSME, 1993) for the 3D animation.

See the video at <http://bit.ly/2r2gruB> and supplementary outtake video at <http://bit.ly/2pGMC5v>.



We welcome getting feedback on stories in each issue.

Send Elephant Ears items to: dale.long@rose-hulman.edu or Dale Long, executive editor-Echoes, CM 14, Rose-Hulman Institute of Technology, 5500 Wabash Ave., Terre Haute, IN 47803.



STAY CONNECTED

with Rose-Hulman through our website rose-hulman.edu. Also become a fan of Rose-Hulman's Facebook page or follow us on Twitter and Instagram @rosehulman.

Branam Innov Cntr @RoseHulmanBIC
2 days ago

Our @RoseHulmanHPVT team had a fantastic time at #pedalprix - thanks for the coverage! @RoseHulman #innovation

Brittany Evins @BrittanyEvins
A successful day of racing through the main business strip of Loxton, in the states Riverland, yesterday #Raceday #pedalprix @ABCRiverland



Turbocharged TESTIMONIAL



HIGH-PROFILE GIFT CELEBRATES, ENCOURAGES TEACHING EXCELLENCE

Donors have many vehicles for supporting Rose-Hulman, but none may be as unusual as the McLaren P1 "hypercar" alumnus G. Felda Hardymon had molded to his specifications in order to drive excellence in teaching while bringing global attention to his alma mater.

The 2015 version of McLaren Automotive's pioneering model, introduced at the Paris Motor Show in 2012, is blessed with more than \$140,000 worth of specialized components and fine details—including its one-of-a-kind, metallic, cobalt blue color, a 3.8-liter twin-turbo V-8 engine, an electric motor power pack, and even a passenger-side vanity mirror with the reassuring inscription "You look Beautiful" for self-critical viewers.

All of those custom-designed features, approved by McLaren head designer Frank Stephenson, helped create quite a buzz in the classic car world. The car also attracted a record \$2,392,500 price at a highly competitive public auction (operated by Gooding & Company earlier this spring at Amelia Island, Fla.). After the 10-percent buyer's premium, more than \$2.1 million remained to endow the Alfred R. Schmidt Chair for Excellence in Teaching at Rose-Hulman. Also, the car's auction and donation brought worldwide attention to the institute.

STORY BY
DALE LONG
PHOTOS
BY MARK
HARDYMON



McLaren P1 images copyright and courtesy of Gooding & Company. Photos by Mike Maez



Felda Hardymon, a 1969 mathematics alumnus, stands beside the McLaren P1 that he put up for auction by Gooding & Company earlier this spring to establish an endowed faculty chair.

"This is my most worthwhile and enjoyable venture ever," says Hardymon, a partner in Bessemer Venture Partner's Cambridge, Mass. office, and a former endowed professor and researcher at the Harvard Business School. His successful investments have included American Superconductor, African telecommunications provider Celtel, the MCAD leader Parametric Technology, and retailers Sports Authority and Staples.

"I could have written a big check to support the college, but that would have been too easy and not as personally enjoyable," says the 1969 mathematics alumnus. "My inspiration was to put Rose-Hulman in the world's spotlight and make others aware of its special place in undergraduate education.

"Rose-Hulman has always had great teaching faculty members who care about their students, care about the material being taught in the classroom, and transfer their academic body of knowledge to others. That's a fact that I appreciated even more upon attending graduate school [at Duke University] and becoming a college professor at Duke and Harvard.

Affectionately named The Professor, the one-of-a-kind vehicle attracted attention from sports car enthusiasts throughout the world.

"I found that those two institutions, as esteemed as they might be, couldn't hold a candle to the learning environment at Rose-Hulman."

Hardymon's special version of the McLaren P1, affectionately named The Professor, vaults from zero to 62 mph in 2.8 seconds and can reach a top speed of 249 mph (without the electric limiter). An active hydropneumatic suspension and Pirelli P-Zero Corsa tires (made specifically for the P1) heighten handling, as do the Akebono carbon-ceramic brakes that bring the car to a complete stop from a speed of 190 mph in 6.2 seconds.

"It was a fun drive and brought lots of attention when I took it for a spin to get milk from the corner market," says Hardymon, chuckling at the memory.

Rose-Hulman President Jim Conwell notes that the P1 hypercar is a fitting representative of the institute. "Felda Hardymon modified it to be an exact fit for him, and that is exactly the approach we take to education," he remarks. "We modify for the individual student. The impact of this gift on teaching and learning cannot be overstated."

Hardymon fondly recalls seeing Indianapolis 500 racers in the basement of the institute's Moench Hall as he was taking demanding classes with classmates who weren't afraid to roll up their shirt sleeves and tinker with mechanical, electrical and chemical projects.

"Rose-Hulman has always been this hands-on kind of place, a cross between a powerful, academic engineering education and the practical," he says.

(CONTINUED ON NEXT PAGE)



DRIVING TEACHING EXCELLENCE



The specially designed McLaren P1 has many distinctive features that increased bids to a record \$2.3 million at auction.

(CONTINUED FROM PREVIOUS PAGE)

"There's a charm about the place that's so special, and I'm glad things haven't changed in the nearly 50 years since I graduated."

The Alfred R. Schmidt Chair for Excellence in Teaching, honoring one of the institute's legendary faculty members (see profile at right), will support creation of transformative learning experiences in the classroom and provide opportunities for national engagement with other exceptional scholars.

"We have always invested in teaching," says Anne Houtman, vice president for academic affairs, "and this generous gift reinforces that commitment while enabling us to continue attracting and retaining world-class faculty. I can't think of a better way to honor Professor Schmidt's legacy."

Steve Brady, vice president for institutional advancement, notes that the donation from the auction is one of the largest in institute history made toward establishing a faculty-endowed chair. ■

Good News Travels Fast

News of Rose-Hulman's hypercar ricocheted around the world. Media coverage surrounding the auction reached an audience of more than 85 million through such publications and web resources as Forbes.com, U.S. News & World Report and MSN.com, along with several classic car and specialty automotive online publications. The international outreach included Yahoo Sports-Canada, Motorlegend (France), Read House Media (China), Luxury Feed (Great Britain), Tykriye Gazetesi (Turkey) and Unimedia (Moldova).

As for social media, there were 230 related posts about the auction and donation, with a primary potential reach of 3.5 million, as well as 15,500 engagements with a potential reach of 1.4 million. Automotive Magazine and McLaren Auto provided the largest social media outlets. Television and radio coverage spread Rose-Hulman's name in San Diego, Atlanta, Chicago and Indianapolis.



Alfred Schmidt
Left
Teaching
Legacy

Alfred R. Schmidt was one of Rose-Hulman's most loyal alumni and longest-serving professors, an inspirational mathematics professor for 46 years until his retirement in 1995. He helped launch the institute's successful Operation Catapult, a program that has brought rising high-school seniors to campus each summer to learn about science and engineering.

"The Mathematics Department in the 1960s stood tall with such marvelous educators and people as Al Schmidt, Ted Palmer, Herb Bailey and C.C. Rogers," says philanthropist G. Felda Hardymon, a 1969 mathematics alumnus. "Every classroom was an excellent learning environment."

Schmidt, a 1949 mechanical engineering graduate, also was the organist for the institute's Commencement for several years and accompanist for the student Rose Chorus. He donated a piano and organs to Rose-Hulman's Hatfield Hall Theater and White Chapel. Schmidt died in 2007.

ENDOWED CHAIRS

DISTINGUISHED FACULTY CHAIRS: FIVE AWARD-WINNING PROFESSORS

Herman A. Moench
Distinguished
Professor



RICHARD DITTEON

Physics & Optical Engineering

Moench was a 1929 electrical engineering alumnus who returned to become a legendary electrical engineering professor and administrator of the institute. Ditteon (PH, 1974) took a similar path and has been a faculty member for 31 years. He also is director of the Oakley Observatory and has earned the Board of Trustees' Outstanding Scholar Award for research.

Lawrence J. Giacoletto
Faculty Chair



EDWARD WHEELER

Electrical & Computer Engineering

Giacoletto, a 1938 electrical engineering graduate, created the groundbreaking hybrid-pi transistor model, and played a key role in the development of the color television and other modern-day innovations. Wheeler (EE, 1982) an Outstanding Scholar Award recipient, has helped establish labs for the study of electromagnetics, micro-electro-mechanical systems, and nanotechnology.

**Chair for Innovation in
Science, Engineering
& Mathematics**



YOSI SHIBBERU

Mathematics

Established by trustee Carl Cook (HD, 2015), this endowed chair recognizes faculty for outstanding contributions to their professions. Shibberu was featured in the Princeton Review's Best 300 Professors book and earned the Dean's Outstanding Teacher Award. He spent the 2014-15 school year as a Fulbright Scholar at Jimma University in Ethiopia, his native land.

Samuel F. Hulbert
Faculty Chair



RENEE ROGGE

Biology & Biomedical Engineering

Besides being Rose-Hulman's 11th president (1976 to 2004), Hulbert was an inspirational educator and biomedical pioneer. Rogge earned the Board of Trustees' Outstanding Scholar Award in 2014; has been the technical director for the institute's Orthopedic Biomechanics Laboratory; and is co-chair of a biennial national capstone engineering design conference.

Roland Hutchins
Faculty Chair in
Civil Engineering



JAMES HANSON

Civil and Environmental
Engineering

Hutchins taught civil engineering on campus from 1924 to 1956. Hanson has received the Dean's Outstanding Teacher Award, is a fellow of the American Concrete Institute, and has been honored by the American Society for Engineering Education and ACI for excellence and innovation in teaching.

Distinguished faculty professorships allow Rose-Hulman to honor its most gifted faculty members, attract the best and brightest professors in their career fields and, in some cases, provide annual stipends in support of research opportunities with undergraduate and graduate students, teaching and professional development. For more information about endowed faculty chairs, contact Steve Brady, vice president for institutional advancement, at brady1@rose-hulman.edu or 812-877-8784.

Entrepreneurs & Attorneys Work Together to Protect the Creative Process

STORY BY
DALE
LONG

What comes first, the idea that sparks an entrepreneurial enterprise or the need for intellectual property legal advice to protect innovative products associated with that business?

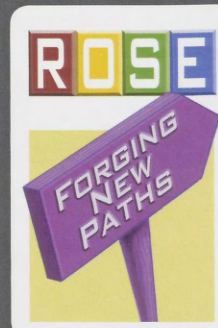
The inventor may desire to keep the device under a veil of secrecy while a business model is developed and financial investment is solicited. However, the intellectual property attorney wishes to be part of every stage in the development process, from idea incubation to the product's first sale.

"The entrepreneur and some type of legal counsel need to build a partnership early in the process," advises intellectual property lawyer James A. Coles, of counsel with Densborn Blachly law firm in Indianapolis. "The earlier they're talking, the better it is for both sides. This is a partnership that's going to be beneficial to both parties: the inventor gets the necessary protection and credit for the original idea; the attorney gets the satisfaction of using skills and experiences to protect a company's assets. Along the way, both sides have a stake in each other's successes."

Inventors, entrepreneurs and business executives often believe they need patent protection for an idea. That's not always the case, and Coles has identified the following primary reasons for inventors and companies to seek intellectual property protection:

- To establish and maintain exclusivity in the relevant market for a company's product or service
- To license to others for the purpose of generating revenue
- To establish a reputation for being innovative
- To establish an intellectual property portfolio for defensive purposes
- To create company assets
- To use for marketing purposes
- To deter (but not necessarily prevent) others from developing competing products or services

Coles, a 1969 electrical engineering alumnus, notes that each of these reasons involves a different strategy for selecting the most worthwhile method of protection, and for determining how the intellectual property will be used and managed.



James Coles (EE, 1969) has been a patent attorney for more than 41 years. He also has expertise in intellectual property, trademark, copyright and trade secret matters.



After spending several years practicing law in Dallas, Gerald Roberts recently decided to return to Indiana and has joined with Jacque Wilson, a 1996 alumnus and intellectual property lawyer, to form Wilson Roberts LLP.

When in Doubt, Seek Counsel

For more than 10 years Gerald W. Roberts, a 1985 electrical engineering graduate, has focused his practice in Dallas, Texas, on intellectual property protection and civil litigation, as well as general business disputes, with clients ranging from individual citizens to a wide range of business entities operating in diverse industries and markets. Before moving to Texas he even worked on a case with other Indiana lawyers involving musician Michael Jackson—a legal dispute between a northwest Indiana singing group, the Gary, Ind.-based The Jackson Five and a major record label.

“Every case is different, but that one was pretty intense,” he says, admitting to being a fan of the King of Pop. Still, he notes, “while I might have admired Michael Jackson and his music, shaking his hand and exchanging pleasantries before deposing him, my job was to get information out of him to help our client.”

Roberts’ motto in regard to IP protection is “Hire me soon, hire me often,” explaining. “If there’s something of value being discovered or uncovered, it might come under legal question. Then, as counsel, I should be involved.”

“If there’s something of value being discovered or uncovered, it might come under legal question.”

— GERALD ROBERTS (EE, 1985)

Strategy for Growth Plays a Role

Jonathon Fruchte has been on both sides of the IP debate. First, he was director of investment operations and manager of venture analysis for Elevate Ventures. Now, he has teamed with four other Rose-Hulman alumni at Expected Behavior, another Indianapolis-based company that’s creating application performance monitoring solutions and web analytics platforms.

“The importance of protecting your intellectual property depends on what type of business you’re building,” says Fruchte, who earned a bachelor’s degree in mechanical engineering in 2005 before adding a master’s degree in engineering management a year later. “If you’re a biotech firm looking to be acquired, then intellectual property protection is something you should think about from day one. If you’re a software firm looking for more brand awareness, there can be value in forgoing protection and open-sourcing your intellectual property. Regardless of your overall strategy, learn to communicate the basic concepts of your business and technology without a non-disclosure agreement.”

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INVENTORS AND PROTECTORS

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Letting the Horse Out of the Barn

Public disclosure of an invention, no matter how small or careless, may be the biggest mistake made by someone seeking patent protection, according to Rob Hodge, a supervisory patent examiner for innovations in transportation, construction, agriculture, electronic commerce and national security for the U.S. Patent and Trademark Office in Washington, D.C. He reports that the law is very clear: any public disclosure of an invention more than 12 months prior to filing a patent application can be used to deny a patent application.

Another critical mistake frequently made by inventors concerns provisional patent applications. This filing provides a starting date for people to

investigate market potential, find investors, and to search public documents and sources to see if the invention already exists or has been previously disclosed by someone else. Also, the creator can evaluate the need to hire a patent attorney or agent, before filing a non-provisional application (within 12 months of the provisional application's filing date). However, Hodge points out many people never go on to file a non-provisional application and, therefore, lose the potential of receiving a patent.

To educate people on these issues, Hodge started the USPTO's Inventor Info Chat webinar series, a free service to help inventors understand the complexities of the patent review process, and is helping organize an Independent Inventor Conference Aug. 11-12 in Alexandria, Va.

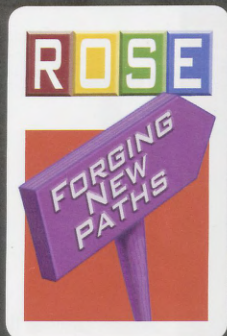
"One of the biggest challenges the USPTO faces is the ever-changing landscape of the laws and court decisions," says the chemical engineering alumnus from the Class of 2000. "When changes occur, they cannot be fully implemented across the entire patent office overnight. It is challenging to ensure that proper training and guidance is provided to all of the patent examiners at the USPTO to ensure consistency." ■

"Public disclosure of an invention, no matter how small or careless, may be the biggest mistake made by someone seeking patent protection."

- ROB HODGE (CHE, 2000)

As a supervisory patent examiner, Rob Hodge helps examiners at the U.S. Patent and Trademark Office stay on top of court decisions affecting patent laws.





PATENT OFFENSES

STORY BY
DALE
LONG
PHOTOS
BY BRYAN
CANTWELL

The word “adjacent” may have three distinct meanings in the Webster dictionary, but those definitions take on entirely new dimensions in the contentious legal world involving intellectual property infringement.

As in: Was the location of a wheel adjacent to, near, in the vicinity, or close to touching the rear axle in the product design under review?

That’s one of the hairs lawyers split this spring when they educated teams of Rose-Hulman upper-class and graduate-level students on intellectual property nuances during a field trip they took to Indianapolis for their Intellectual Property for Engineers course.

Considered unique to an undergraduate engineering curriculum and taught by mechanical engineering and engineering management professor Richard Stamper, the course examines the influence intellectual property law has on the professional practice of engineers, scientists and engineering managers. Course topics included extracting value from intellectual property, patentable subject matter, novelty and loss of right, patent prosecution and litigation, copyrights, trade secrets and trademarks.

The lesson that didn’t take place at Rose-Hulman (or even in a classroom) was the field trip to the Faegre Baker Daniels law office in downtown Indianapolis,

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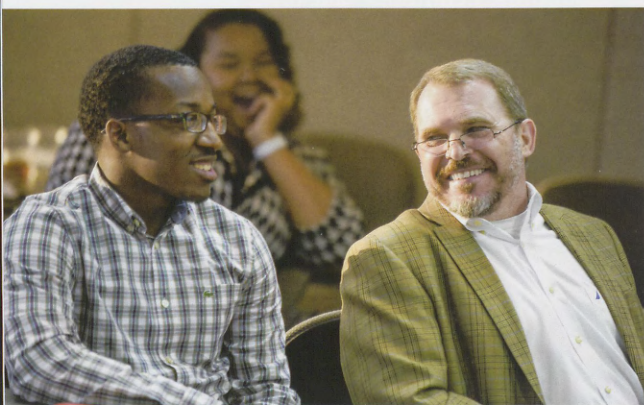
**STUDENTS LEARN
NUANCES OF
INTELLECTUAL
PROPERTY LAW**

IP FOR ENGINEERING

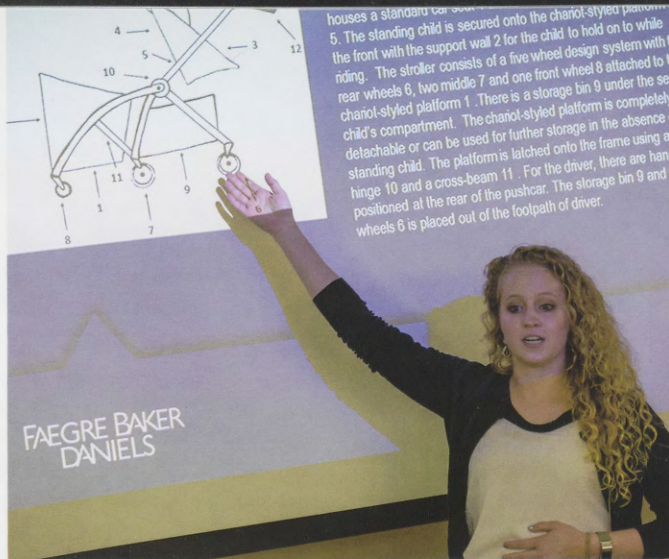
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where student teams gave “depositions” related to their attempts to design around a baby stroller already under U.S. patent protection. As they looked out at the city’s skyline from a spacious conference room, the six student teams defended aspects of their designs under probing from practicing intellectual property attorneys William S. Meyers and Marcelo S. Copat. It was a friendly exchange; both attorneys are Rose-Hulman alumni.

“I wish this type of course had been available when I was in college,” says Meyers, who earned bachelor’s and master’s degrees in optical engineering. “This is valuable training before these engineers-in-training get out and have to defend their ideas in real-world situations, where millions of dollars, companies’ fortunes and people’s livelihoods are on the line.”



Attorneys Marcelo Copat (top, right) and Joseph Tanner (below) provided insight on intellectual property and product liability law to students.



Students explained (left) how their product designs didn’t infringe on current patents, under cross examination by intellectual property attorney William Meyers (below).

Copat, also a partner at Faegre Baker Daniels, is a 1984 electrical engineering alumnus who had extensive industry product development experience before entering law school.

Along with the deposition session, product liability legal expert Joseph Tanner discussed the valuable role engineers and scientists have in helping companies defend claims, asserting, “we need engineers to understand and appreciate the ramifications of what they do.” Appropriate product testing procedures, documentation and safe alternate designs should be taken into account when designing any project, he says.

The course also featured campus guest speakers: the engineer as an expert witness, with attorney Robert Waters (EE, 1984); trademarks, with attorney Bryan Hales (AO, 1993); employment agreements and non-compete restrictions, with attorney James A. Coles (EE, 1969); the patent examination process, with Robert W. Hodge (CHE, 2000), supervisory patent examiner at the U.S. Patent Office’s Technology Center; and enforcement of the patent right, with attorney William A. McKenna (CS/MA, 2002).

“We discovered that there’s more to engineering than just simply engineering a new product, and how important the engineer is in the design and testing process,” says Malcolm Marshall, a 2017 biomedical engineering graduate. “There’s so many things that we have to take into consideration, and the ramifications of those decisions are very important. These are the real-world, big-picture



things that you may only spend a portion of one class period discussing in your core engineering classes. This dives much deeper to provide context and perspective.”

Stamper is a registered patent agent for the U.S. Patent and Trademark Office and has served as an expert witness in both patent and product-liability disputes. He started teaching the course in 2008 and it has been offered biennially to students in all academic majors. The design-around-a-patent exercise, with student teams defending their projects before practicing intellectual property lawyers, is an element added to the class in 2012.

“I love teaching this class because it is so useful to future engineers and scientists,” remarks the 1985 mechanical engineering alumnus. “In many of the courses I teach, I help the student make incremental improvements in things that they already are familiar with, like computer-aided design. But in Intellectual Property for Engineers the students come in with a blank canvas and come away with a better picture of the professional practice of engineering.” ■

STORY BY
DALE
LONG

THE LIFE AQUATIC

WITH
STEPHEN OWEN

Imagine your car becoming disabled on an unfamiliar, deserted county road in the middle of the night. You scramble for a sense of direction amid the howls of nearby coyotes and owls. Once you locate your cellphone in the pitch-black environment, you need to describe your surroundings to someone several miles away.

Now translate that scenario's challenges to an underwater environment, and you have some sense of Stephen Owen's world. As one of the few professional engineers who is also a commercial diver, he may be

found on any given day at depths up to 60 feet below the water's surface, inspecting bridge piers and footings, naval facilities, ports, and cruise ship terminals.

"You certainly can't be afraid of the dark or have any form of claustrophobia," Owen says. "There are times when it can become very disorienting while

navigating in a labyrinth of piles. You throw in some current, cold water, debris, and an occasional eel that swims up to your face mask to say hello, and it can be very uncomfortable."

This has added an unusual perspective to his passion for structural engineering.

The 2011 civil engineering alumnus is a senior project engineer with Marine Solutions Inc., a company based in Nicholasville, Ky., that specializes in building and maintaining waterfront, navigation and bridge structures. He became interested in diving after inspecting bridges, wharves and marinas from boats or nearby land-connected structures.

"There were elements of structures that I and others couldn't observe without getting in the water," admits Owen. "The water can be a harsh environment on essential parts of a structure that are typically inaccessible: steel corrodes, timber decays and concrete degrades."

After learning basic diving techniques, he became a certified commercial diver after training up to 100 feet underwater, utilizing surface-supplied diving equipment in lakes created by abandoned strip mines.

Now, typically diving alone as a part of small team, he uses small handheld tools (cameras, measuring devices and probes) to examine possible undermining of bridge piers; document existing conditions of timber, concrete or steel structural members; and assess the well-being of structures following a storm or collision from a wayward barge.

"Being an engineer gives me a better understanding about how things are constructed, what's out of the ordinary or defective and how elements are affected by different forms of degradation," says Owen, whose professional engineer's license is a valuable asset in his current career field.

"Diving is essentially a tool to provide a more thorough, hands-on perspective on aspects of a structure that have likely been seen by only a few people throughout its history.

"I am always inspecting from an engineer's viewpoint. Due to the dark underwater surroundings, I am often required to describe a solution by feel without truly seeing the problem.

"That's the true value of an engineer diver." ■



IN THE VANGUARD

R. Michael Meneghini loves to work with his hands. He even built the bed he slept on during his time at Rose-Hulman.

The truth is, though, his abilities go well beyond building beds—as seen in the video (linked on page 16) accompanying a New York Times story from earlier this year. The video shows Meneghini piloting a precision drill and using a mallet to urge an artificial knee into place.

Meneghini works regularly with artificial knees as head of the joint-replacement program at Indiana University Health's Saxony Hospital in Fishers, Ind. But the 1995 civil engineering alumnus is doing more than simply replacing knees and hips. He's immersing himself in research that could change the way implants are designed, chosen and set in place.

Meneghini is one of many alumni now working in the medical profession. In fact, in recent years, Rose-Hulman has sent an average of five students to medical school annually, earning the institute's students a 52 percent acceptance rate to medical school—better than the national average.

And, as with Meneghini, some graduates are driven to move healthcare forward.

Named in 2014 to a list of the 22 top North American knee surgeons, Meneghini is doing his part by designing a surgical program that boasts the nation's eighth-lowest rate of readmissions. At the same time, he's building on international studies to see how artificial knees can be designed and implanted to help people not just walk, but walk with their normal gait.

STORY BY
JOHN
THOMAS



Michael Meneghini

Alumni Doctors are at the Forefront of the Medical Profession



Benjamin Smith

RURAL HEALTH PRESCRIPTION

Benjamin S. Smith, meanwhile, is moving healthcare forward by providing care where it's needed most. He is a primary family physician in Breckinridge County, Ky., a rural area of 25,000 residents in the north-central region of the state, between Louisville and Evansville, Ind., with a high poverty rate and a dearth of medical services. These characteristics require him to cover a lot of ground—a fact highlighted in a description of a typical day:

"This morning I saw 11 people in a 25-bed community hospital," Smith says before describing still more patient visits in other settings. "I just came from a nursing home in a town in neighboring Ohio County that's even smaller than the one where I work."

Then, after a pause, he adds, "I've probably seen about 50 people today."



Working in an office with another physician and three nurse practitioners, the 1997 chemistry alumnus practices in practical ways that may be different from his peers who are in more typical practices. “You don’t look at it as a business. You just say, ‘Let’s do the job of taking care of people,’” says Smith.

Alyssa A. Riley brings a similar patient-centered sentiment as a pediatric nephrologist with Ascension’s Dell Children’s Medical Center in Austin, Texas. She loves solving the critical-illness problems that come her way but also works to address broader issues.



“I think each patient I see presents an opportunity for me to use my engineering skills as a problem solver.”

Currently that means being involved in a quality-improvement project examining conditions that develop while patients are under care. “There are a lot of points that could be addressed where we can improve patient outcomes and patient safety measures,” says the chemical engineering alumna, who graduated in 2000.

Specifically, Riley spends most of her time these days working on ways to reduce acute kidney injuries, which adversely affect thousands of patients each year in the U.S.

PUBLIC HEALTH REMEDY

Patient safety also is in focus for James K. Gilman, the new chief executive officer of the National Institutes of Health Clinical Center, a leading-edge, human-trial clinical research facility in Bethesda, Md. The 1974 biology graduate, a trained internal medicine and cardiovascular disease physician, retired after a rewarding 35-year career with the U.S. Army, including a stint as director of Walter Reed Health Care Center in Washington, D.C.

He is now dealing with the inherent operational risks within a 200-bed hospital and is



noticeably impressed by the scope of his team’s work.

“There’s an awful lot of cancer work,” Gilman says, beginning to list the groundbreaking research conducted at his facility. “Sickle cell anemia—we might actually cure it...STEM cell transplants. The development of drugs for HIV took place here a number of years ago... Zika and, of course, a couple of patients who had Ebola were hospitalized here. Infectious disease. A lot of genetic disorders...” The list goes on.

David L. Lakey also is dealing with a long checklist involving public health issues. As vice president for population health for the University of Texas system, he coordinates health initiatives across 14 institutions. Before that, he was the commissioner of the Texas Department of State Health Services.

[CONTINUED ON NEXT PAGE]

HEALTH CALLS

(CONTINUED FROM PREVIOUS PAGE)

In those roles, Lakey has attacked Texas-sized challenges such as prematurity rates, a shortage of mental health services, how the availability of transportation affects public health, and virus outbreaks. "I work with a variety of people to understand how we solve some of the bigger health issues," says the 1986 chemistry alumnus. He was trained in internal medicine, pediatrics and infectious disease.

As with other Rose-Hulman alumni, Lakey entered his profession with a desire to provide direct care but soon found his scope broadened by big issues, including one of the biggest of all: whether focusing on illness gives us the best return on our healthcare dollars.

"Almost 20 percent of the U.S. economy's gross domestic product goes into health care, and we have only mediocre health outcomes," Lakey asserts. "We are focused on the provision of sick care, but a lot of work needs to take place in trying to address how we keep people healthy." ■

GO INSIDE the operating room as Michael Meneghini (CE, 1995) performs a surgery at Indiana University Health's Saxony Hospital in Fishers, Ind. ('A Partial Knee Replacement' video within The New York Times story): <http://nyti.ms/2smkR3R>

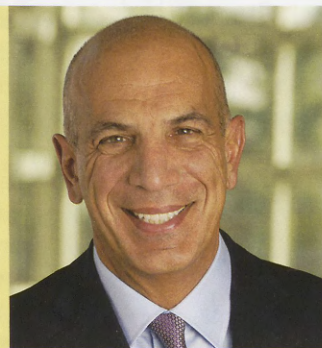


Physician **Benjamin Smith** (CHEM, 1997) was honored this year with the Rose-Hulman Alumni Association's Career Achievement Award for professional and community impact. | **SEE PAGE 37**



A Diagnosis for Healthcare's Future

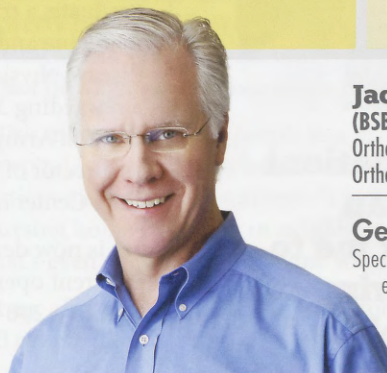
ALUMNI OFFER THOUGHTS ON THE FUTURE OF HEALTH CARE AND POTENTIAL ADVANCES WE ARE LIKELY TO SEE.



Michael A. Mussallem
(CHE, 1974; HD, 1999)
Chairman/Chief Executive Officer,
Edwards Lifesciences

Patient-Focused Innovations

There is much still to solve in the treatment of both chronic diseases and those that affect the aging. For patients, it is not just about leading longer lives, but also about having quality of life in their advanced years. With this in mind, advancements in medicine are focused on providing less-invasive procedures, ensuring faster recoveries and returning people to the active, independent lives they desire. Whether this means a more advanced heart valve that can be implanted without open-heart surgery or patient monitoring technologies that use predictive analytics to alert clinicians to problems before they occur, the patient-focused innovations that deliver high-quality solutions for patients and clinicians will ultimately change the way medicine is practiced.



Jack Farr, MD
(BSBIO, 1975; HD, 1999)
Orthopedic Surgeon,
OrthoIndy/OrthoIndy South

Genomics Expansion

Specific patient management will be potentially more effective for the patient and more cost effective for society. Stem cell applications also will be refined and optimized for specific patients.

Arthur L. Rawlings, MD
(ME, 1985)

Associate Professor of Clinical Surgery,
Program Director, General Surgery,
University of Missouri Health Care

Building Patient-Doctor Trust

For several decades the Accreditation Council for Graduate Medical Education has wanted to assure society that medical school residents finishing their respective training are competent to practice medicine. Entrustable Professional Activities are being developed to provide a physician in training with the necessary skills to be entrusted with a particular activity, such as managing diabetes or performing a laparoscopic cholecystectomy. The EPA system also provides a summative evaluation that is reliable and reproducible, while making sure that physicians have attained minimum standards in medical fields.





James K. Gilman, MD
(BSBIO, 1974; HD, 2011)
Chief Executive Officer,
National Institutes of Health
Clinical Center

Precision Medicine

The possibilities for economical whole genome sequencing, customized cellular engineering, and gene editing are staggering. There are policy and ethical issues that will need to be resolved. Cancer treatments will change as will the treatment of genetic disorders for which we now have little to offer.

Early Diagnostics

The ability to identify serious problems earlier in their course will allow for more effective interventions. Past presumptive diagnoses, based on less sophisticated diagnostic methods, will yield to the development of diagnostic tests with a higher degree of specificity. Several of those tests will become available at the place where care is given—important when dealing with infectious disease outbreaks.

Bioinformatics

Big data techniques will detect trends in populations that will enable public health measures to be put in place early in an outbreak to blunt its impact.

Ben F. Brian, PhD

(CHE, 1982)
Former Chief Operating Officer,
Twelve, Inc.

Public Financing

The advances that fall under personalized disease management are connected by the premise that almost everything we need to fight disease is already within us. This will take time and commitment, not only from the scientific community, but also from the federal government. Currently there aren't the necessary financial returns to ensure consistent pharmaceutical industry investment. So perhaps the biggest advance in healthcare will be the generous public funding of critical research.

Immunotherapy

There's some really cool stuff being done here, but basic science research money is in danger of falling under the budget ax. Work on T cells and switching pro-tumor macrophages to an anti-tumor state show the promise in this field. The ability to supercharge or redirect your immune system to fight inflammatory-based diseases or cancer will be at the core of personalized disease management.

Microbiome

Mary Roach's must-read book "Gulp" provides a fascinating account of the millions of bacteria that comprise your microbiome. Research has demonstrated how these bacteria lead to changes in cellular activities which can cause or accelerate disease. If you can stomach it, pun intended, the last chapter provides a glimpse into the potential to flip the switch on the bacteria within us.

Diagnostics

Imagine a device like Star Trek's Bone's Tricorder that's able to detect illness before symptoms arise. That may sound like a reach, but with regulatory strategy and clinical evidence there will be diagnostic tools to identify which switches to turn on (or off) so you can cure yourself.

Evan R. Kokoska, MD

(CHE, 1989)
Director of Pediatric Surgery,
Peyton Manning Children's Hospital

Prematurity Care

Over the next 10 to 20 years, a good placenta, plus uterus substitute, may become available to possibly decrease or even alleviate some of the complications associated with prematurity, especially in babies born between 24 and 32 weeks of gestation. (Operations on preemies are high risk and have the potential for lethal liver bleeding.) This quality placenta will allow organs to mature in an environment that may be less toxic and promote organ development in a more natural way. Some early studies in sheep show some promise in this area.



R. Michael Meneghini, MD

(CE, 1995)
Director of Joint Replacement,
Indiana University Health Saxony Hospital

Altering Genetic Predisposition

The ability to alter genetic predisposition for disease through various modalities will help cure devastating diseases such as cancer and cardiovascular disease.



Chad A. Zarse MD

(AB, 2005)
Nephrologist,
Indiana Kidney Specialists

Streamlining the System

As basic science continues to be translated to clinical care, we will see this incorporated into the daily care of patients, with the overall goal to improve patient outcomes and lower healthcare costs. Streamlining ways to obtain urgent outpatient follow-up (imaging studies, lab tests and consultations) would improve care and lower costs. More electronic consultations would allow primary physicians to ask clinical questions of specialists, rather than having the patient being physically examined by the specialists. Making psychiatrists more available to primary care physicians—through telemedicine—will prevent under-diagnosis and treatment of mental health disorders that often lead to worse outcomes for many chronic conditions or addiction disorders.

Eric J. Trueblood MD (CHE, 92)

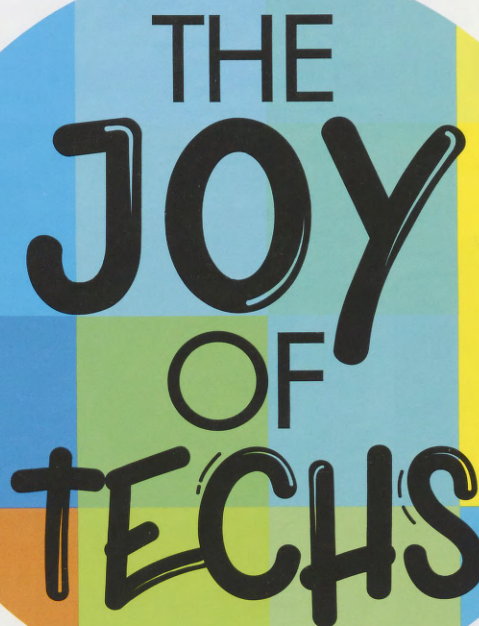
Medical Director
PAREXEL International Staff Physician,
Indiana University Health

Specialized Cancer Care

Continued improvement in individualized cancer treatment will include therapies targeting specific tumor mutations and/or using a patient's own immune system to effectively fight malignancies. This will improve survival rates and also decrease reliance on chemotherapies.

Wearable Technologies

Advances in noninvasive wearable technologies will facilitate clinical monitoring and allow for analysis of data that traditionally has required blood sampling in a laboratory. These technologies also will augment data collection for clinical trials.



THE JOY OF TECHS

STORY BY
**SCOTT
HALL**

ENGINEER IS SPARKING INTEREST IN STEM

Shawn Hymel is an engineer who is having the time of his life helping to show that technology is fun.

The 2006 computer engineering alumnus has gone from designing printed circuit boards for do-it-yourself retailer SparkFun Electronics to creating demonstration Adventures in Science videos for the retailer that reveal, in a fun-filled way, how you can use an oscilloscope, blast colleagues with Silly String or create whimsical April Fools' Day pranks.

As the Boulder, Colo., company's name and "Start Something" tagline suggest, SparkFun accentuates the joy of experimentation. Many of its products are circuit boards developed on the open-source Arduino hardware and software platforms, with sensors that can detect sound, light, temperature, motion or other forces. Hymel has built his own creativity into such projects as those that dispense treats when a dog steps on a weight-sensitive platform.

"SparkFun definitely has a playful mentality when it comes to work and how things are done, created, designed and built," says Hymel, 33, one of three creative technologists producing entertaining and educational videos, tutorials and social media posts for SparkFun.

For his videos, Hymel typically dons a white lab coat and a wacky bow tie in homage to his hero, public science advocate and former television show host Bill Nye. Viewable on YouTube and the



SparkFun website (www.sparkfun.com/videos#adventures), the clips are aimed at a high school education level, but they also have proven popular with retired engineers. And the viewers don't hesitate to offer critiques and commentary.

"You have to consider the demographic I'm dealing with," he says. "Every video I make, I get some feedback that's used to improve future videos."

Hymel tries to complete at least two videos or comparable projects each week. Several of them are educational in nature, showcasing specific products and applications, demonstrating the proper use of lab equipment, or explaining basic concepts in engineering, programming or physics.

To illustrate the concept of electrical current, for example, he built a network of plastic tubing filled with water, with clumps of steel wool positioned as resistors.

"After about a month, the steel wool disintegrated in the water and it turned into this murky muck I've got to clean out," he says. "It's sitting on my desk now."

During his many adventures, Hymel has been drawn toward recognizing the value of marketing, considered "the dark side" by most in his profession.



Shawn Hymel has lots of fun at work as a creative technologist for SparkFun Electronics — and it shows in his Adventures in Science videos.

SHAWN'S FAVORITE SPARKFUN VIDEOS

How to Use an Oscilloscope

<http://bit.ly/2pULKyb> • [He could have used this video at Rose-Hulman]

Dog Treat Dispenser

<http://bit.ly/2p2vOVk> • [A simple, silly, but effective project]

Oktoberfest B.A.C. Data Lager

<http://bit.ly/2pUs2Cw> • [Getting paid to get drunk]

Arduino April Fools' Day Projects

<http://bit.ly/2pCp1Q> • [Mutual pranking by SparkFun staff]

SparkFun Mbed Starter Kit

<http://bit.ly/2qpvF3k> • [Parody on 1950s Black-and-White Commercial]

Watch more Adventures in Science videos at
www.sparkfun.com/videos#adventures



"While many engineers eschew marketing pretty hard, I view it as a platform to be able to reach the younger crowd, to encourage them to consider STEM careers, take their physics class more seriously and participate in after-school robotics," he says.

Hymel sometimes misses the hard science of design engineering (he has a master's degree in electrical engineering from Virginia Tech), but he still gets occasional opportunities to scratch that itch. For this year's South by Southwest media conference in Austin, Texas, he helped develop a novelty item for the SparkFun trade booth: a simple circuit board kit that visitors could solder together and wear like a badge to play remote games of Rock Paper Scissors with other attendees through an infrared communication network.

"It's really silly, right?" he says. "But it was a fun icebreaker and experiential marketing campaign, and it got people excited about the things we're doing."

Because of this, Hymel is grateful for his current career path and the teaching opportunities it provides.

"My idols are TV personas, and having that kind of broad reach, that platform to speak to, potentially, millions, is significant," he says.

"If I can reach a kid across the country to persuade them to pursue STEM, I call that a win." ■



OSBORN CONSULTING FINDS THE WORK-LIFE SWEET SPOT

STORY BY
VALERIE
WAHLSTROM

BALANCING CT

Tarelle (Van Dyk) Osborn entered her entrepreneurial career with a plan and a purpose: to establish an enterprising business that provides a balance between work and life.

Thirteen years later, Osborn Consulting of Bellevue, Wash., is employing more than 25 people and has been recognized as a workplace with a culture and policies that align with Osborn's personal values. Those include professionalism, collaboration and creativity, relationship building, and lifelong learning, along with health and well-being, laughter, and fun. This culture, she believes, is rare in engineering office environments.

"Keeping a balanced workload within the normal 40-hour work week schedule is not always easy," says Osborn, a 2001 civil engineering alumna. "I wanted to work with people, both coworkers and clients, who respected my values."

At her firm, she says, "we trust that people can manage their own schedules and we encourage them to use their personal time off, preventing burnout. Refreshed and happy

employees are more engaged in their work, and, ultimately, that's good for the company, our employees, and their families."

Osborn Consulting's flexible and enjoyable culture has attracted a workforce that's 65 percent female (more than four times the 15-percent norm in the industry), and includes several working mothers. It also helped Osborn become recognized as the 2016 Civil Engineering Entrepreneur of the Year by the American Society of Civil Engineers.

"Working parents seeking that work-life balance are an untapped resource. We've gotten so much value out of that segment of workers," she says. "Developing this culture and encouraging everybody to be a part of it is what works. Everyone is more committed in a sense that 'I belong here,' and that comes through in their work. Profitability is a natural byproduct of all of that."

For Osborn, her company's founding values are still extremely personal. She's not only the firm's president and principal engineer,



as well as a recognized industry expert in storm water system analysis and design, but she and husband Josh (CE, 2001) also are raising three children, ages 9, 6 and 1. With all of that on her plate, maintaining a work-life balance is critical.

Though she admits that there isn't a magic formula for keeping everything in balance, and that some days are harder than others, having support from family and employees is key.

"What motivates me is providing a work environment that people enjoy and that I enjoy. I want to



be here. I don't want to leave my kids every day to come to a place that I'm not excited about or that I don't care about," Osborn says.

"In a sense, the workplace is my second family." ■



Tarelle Osborn earned the American Society of Civil Engineers' 2016 Entrepreneur of the Year Award. Her firm, Osborn Consulting of Bellevue, Wash., takes pride in providing quality services in an enjoyable workplace atmosphere.



Creating A Work-Life Balance

Osborn Consulting's techniques for supporting both employees and clients include:

FLEXIBLE WORK SCHEDULES

Employees tailor their own hours to allow them to meet obligations outside of work, and are encouraged to take full advantage of vacation time.

STRATEGIC INVOLVEMENT

Staff members at all levels are engaged in the company's short-term workflow planning as well as its long-term strategic planning.

FUN ATMOSPHERE

A relaxed, non-work-related activity—like an egg-toss contest or making sock puppets—is offered weekly to build team camaraderie.

CHILD/PET FRIENDLY

Most weeks, children and even pets grace the office environment.

STORY BY
JOHN
THOMAS

IF YOU THINK VIRTUAL REALITY IS JUST A GAMING TECHNOLOGY THAT LETS PEOPLE DISCONNECT FROM THE "REAL WORLD," YOU HAVEN'T BEEN LISTENING TO ALUMNUS KENT BYE'S VOICES OF VR PODCAST.



Getting REAL

EXPLORING VIRTUAL REALITY'S
POTENTIAL BEYOND GAMING

A few times each week, Kent Bye sits down with people on the front lines of virtual reality for conversations about VR and its potential. And while the conversations do sometimes cover gaming, the 1998 electrical engineering graduate and his guests really hit their stride when discussing practical applications for VR in areas such as medicine, the arts, business, the environment, and, yes, real-world human interaction.

"Anybody who does virtual reality experiences, once they come out of it, it just really inspires them to think about the different possibilities that are enabled by this new communication medium," Bye says from his Portland, Ore., home. "I don't think the endgame is really to escape into these fantasy worlds, but to become more connected to what's happening on earth."

The implications for this greater connectivity range from the physical to the metaphysical, from the immediate to the futuristic, and from the lighthearted to the serious.

For example, Bye's podcasts over the last three years have covered such topics as using virtual reality to correct vision problems and to "rewire" the brains of stroke patients. One included an interesting discussion about stirring compassion by putting people into difficult situations or on the front lines of global problems. Still others examined how virtual reality promises to change the way we use computers, the way we communicate, the way we conduct business, and, of course, the way we play.

Often, these discussions highlight the way virtual reality links things we usually think of as separate—like the left and right brain, subjective and objective perspectives, and the mind and body.

"VR is trying to bring back a holistic way of thinking," Bye says, "because in order to have a good VR

experience you have to consider all dimensions—the emotional dimension, what it means to be embodied in an experience, what it means to express your agency and what it means to stimulate your mind or to interact with other people."

Bye, who also writes a blog for the Road to VR website, sees these opportunities as nothing less than revolutionary. In fact, he compares the emergence of virtual reality to the invention of the Gutenberg press, both in its immediate and long-term impact.

Of course, the big question is one that Bye asks each of his guests, and is at the heart of the book he's releasing later this year: What is the ultimate potential of virtual reality? He admits it can be a hard question to answer and points again to the Gutenberg press for context. If someone had asked people 500 years ago, "Tell me about all the different kinds of books that are going to be written (for publication)," they couldn't have comprehended an appropriate answer.

"I think that VR is just the same," Bye says. ■





Kent Bye has interviewed virtual reality technology leaders for his popular podcast and blog.

THE BIG QUESTION:

What's the Ultimate Potential of VR?

Kent Bye has closed each of his more than 700 podcast episodes by asking each guest the same question: "What is the ultimate potential of virtual reality?" Here are some of the answers:

Darshan Shankar, BigscreenVR Founder:

"Whatever you do on a computer today, VR is drastically going to change that in the next few years."

Nonny de la Peña, Emblematic Group CEO:

"VR is going to advance knowledge in a way that might just potentially change the world."

Danfong Dennis, Condition One CEO/Founder:

"There is this tremendous potential to cultivate compassion to relieve the suffering of others."

James Blaha, Vivid Vision CEO/Co-Founder:

"I think we have so many more options... in how we're showing new information, experiences, sights, sounds, and eventually more than that, and that's going to have so many more applications than anyone expects."

Listen to Kent Bye's Voices of VR Podcast at voicesofvr.com and find his latest VR thoughts on Twitter @kentbye.



OFF TO THE RACES

Tech Tools are Transforming the Fan Experience

While the indisputable center of the racing universe each May is the Indianapolis Motor Speedway, home of the Indianapolis 500 (proclaimed “The Greatest Spectacle in Racing”), David Dusick is quick to point out that the two-and-a-half-mile oval isn’t the only spectacle in motorsports.

In fact, there are many racetracks across the country, from large super speedways to small-town dirt tracks. And their fiercely loyal fans deserve an exhilarating experience mirroring the one in Speedway, Indiana.

Increasingly, those experiences require sophisticated technology.

That’s where Dusick and RaceTrack Engineering come in.

After learning the trade as a member of IMS’s facilities engineering team, the 1999 mechanical engineering alumnus launched his Speedway-based company in 2006. The firm does plenty of high-end work at IMS racing events, and that has opened doors to bringing more sophisticated technology to smaller race tracks.

“When I first started my business, I wanted to take the things we learned at the big track and filter that down to others,” Dusick explains.

RaceTrack Engineering designs and installs timing and scoring systems, video replay systems to assist with officiating, scoreboard and video display systems, audio systems, and radio communication systems. The company also provides staffing—race directors, track marshals, timing/scoring staff and track announcers.

STORY BY
STEVE
KAELBLE
PHOTOS BY
BRYAN
CANTWELL



David Dusick keeps track of all the action on the Indianapolis Motor Speedway each May for his RaceTrack Engineering company.



David Dusick and colleague Jason Penix review a race track incident using the RaceTrack Engineering-managed IndyCar Video Officiating Replay System.

All of this technology benefits track operators and fans alike, and it helps raise the bar on the fan experience. Consider the timing technology. For track owners, a manual function involving people clicking stopwatches is now fully automated to insure accuracy. This lap-by-lap electronic timing data for each car is keeping fans informed through smartphones.

"We have the ability to take something that was an operational function and give it back to the fans," Dusick says.

A similar technology transfer is likely as Global Positioning System tracking becomes more prevalent, creating a more high-end fan experience through data and video that's available through a variety of electronic devices. In fact, video officiating is an area where race track officials are battling to keep up with the technology in spectators' hands. Anyone watching a race can record just about anything that occurs during an event, creating videos that show such details as rule violations and spectacular crashes.

"We have to stay ahead of that curve," says Dusick, who organized his first racing event, a mountain bike challenge, for his Rose-Hulman fraternity.

Race officials "need to have as much information as possible. If someone has more information than you do, you're forced to make a less-informed decision," he adds. That's why the IndyCar race series, featuring racers from the Indianapolis 500, dropped a million dollars on a sophisticated video replay system. "They

can view video footage to instantly review what happened anywhere on the track," he says.

RaceTrack Engineering, in turn, tries to bring a similar level of sophistication to smaller race tracks. "We were tasked with finding as quality a system as we could without the million-dollar price tag," he says. "We do that on a turnkey basis. Then, we manage the system for them."

The same concept applies to audio systems. A great fan experience requires high-quality public-address

audio that allows information to be heard over the roar of the race car engines.

"We offer a PA system lease to racetracks. We set it up and install it," Dusick says. What was a massive and unaffordable capital expense becomes a more palatable lease payment in the operational budget, he explains.

When it comes to technological applications to enhance the fan experience, the sky is the limit. "As with any engineering project, budget is the number one constraint," says Dusick. That's particularly true at the smaller tracks that are vitally important to the sport, because they provide hundreds of thousands of people with weekly entertainment, feeding racing's future with new driving talent. "To me, those smaller race tracks are just as important as the Indy 500," he says.

Providing these racing services has had Dusick on the road most weekends from the early spring to late fall. His calendar for the first two months of this year's racing season was filled with trips to help with races in St. Petersburg, Fla.; Palm Springs, Calif.; Phoenix; Memphis; Bristol, Tenn.; and Birmingham, Ala. It's a relief that the month of May was spent in his backyard at IMS.

"The days of people sitting in wooden grandstands for hours with World War II era paging horns as your only source of race information are gone," Dusick says.

"Today's race fans have a different mindset, and we're challenged to meet those expectations." ■

Woman in STEM!

OVERCOMING THE 'LITTLE VOICE'

As one of the first women ever to graduate from Rose-Hulman, and with 20 years of experience as a successful software architect, Tiffany (Blandin) Trusty knows first-hand the challenges facing women to feel like they belong in science, technology, engineering and mathematics (STEM).

Along the way she's trying to change a traditionally male-dominated career field in which women make up only 24 percent of STEM careers, while 48 percent of the U.S. work force is female.

"We get in our own way. It's a lack of confidence," Trusty says. "It's the impostor syndrome. Everyone has that little voice in their head that tells you that you're a fraud and you're going to be found out. In a woman's head, it's louder. I still have it and I've been doing this for 20 years. They shouldn't pay attention to that voice, and must overcome the ingrained gender bias that people don't even realize they have."

Trusty is doing her part, playing an active role in several outreach programs geared toward bringing more women into high-tech careers. She has helped Indianapolis' Women & Hi Tech further its mission to develop, support and promote women in technology fields; speaks regularly at Passport to Hi Tech, an event encouraging young girls toward STEM careers; and has become a mentor for girls participating in the National Center for Women in Technology's Aspiration in Computing Awards program.

STORY BY
SUSAN
HOSKINS
MILLER

"Tiffany gets it," says former Indianapolis mayor Greg Ballard. One of several people supporting Trusty and her efforts, he was part of several initiatives to bring STEM careers to Indianapolis and to fill them with women. "She has her fingers in all of this," he remarks. "People like her are the glue that holds all these efforts together. She understands what is needed because she has the technical competence herself."

Trusty's advice to women who love STEM: Put yourself out there, be confident in your abilities, and go after what you want. She took her own advice, earning an associate's degree at Indiana's Vincennes University before becoming a member of Rose-Hulman's inaugural incoming first-year class with female students in 1995. She earned a degree in electrical engineering two years later.

Now, she runs her own software consulting business, Trusty Applications, works as director of apprenticeship at an Indianapolis-area coding academy, and is a wife (to Rose-Hulman grad Micah Trusty) and mother. She also earned a master's degree in engineering management from Rose-Hulman in 2007. Trusty was presented the Rose-Hulman Alumni Association's Career Achievement Award this spring for her career achievements and commitment to improving diversity in STEM.

"A woman will look at a job that calls for eight different qualifications. If she has only six, she won't apply because she assumes she isn't well-qualified enough," Trusty says. "A male with only four of those qualifications will apply and say, I only have four of these but I am willing to work hard and learn."

"Again, it's that confidence factor, and the impostor syndrome comes to life. It's that way both with job applications and with speaking at conferences.

"Women don't put themselves out there the way men do. They won't apply. They just need to go for it." ■



Indianapolis Becoming Hub for Women in Tech

Through the efforts of Tiffany Trusty, other alumnae, and female STEM professionals,

> **INDIANAPOLIS
IS THE
FOURTH-BEST
CITY IN THE
NATION FOR
WOMEN IN
TECHNOLOGY,**

according to a Smartasset.com study. It examined such factors as gender pay gap, income after housing costs, percentage of tech jobs filled by women, and four-year tech employment growth.

The study revealed that Indianapolis is actually one of only three cities in the nation with a gender pay gap that is skewed in favor of women. The median pay for women in computer and mathematical occupations is around \$61,497. That's about \$1,300 more than the median pay for men with the same jobs.

<http://bit.ly/2o5R50k>



"Everyone has that little voice in their head that tells you that you're a fraud and you're going to be found out. In a woman's head, it's louder."

—Tiffany Trusty (EE, 1997; EM, 2007)



CAMPUS KALEIDOSCOPE

PHOTOS BY
BRYAN CANTWELL
STAFF PHOTOGRAPHER



This spring once again brought out the beauty of Rose-Hulman's 200-acre campus. One particular highlight was the blossoming cherry tree orchard, near the White Chapel, which was planted in 2012 to celebrate the 20th anniversary of the institute's relationship with Japan's Kanazawa Institute of Technology. | This spring's rains couldn't keep students from enjoying the outdoors between classes and activities, and the Branam Innovation Center was a busy place as student teams pushed themselves and their projects to the limits in hopes of earning recognition at regional, national and international competitions. | As you will notice at Homecoming (Oct. 6-8), the campus is as vibrant as ever (See schedule on page 37). | Hope to see you there!



Stepping Out

Downtown Indy, Here We Come!

Rose-Hulman will become a steady presence in Indianapolis, aiding the city's growing tech sector, when the institute signs a lease this summer on space in The Union 525, the downtown development providing infrastructure for tech companies to scale up.

The institute joins a growing roster of tenants—among them Scale Computing, co-founded by 1996 computer science alumni Jeff Ready and Scott Loughmiller; TechPoint, an organization promoting tech sector growth in Indiana, and Launch Indy, a co-working space for entrepreneurs.

"Rose-Hulman's commitment to innovation, education and excellence underscores The Union 525's ethos," says Union 525 Managing Partner John Hurley. "We are thrilled that a leading-edge institution such as Rose-Hulman has selected The Union 525 for its Indianapolis location."

The new tech hub is across the street from Rolls Royce and Eli Lilly & Co. as well as within walking distance of the new downtown Cummins complex and Salesforce Tower.

"Locating in the Union 525 will enable Rose-Hulman to assist in the development of central Indiana's tech sector even more in the future," says Rose-Hulman President Jim Conwell. "We're looking forward to enriching our relationship with Indianapolis, the central Indiana business community and our alumni."



Dylan Linville

Astronomical Achievements Lead to Goldwater Scholarship

Dylan Linville's research achievements in astrophysics have resulted in his selection as a 2017 Goldwater Scholar, one of the nation's most prestigious honors for undergraduate students majoring in the natural sciences, mathematics and engineering.

The physics major has utilized an optical reflecting telescope at the institute's Oakley Southern Sky Observatory in Australia to examine the size, shape and possible composition of asteroids that are scattered throughout the galaxy. He also has contributed to research projects in asteroid photometry with professor Richard Ditteon (PH, 1975), director of the Oakley Observatory, and is spending this summer working on projects at the National Radio Astronomy Observatory in Green Bank, W.Va. He eventually hopes to become a college professor.

Pedal, Chem Car Teams on a Roll

Students' human- and chemistry-powered vehicles excelled in competitions this spring. The Pedal Car team challenged some of the world's best cyclists and vehicles at Australia's Pedal Prix after speeding to victory in the American Society of Mechanical Engineers' E-Fest North America East competition. Meanwhile, the Chem-E-Car team has qualified for this fall's national championships after placing second in the American Institute of Chemical Engineers' North-Central regional conference.

A series of consistently strong performances placed the human-powered vehicle ahead of 33 college teams at the regional. The vehicle's active lean control mechanism took top honors in the innovation category, while the vehicle's overall sleek design ranked second. On the race track for the regional, the team placed second in the women's speed race and was third in the men's event.



Then, the entire team combined to finish sixth in the 2.5-hour endurance race.

This the first time that the Chem-E-Car team has advanced to the national finals. The AIChE challenge engages college students in designing and constructing a car powered by a chemical energy source that will safely carry a specified load over a given distance and stop.

High-Tech Prototypes Come from Teamwork

A growing partnership is enabling engineering students and project managers at Rose-Hulman Ventures to create prototypes of devices invented by researchers at Indiana University through the Indiana University Research and Technology Corp. The collaboration has resulted in 11 prototypes of high-tech inventions since 2010 that can be commercialized by industry.

These projects have included a device to make skin biopsies more uniform and efficient, a lower-cost alternative to prefilled saline bottles used in emergency rooms, a device to improve the safety of skin grafting, and a noninvasive device to monitor nerve activity in the heart.

Mitch Landess (BSEE, 1994; MSEE, 1996), director of business development and operations at Ventures, notes that in many cases Ventures engineers have enhanced a device's functionality and design characteristics through the process of working with the client from concept to tangible prototype.

Civil Engineering Gets National Honor for Career Prep

The Department of Civil and Environmental Engineering has been recognized by the American Society of Civil Engineers with the Walter LeFevre Award for exemplary promotion of licensure, ethics education and professionalism in engineering education.

All graduating civil engineering students are strongly encouraged to take the Fundamentals of Engineering exam annually (all did in 2016), and a series of guest speakers from industry assist in addressing the importance of licensure to a graduate's career. Students also learn how to become eligible to take the Professional Engineering licensure exam and the vital role of continuing education in career development.

Ethical decision-making has been integrated into each year of a student's academic development, and guest alumni speakers highlight career professionalism annually.

Keep up with what's happening on campus:
www.rose-hulman.edu/news



Change Agents

RETIRING FACULTY LEAVE LEGACY OF INNOVATION

STORY BY
DALE
LONG
PHOTOS
BY BRYAN
CANTWELL



A sign with the following statement greets visitors to Don Richards' office in the mechanical engineering department area of Moench Hall: *"Blessed are the flexible for they will never get bent out of shape."*

A good motto for Richards as well as two other longtime faculty—Allen Broughton in mathematics and Heidemarie Heeter in humanities and social sciences—who are leaving their mark on Rose-Hulman as they retire this year.

Through many twists and turns since joining the faculty in 1988, Richards has been a trailblazer for change in undergraduate engineering education.

Richards worked with colleagues to adapt first- and second-year curricula that provided students with the multidisciplinary building blocks for many fields of engineering. He was a facilitator for the institute's annual Making Academic Change Happen workshops, tutoring professors and administrators throughout the world to embrace change in academia.

He also has directed Rose-Hulman's Center for the Practice and Scholarship of Education, helping

Don Richards (mechanical engineering), Heidemarie Heeter (humanities and social sciences) and Allen Broughton (mathematics) had key roles in expanding their academic areas throughout their faculty tenures.

faculty in all academic disciplines to achieve their full potential, and has examined ways to implement elements of engineering design into students' four-year educational experience.

"I found my place in the sun here. Rose-Hulman is a unique place where everyone is interested in undergraduate education and making the most of the undergraduate experience," says Richards. "My expertise as a professor is teaching heat transfer, but nationally I'm not 'Mr. Heat Transfer.' Rather, I'm known for being associated with the innovative things we've done here at Rose-Hulman."

Also a change agent, Broughton helped bring together mathematics with elements of computer science, chemistry, biology and physics, and expanded student research experiences, during 20 years as head of Rose-Hulman's math department.

And, Heeter brought relevance to the German technical translation program over her 27 years as a German professor at Rose.

The dynamic trio retired at the end of the 2016-17 academic year.

"I built a strong team that built partnerships that considered where math is being used in the real world," says Broughton, who came in 1994 to lead Rose-Hulman's math department. Collaborations with other academic departments fostered double-major and two-degree programs, a major in biomathematics, a second major in computational science and minors in computational science and biomathematics, and encouraged interest and eventual course development in the expanding field of big data. The number of math graduates has grown steadily throughout the years.

The quality of undergraduate research experiences also has expanded during the past six years when Broughton led the Weaver and Rose Summer Undergraduate Research Programs, supported by the institute and donors. A record 16 students will be working on science, engineering and mathematics projects this summer with faculty mentors.

"These projects provide cutting-edge opportunities that students wouldn't get in the classroom, preparing them for graduate school or research and development in industry," says the native Canadian.

Heeter brought experiences from growing up and being educated in Germany to teach German language and culture for 27 years. She obtained a doctorate as a mature student, with a family, after traveling weekdays between her home in Indianapolis and Indiana University's Bloomington campus, and came to Rose-Hulman at the height of political and societal change in Germany.

"Language is a dynamic field, and with the Berlin Wall coming down, the 1990s were an exciting time to be a German professor," she says.

Heeter taught all four years of German courses on campus. Through the German technical translation program, she helped nearly eight students annually become certified with a competency to comprehend and translate technical and scientific articles and manuals from German into English. She also has helped build study abroad programs at German universities, and has twice escorted student groups to Germany to visit landmarks and experience the country's culture. ■

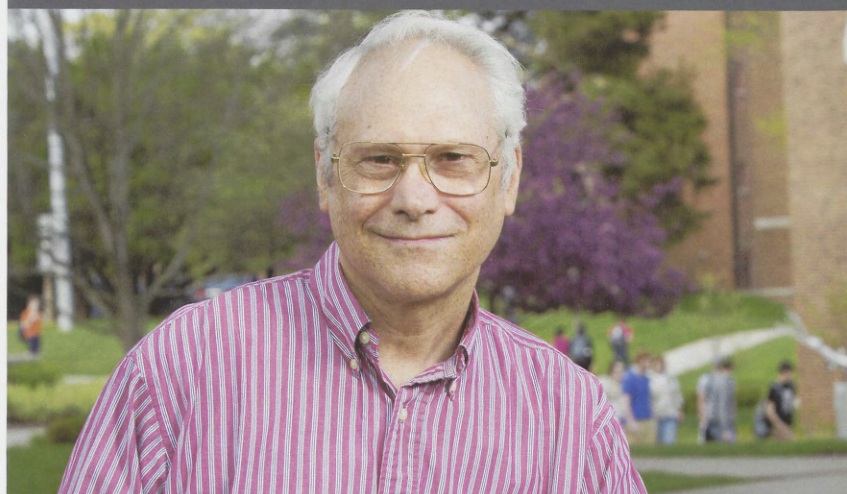
Elton Graves' Impact Incalculable

For more than 30 years, Rose-Hulman counted on Elton Graves—and he kept up his end of the equation.

Whether teaching in the math department, assisting students outside of class, directing competitions or advising the Pi Mu Epsilon honor society, his enthusiasm for mathematics, his skill at teaching and his service to the institute always added up to excellence.

Graves died April 1, not long after announcing his retirement due to illness.

A gifted professor who used models and demonstrations to explain difficult concepts and varied his approach when he saw that students were struggling, Graves was recognized in 2012 by the Princeton Review in its *Best 300 Professors in America* book. He also received the institute's Dean's Outstanding Teacher Award and earned the Distinguished Educator and Service Award from the American Society of Engineering Education's Math Division. He was the first educator to earn the ASEE Mathematics Director's Best Paper Award.



Graves was director of Rose-Hulman's Fast Track Calculus Program, advisor to the Pi Mu Epsilon mathematics honor society, chair of the Admissions and Standing Committee, Indiana director of American Mathematics Competitions, and coordinator for the Wabash Valley MATHCOUNTS competition.

"Many of the Rose-Hulman faculty are extremely dedicated to the students and their education, but even here Elton was head and shoulders above the rest," notes mathematics department head David Rader. "Elton's passion showed itself not only in the classroom, but also in his preparation, his interactions with students and his service to both institute and the mathematics community."

"No matter how highly his colleagues thought of him, it is his influence on students that truly defines Elton. He inspired others throughout his career, and will continue to inspire as we remember him."

Memorial donations in Elton Graves' honor are being accepted at Rose-Hulman through rosetem.rose-hulman.edu/drgaves, or call 812-877-8453.

Students' Work Elevates Institute's Engineering Physics, Optical Engineering Programs

The research and laboratory experiences of engineering physics and optical engineering students Kayla Storie and Rebecca Swertfeger have made professional scientists and engineers, national college educators and prospective employers sit up and take note.

Nearly 4,000 hours of work in the campus' microelectromechanical systems (MEMS) laboratory helped Storie earn a position as a process engineer supporting Intel's cleanroom facilities in Chandler, Ariz.—a rare opportunity for a new bachelor's-level graduate. She earned the best poster presentation award at the 2017 Conference for Undergraduate Women in Physics after making a groundbreaking discovery in micromachining.

Meanwhile, Swertfeger is spending this summer working on an optical component for the 2020 Mars rover during an internship at NASA's Jet Propulsion Laboratory. She received an award for best student paper at the International Conference on Photonics in Portugal for past summer campus research in a NASA-sponsored communications project.

STORY BY
**DALE
LONG**
PHOTOS
BY **BRYAN
CANTWELL**



"Students are taking advantage of the Physics and Optical Engineering Department's high-quality laboratory equipment and faculty expertise to make important inroads in their own scientific discoveries," says Galen Duree, department head. "Rose-Hulman has established a solid reputation nationally and internationally in undergraduate optical engineering and physics, and our students and alumni continue to be our most valuable calling cards to our program's continued success."

Recent engineering physics graduate Kayla Storie (above and right) revealed that micromachining processes could place flexible electronic devices on clear thin plastic film. She is now a process engineer for Intel.

Richard Liptak, assistant professor of physics and optical engineering, adds, "Few undergraduate students in the country come away with the wealth of knowledge in MEMS technology than those in Rose-Hulman's engineering physics program."

Through two years of research, Storie revealed that micromachining processes could place flexible electronic devices (transistors, capacitors and sensors) on clear thin plastic film—a discovery that could lead to substantial cost savings in the semiconductor industry. She also joined a group of classmates in showcasing their senior-year design project at the



Directed Energy Professional Society's Directed Energy Symposium in Huntsville, Ala. Due to Storie's level of research and development expertise, high-tech companies throughout the country found it hard to believe she will be receiving "just" a bachelor's degree this spring in engineering physics.

"Most people were shocked to learn, with my level of cleanroom experiences, that I wasn't a master's or Ph.D.-level student. I had to prove that I had experience well beyond what my years in school might suggest," Storie says.

Swertfeger turned to the optical engineering program after starting her freshman year as a chemical engineering student. After taking a class on



Rebecca Swertfeger (left) earned the best poster presentation award at the International Conference on Photonics in Portugal for a campus research project. She is spending this summer as an intern with NASA.

semiconductors, and with no laser experience, she was accepted to work with other students on a \$500,000 NASA research project that continues on campus.

"The opportunity to become involved in cutting-edge work is incredible," the senior says. "I can apply ideas and skills that I have learned in class to something that will make a difference in the world one day. I can see the outcome of my work, not as a grade, but as a product or idea that will actually be used. It's incredibly rewarding to see a physical outcome of all of my hard work."



LEARN MORE about the Physics and Optical Engineering Department at <http://bit.ly/2r7HnyR>

Several graduate schools and companies are eager to procure Swertfeger's skills after this summer's NASA internship and her upcoming senior year of studies. She also has been able to develop associations with several top professionals in optical engineering.

"I have found that it is rare to find undergraduate students with research experiences in optics, much less a paper under their name. Those opportunities have opened many career pathways for me," she says. ■

Bailey

Challenge

BY PROFESSOR EMERITUS
HERB BAILEY



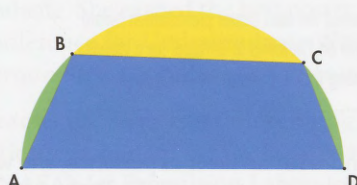
This has been a time of change and transition in life for my wife and me. At 90 years old we moved from a house to an assisted living facility. Now, at 91, we're once again back in a house (address below) and looking forward at what's ahead at 92 and beyond. Hopefully, I have been able to keep track of all the many solvers for these challenges—more than 110 for the winter issue problems. If I missed someone, please let me know.

SPRING PROBLEM 1

Kim bought 17 pencils for 72 cents. Some pencils were red and the rest were blue. The number of each color bought and the price per pencil (in cents) were all integers. The blue pencils cost one cent more than the red ones. How many red pencils did she buy?

SPRING PROBLEM 2

A trapezoid **ABCD** is inscribed in a semicircle with a radius of 2. They share the same base **AD**. The lengths of segments **AB** and **DC** are both 1. Find the area of the trapezoid.



SPRING BONUS PROBLEM

Find a four-digit number such that if you reverse the order of the digits the new number is four times the original number. An example that fails is 2457 since the new number is 7542, but 7542 is not $(4)(2457)$. The leading digits cannot be zero. A little credit will be given for a computer search, but for full credit show your work or at least some of it.

SOLUTION TO WINTER BONUS PROBLEM

Let V_D and V_L be David's and Laura's respective running speeds and C be the track circumference. If T is the time from start until their first meeting, then $100 = TV_D$ and $C/2 - 100 = TV_L$.

$$\text{Thus: } \frac{V_D}{V_L} = \frac{100}{\frac{C}{2} - 100}$$

Also, if T is the time from start until their second meeting, then $C/2 + 40 = TV_D$ and $C - 40 = TV_L$.

$$\text{Thus: } \frac{V_D}{V_L} = \frac{\frac{C}{2} + 40}{C - 40}$$



Equating these two expressions for the speed ratio and solving gives $C = 520$, thus the track radius is $520/2\pi$.

Send your solutions to Herb.Bailey@rose-hulman.edu or to:
Herb Bailey, 8571 Robin Run Way, Avon, IN 46123. Alumni should include their class year.

Congratulations to the following solvers of the winter problems:

ALUMNI: T. Jones, 1949; C. Hirschfield, 1954; K. Verdeyen, 1954; B. Hall, 1955; J. Moser, 1956; A. Sutton, 1956; H. Brown, 1957; C. Ambuehl, 1958; D. Bailey, 1959; J. Dhooge, 1960; J. Kirk, 1960; R. Ireland, 1961; J. Ray, 1961; J. Tindall, 1961; C. McCoy, 1962; J. Snyder, 1962; R. Lovell, 1963; A. Cleek, 1964; D. Moore, 1964; J. Boyer, 1965; S. James, 1965; R. Kevorkian, 1966; T. McLeish, 1968; R. Dutton, 1969; A. Englehart, 1969; K. Metz, 1969; R. Jirousek, 1970; S. Jordan, 1970; D. Jordan, 1971; W. Pelz, 1971; S. Sample, 1971; D. Hagar, 1972; G. Houghton, 1972; T. Nelson, 1972; J. Sanders, 1972; H. Young, 1972; R. Collins, 1973; R. Kominarek, 1973; M. Marinko, 1973; D. Wheaton, 1974; E. Boyer, 1975; P. Eck, 1975; M. Bailey, 1976; W. Hamman, 1976; B. Hunt, 1976; D. Walker, 1976; J. Smith, 1977; P. Van de Motter, 1977; T. Greer, 1978; S. Warner, 1978; R. Priem, 1979; J. Slupesky, 1979; R. Joyner, 1980; J. Koehling, 1980; W. Krehely, 1980; J. Farrell, 1981; P. Gunn, 1981; S. Nolan, 1981; M. Taylor, 1982; R. Downs, 1983; T. Endress, 1983; B. Geene, 1983; J. Marum, 1983; K. Shafer, 1983; W. Bandy, 1985; D. Johnson, 1987; M. Lancaster, 1987; A. Wilt, 1987; S. Sarma, 1988; C. Abdour, 1989; E. Cegielski, 1990; G. Heimann, 1990; R. Burger, 1991; S. Cox, 1991; B. Heinz, 1991; R. Hochstetler, 1991; P. Kimmerle, 1991; C. Schlamm, 1991; R. Wilkinson, 1991; J. Zamora, 1991; R. Antonini, 1993; D. Bailey, 1993; J. Markwardt, 1995; M. Ley, 1997; M. Pilcher, 1998; C. Ehrhart, 1999; S. Walshon, 2000; B. Hirsch, 2004; B. Ross, 2004; J. Lange, 2005; T. Homan, 2007; M. Trowbridge, 2008; S. Ostling, 2009; K. Kragh-Buetow, 2010; N. Schoumacher, 2010; D. Schoumacher, 2010; and J. Munson, 2014.

FRIENDS: M. Allanson, L. Bandy, S. Bonney, C. Cook, A. Foulkes, L. Gaintner, B. Harding, J. Hern, J. Hoffman, G. Hough, N. Kominarek, M. Kremer, L. Kulbago, T. Kulbago, J. Ley, J. Marks, L. Metcalfe, J. Nees, L. Puetz, T. Robinson, A. Rohm, M. Rosene, B. Schacht, B. Studevent-Hickman, D. Voltmer, D. Walker and S. Wilson.

BRINGING BACK MEMORIES

While Christopher Abdour may not return to campus often, his memories of Rose-Hulman and taking classes from now-emeritus mathematics professor Herb Bailey are renewed within each *Echoes*.

From Tampa, where he is an acquisition program manager for the Department of Defense's U.S. Special Operations Command, the 1989 electrical engineering and mathematics graduate spends considerable time solving each Bailey Challenge, and passes along the problems to young family members.

"The Bailey Challenges are great fun because they provide a memory link back to my college days. It's hard to root for Rose-Hulman sports from afar, but by doing the challenges I am able to remain connected to both the college and a former professor," he says. "The best challenges contain some insight into either Professor Bailey or his family. Puzzles with a theme, purpose or story are more interesting."

Abdour recalls fondly how Bailey would include challenge-type problems for extra credit on exams. A correct answer to an extra problem, along with the professor's lenient grading (according to Abdour) in celebration of the Chicago Bears' 1985 Super Bowl victory, helped the struggling student pass a difficult Calculus II exam. Other influential Rose-Hulman teachers for Abdour were his academic advisor, now-emeritus electrical engineering professor Frank Acker, current physics professor Michael Moloney and former chemistry professor Ken Carter. "I hated chemistry, but to this day I often quote Professor Carter," he says. "After offering to drink an acid that had been neutralized with a base, he chickened out, claiming, 'The payoff does not warrant the risk.'"

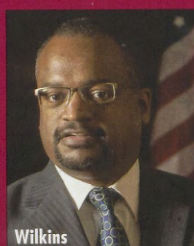
In his spare time, Abdour likes working crossword puzzles, playing chess and Scrabble board games, and collecting and building mechanical puzzles.

Wilkins Passes along Advice, Gibson Honored at Commencement

Distinguished alumni Robert L. Wilkins and Gregory L. Gibson were front and center at this year's commencement, with Wilkins being the event's main speaker and Gibson receiving an honorary degree.

Wilkins, a 1986 chemical engineering graduate, is a judge on the U.S. Court of Appeals for the District of Columbia. He also played a key role in the establishment of the Smithsonian National Museum of African American History and Culture on the National Mall in Washington, D.C. He received an honorary degree from Rose-Hulman in 2014.

Gibson is president of ReTec Corporation, an environmental management consulting and engineering company based in Terre Haute, his hometown. The 1984 civil engineering alumnus has extensive experience in the development and operation of waste management, and has owned and operated landfill, hauling and transfer station operations in Indiana, Illinois, Wyoming, Idaho, Arizona and Texas.



Wilkins



Gibson

Join Alumni in Taking Relaxing Panama Canal Cruise

The Office of Alumni Relations is inviting alumni, family members and other special guests on an 11-night cruise to the Panama Canal, a landmark engineering wonder. The deluxe Azamara Quest will depart from Miami on Jan. 4, 2018 for a course through the Caribbean Sea to a stop in Cartagena, Columbia, before passing through the Panama Canal. After spending a day in historic Panama City, the ship will take guests to visit Gollito, Quepos and Puntarenas in Costa Rica for four days before disembarking in Caldera in advance of departure from San Jose on Jan. 15. Along the journey, meet and mingle with alumni at welcome and bon voyage cocktail receptions. For trip details, contact rose.ahitravel.com or 812-877-8976.



20-Year Alumni Duo Recognized for Career Achievements

The Alumni Association presented Career Achievement Awards this spring to 1997 graduates Benjamin S. Smith and Tiffany Trusty for making a difference in their communities, and science, technology, engineering and math (STEM) professions.

As a family physician, Smith provides primary health care for Breckinridge County, a medically underserved region in west-central Kentucky. The chemistry alumnus also has been president of the Breckinridge County Community Center (Hardinsburg, Ky.), a nonprofit organization bringing recreation to local citizens, and was named the Kentucky Department of Fish & Wildlife's Landowner of the Year in 2006 for his land and wildlife conservation efforts.

Trusty has a passion for technology and entrepreneurship, and inspiring more women to pursue careers in the tech sector. The electrical engineering alumna supports Indiana and national efforts for the Women in STEM initiative, has been a longtime leader for Indianapolis' Women & Hi Tech group and is a member of the National Center for Women in IT Affinity Group Alliance. Her career has included being a mentor and director of the apprentice program for the Eleven Fifty Academy and now developing software through her Trusty Applications enterprise.



Smith



Trusty

Homecoming Schedule

FRIDAY, OCTOBER 6

- 9 a.m. | Alumni Golf Outing | Hulman Links/Country Club of Terre Haute
- Noon | 1874 Heritage Society Luncheon | Kahn Room, HSU

CLASS REUNIONS:

- Class of 1952 – 65th Reunion | Country Club of Terre Haute | 6 p.m.
- Class of 1957 – 60th Reunion | Alumni Center, Hatfield Hall | 5 p.m.
- Class of 1962 – 55th Reunion | Country Club of Terre Haute | 6 p.m.
- Class of 1967 – 50th Reunion | Lake Room, HSU | 5 p.m.
- Pep Rally & Queen Coronation | Cook Stadium, SRC | 8:30 p.m.
- Bonfire & Fireworks | Intramural Fields | Following Pep Rally
- Graduates of the Last Decade Party | Copper Bar, Downtown | 9:30 p.m.
Hosted by the Class of 2012

SATURDAY, OCTOBER 7

- 9 a.m. | Rosie's 5k Fun Run/Walk | Bill Welch Track, SRC
- 9:30 a.m. | Herman Moench Bust Dedication Ceremony | Root Quad
- Noon | Tent City | Parking Lot, Cook Stadium
Groups include Varsity R Club, Operation Catapult, National Society of Black Engineers, Resident Assistants, International Student Association, Institutional Advancement Volunteers, Rosie's Kid Zone, Engineering Management, Connecting with Code, Greek Organizations
- 2 p.m. | Football Game, vs. Mount St. Joseph | Phil Brown Field
- 6 p.m. | 50 Plus Golden Gala Reception | Vonderschmitt Dining Room, HSU
- 6:30 p.m. | 50 Plus Golden Gala | Vonderschmitt Dining Room, HSU

CLASS REUNIONS:

- Class of 1972 – 45th Reunion | Rex Room, Clabber Girl* | 6 p.m.
- Class of 1977 – 40th Reunion | Rex Room, Clabber Girl* | 6 p.m.
- Class of 1982 – 35th Reunion | Rex Room, Clabber Girl* | 6 p.m.
- Class of 1987 – 30th Reunion | Museum Room, Clabber Girl* | 6 p.m.
- Class of 1992 – 25th Reunion | Museum Room, Clabber Girl* | 6 p.m.
- Class of 1997 – 20th Reunion | Museum Room, Clabber Girl* | 6 p.m.
- Class of 2002 – 15th Reunion | Museum Room, Clabber Girl* | 6 p.m.
- Class of 2007 – 10th Reunion | Moggers Restaurant* | 6 p.m.

* Located in Downtown Terre Haute

SUNDAY, OCTOBER 8

- 10:45 a.m. to 1:15 p.m. | RoseWoods Couples Brunch | Saint Mary-of-the-Woods College
Register by calling 812-535-5270

SRC: Sports & Recreation Center | HSU: Hulman Student Union

REGISTER AT:
www.rose-hulman.edu/homecoming

CLASS NOTES

60s

James H. Phillips (EE, 1960) contributed to a five-CD set of recordings featuring Polish composer and politician Ignace Jan Paderewski that has been recently issued by Appian Publications and Recordings in England. About 30 percent of the 78-rpm sides used in the project came from Phillips' personal collection. In addition to his music interests, he is the current Arizona state billiards champion in his age group.

70s

John W. Phipps (CHE, 1970) utilizes his background in farming and engineering as a commentator for the weekly U.S. Farm Report, the nation's longest-running syndicated agriculture-focused television program. He was host for the program from 2005 to 2014, when he returned to work on his family farm near Chrisman, Ill. Phipps now writes humor and commentary articles for several national agricultural-related publications, and is a frequent invited speaker at community events throughout the nation.

Michael D. Bennett (ME, 1973) is the first African-American president of the Indiana University School of Dentistry Alumni Association. He is an oral maxillofacial surgeon with offices in Indianapolis and Fishers, Ind.

Jerry L. Ehlers (EE, 1974) is director of airfield lighting sales for Hughey & Phillips, a global company based in Urbana, Ohio. He formerly assisted in the design and deployment of projects for Honeywell's aerospace electronic systems division, including an innovative lighting project at Chicago's O'Hare Airport.

John N. Voyles (ME, 1976) has retired as vice president of transmission and generation services for Louisville Gas and Electric Company and Kentucky Utilities Company, ending nearly 41 years with the company. He managed two electric generating stations and one hydroelectric station, and was LG&E's first director of environmental excellence.



Randal A. Ridgway (ME, 1977) has sold J.W. Ridgway Heating and Cooling in Frankfort, Ind., after working 40 years at the family business. He is still assisting as a consultant.

Frederick B. Boyd (CE, 1978) is the highway department superintendent and county engineer for Knox County, Indiana. He spent 22 years in the same positions at nearby Sullivan County (Ind.) and formerly was an engineer with the Indiana Department of Transportation.

80s

Daniel E. Wolodkiewicz (ME, 1982) has received Circle of Excellence distinction as a financial/investment planner for Equity Services Inc. He has an office in Beavercreek, Ohio.

Gregg A. Lowe (BSEE, 1984; HD, 2014) has been appointed to the board of directors for Silicon Labs, a leading provider of silicon and software solutions. He

formerly was president/chief executive officer of Freescale Semiconductor and a vice president for Texas Instruments.

Jeffrey S. Gilbert (BSME, 1985; MSEM, 2006) is chairman of NeedsGap LLC, a Carmel, Ind.-based nonprofit group supporting community humanity projects through philanthropic and service support. He also is the longtime chief executive and founder of Software Engineering Professionals, a software development company.

Michael D. Castor (ME, 1988) is vice president of Indianapolis-based Anova Technical Services, and his first charge in that role is leading a project to replace Indiana University Health's Bloomington hospital. He spent 15 years as a division leader for BSA LifeStructures, working on construction projects across Indiana.



Joseph H. Irwin (ME, 1988) is general manager of Soil-Max, an innovative agriculture equipment company that is developing a new production facility in Terre Haute. He is helping the firm introduce new products to solve sub-surface irrigation and drainage problems.

Michael B. Leavitt (CE, 1989) has become the chief of the Cordry Sweetwater Volunteer Fire Department and Ambulance Corps in Nineveh, Ind., which he has served since 2009. By day, he is a division manager for DLZ Corporation in Indianapolis.

Lincoln Gets National Distinction in Physics

After spending years shining a light on science, the American Institute of Physics has turned the spotlight on Don Lincoln (PH, 1986) as recipient of the 2017 Andrew Gemant Award, an annual prize honoring cultural, artistic or humanistic achievements in physics.

The award committee selected Lincoln for his more than 20 years of communicating particle and cosmological physics through public lectures, book, videos and articles, especially those aimed at physics educators. AIP Chief Operating Officer Catherine O'Riordan notes that Lincoln has made the world of subatomic particles accessible to the public.

Lincoln, a senior scientist in the area of particle physics at Chicago's Fermi National Accelerator Laboratory, hosts dozens of particle physics videos for Fermilab's YouTube channel, the most popular of which has nearly three million views. He wrote the weekly Fermilab Today columns for more than a decade and has written articles for such publications as *Scientific American* and *The Physics Teacher*, authored three books about particle physics and the universe, and presented a popular TED talk.

Lincoln's distinguished research has included contributions to the discovery of the Higgs boson.



Bailey Among Ford's 'Thirty Under 30'

It hasn't taken long for Hannah Bailey (ME, 2016) to make a difference at Ford Motor Company and Detroit. Through the company's Thirty Under 30 program, she is spending this year helping nonprofit organizations focus on community issues of food insecurity.

In its second year under Executive Chairman Bill Ford, Thirty Under 30 strives to develop young employee leaders who also serve their communities.

Bailey, who works in the Body Exterior and Safety Engineering Department through Ford's College Graduate program, is helping Detroit's Pope Francis Center develop strategies to help connect with younger generations who represent a future donor and volunteer base. She also is involved in Ford's Women in Product Development group, which connects employees for networking, learning and mentorship; presents middle school career day safety engineering demonstrations through Ford's Volunteer Corps; and helps a local church operate a store that donates its earnings to charitable organizations.

"I like Ford's company culture, which is very people focused, values its employees and diversity, and shows commitment to continuous improvement," says Bailey, who was an intern before being hired full time. At Rose-Hulman, she was a member of the Efficient Vehicles Team and Valeo Innovation Challenge project, and attended the North American International Auto Show as part of an initiative to encourage more women in the automotive industry.



90s

Robert Jacobs (CHE, 1990) is the vice president of product marketing and communication for Volvo Car USA, and a member of the leadership team for the company's Americas region. He previously was vice president of brand management for the Starwood Group's Westin and Sheraton hotel divisions and spent 21 years in worldwide marketing, brand management and manufacturing operations for Proctor & Gamble.



Brian R. Runkle (EE, 1990) is senior vice president of transformation and operational excellence for Webster Bank of Waterbury, Conn. He has more than 20 years of experience in finance, with a variety of experiences within GE Capital.



Kenneth J. Koziol (CE, 1992) has been promoted to vice president of development for The Garrett Companies, a national multifamily development, construction and management firm based in Greenwood, Ind. He has nearly 25 years of experience in construction and facility programming, and had key roles in the development of new airport terminals in Detroit and Indianapolis.

Jeffrey L. Papa (ECON, 1993) earned a doctorate in education administration and leadership from Indiana State University.

Ryan W. Steinhart (ME, 1994) has been promoted to a principal member with ownership interest in Hafer Associates, a design/engineering/architectural firm based in Evansville, Ind. He is an engineer who has specialized in hospital projects since joining the company in 1996. Ryan's brother Ron W. Steinhart (ME, 1990) also is a principal with the firm.



Toby L. Thomas (ME, 1994) is the president and chief operating officer of Indiana Michigan Power, an operating unit of American Electric Power. He formerly was vice president of AEP's competitive generation division and vice president of the company's Kentucky Power unit.



Jacque Wilson (ME, 1996) is a new partner specializing in intellectual property cases with the Snyder Morgan LLC law firm in Fort Wayne, Ind. He had been assistant counsel in Zimmer's Intellectual Property Group.



Kevin L. Tretter (EE, 1999) is senior product marketing manager with Microchip's mixed signal and linear product group in Chandler, Ariz.

00s

Shana D. Goodman (EE, 2001) became the first woman to be a divisional chief engineer at the Naval Surface Warfare Center at Crane, Ind. She has had six different positions in the flight systems division during 16 years with the military high tech development center.

Robert F. Guratzsch (CE, 2002) is the global supplier manager for Schlumberger in Houston, handling supply chain operations. He formerly managed D&M location operations for the company from offices in Trinidad & Tobago.

David L. Breiding (BE, 2004) has continued his passion for swimming as head coach of the Terre Haute Torpedoes, a youth swim team. He also is a math teacher at Dugger (Ind.) Union High School.

Dylan T. Tarr (CE, 2004) is president of the Tarr Group, an enterprise providing service to central Indiana real estate projects. He formerly was a development director for Mainstreet and project manager for Gresham, Smith and Partners.

Justin C. Droba (MATH, 2006), a research and development specialist at NASA's Johnson Space Center, earned NASA's Best Paper Award for "Tangle-Free Finite Element Mesh Motion for Ablation Problems."

Jacob D. Fuerst (CHE, 2006) has passed professional engineering's metallurgy and materials licensure exam in Alabama, and is now the senior metallurgist and materials scientist for Remington Outdoor Company in Huntsville, Ala.

CLASS NOTES

James E. Zeszutek (ME, 2006) earned a law degree from Mitchell Hamline School of Law (St. Paul, Minn.) in 2015 and is now a patent attorney at Brooks, Cameron & Huebsch in Minneapolis.

Riley S. Buttry (ME, 2007) is operations manager for Bastian Solutions' engineering team in Greenfield, Ind. He spent 13 years as a project leader and manager for Roche Diagnostics in Indianapolis.

Yaw Aning (CE, 2007) was featured by *Indianapolis Business Journal* among Indianapolis' 40 top young professionals under the age of 40. He is cofounder and chief executive officer of Sticksnleaves, a company developing web and mobile applications.



Rachel N. (Howser) Roberts (CE, 2008) has been promoted to senior engineer at Energo Engineering in Houston. She has worked for the company since 2011, and earned a doctorate in earthquake engineering in 2013 from the University of Houston.

Joel P. Westrup (ME, 2008) has been promoted to principal engineer of ThermalTech Engineering's office in Elizabethtown, Pa. He has been an engineer in the company's Cincinnati headquarters since 2009.



Sean P. Feeney (SE, 2009) is a lead development operations engineer with Target in Minneapolis; he was a cloud infrastructure architect for Amazon Web Services.

Isaac E. Weintraub (ME, 2009) co-authored three papers with a team of researchers from the Air Force Research Laboratory in Dayton, Ohio. He is a scientist with General Dynamics Information, based at the Wright Patterson Air Force Base.

10s

Keenan Long (ME, 2010) joined three UCLA School of Management MBA classmates in winning the 2017 Game Day Sports Case Competition at Villanova University. He is an advanced concepts engineer for Easton Baseball/Softball.

Stephanie L. Drenten (ME, 2011) has earned a master's degree in engineering for sustainable development from Cambridge University (England). She is using these new skills as an energy program engineer for Forest City Realty Trust in Cleveland.

Ariel M. (Young) Roberts (ME, 2011) is a senior engineer for Eli Lilly & Company in Indianapolis, specializing in delivery and device research and development. She formerly was a senior design engineer with Bastian Automation Engineering in Greenfield, Ind.

Sadie M. Geerligs (OE, 2012) was featured in the UNSTOPPABLE WASP blog that's showcasing young female scientists. She is an applications engineer for AFL, a fiber optic company. Learn more about her job and career at <https://news.marvel.com/comics/60961/unstoppable-wasp-meeting-minds-pt-3>.

Brothers **Andrew J. Milluzzi (CPE/SE, 2012)** and **Anthony Milluzzi (EE, 2016)** led a forum discussion on collegiate amateur radio at the 2017 Orlando Hamcation. Both were active members in the Rose-Tech Radio Club. Andrew is a doctoral student researching heterogeneous system optimization at the University of Florida, while Anthony has started graduate school at Ohio University.

Victor M. Aguilar (BE, 2014) was among 40 young scientists from across America and Puerto Rico named Yale Ciencia Academy Fellows. He is pursuing a doctoral degree at Cornell



University, focusing on engineering biomimetic microenvironments to model muscle stem cell interactions with tissue aging processes. He also is a science writer for the Cornell Daily Sun and a mentor to the SciComm Club at Cornell.

Omar H. Abdul-Rahman (CS, 2014) was member of a team of Cranfield University School of Business (London) MBA students earning the Entrepreneurs' Choice Award while winning the Southern European final round of the global Venture Capital Investment Competition.

MAJORS KEY

BE: Biomedical Engineering	BIO: Biology	CE: Civil Engineering	CHE: Chemical Engineering	CHEM: Chemistry	CPE: Computer Engineering	CS: Computer Science	EE — Electrical Engineering
EM: Engineering Management	EN: Environmental Engineering	MATH: Mathematics	ME: Mechanical Engineering	OE: Optical Engineering	PH: Physics	SE: Software Engineering	



Flotemersch Honored for High Quality Work

Helping companies and organizations deal with chaotic situations has earned Harry B. Flotemersch (EE, 1984) distinction as a consultant and leader in innovation and quality improvement programs within the automotive and defense industries. He was named the American Society of Quality's Automotive Division Quality Leader of the Year in 2016.

Flotemersch is a senior consultant at Shainin LLC (Northville, Mich.), providing problem-solving coaching to North American clients. His work for other companies has earned such recognition as the Chairman's Award for BAE Systems (Troy, Mich.), the Best of the Best Honor at DaimlerChrysler (Auburn Hills, Mich.) for involvement in a \$101-million warranty savings project, and Delphi President's Council Award for overall quality system improvement in the Delco products division (Flint, Mich.).

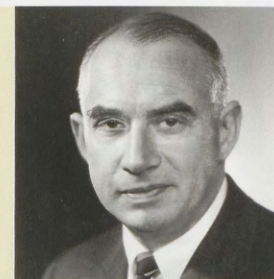
"I have sought out a career path that leveraged what I was good at and avoided what I was not," he says.

Flotemersch is most interested in how structured innovation methods are leveraged to aid quality problem solving in practice. He has conducted several webinars and national conference presentations on a variety of subjects involving structured innovation, and has used these methods to develop corrective actions for his clients.

In Memoriam

Howard Irvin Found Future in Plastics

Howard H. Irvin (CHE, 1943), 98, died Feb. 1, 2017, in Chicago. Leaving Nazi-occupied Germany in 1938, Irvin came to New York City at the age of 19 with only \$10 to his name. He worked for a year at Hyde Farm (Burkeville, Va.), an experimental farm for German Jewish student refugees, before attending Rose-Hulman on a scholarship provided by the Warburg banking family of New York. He worked for more than 40 years at Marbon Chemical Company, a division of Borg Warner Corporation. Irvin co-invented a hard plastic called Cylolac, which was used for AT&T princess telephones, Lego blocks, football helmets and plastic furniture. Later in his career Irvin was a Rose-Hulman trustee.



Donald D. Logsdon (ME, 1942), 98, died March 16, 2017, in Tellico Village, Tenn. He worked at oil refineries, chemical plants and natural gas terminals throughout the world for Standard Oil Company and Amoco Chemical.

James L. Johnston (EE, 1943), 94, died Jan. 12, 2017, in Maryville, Tenn.

Eugene "Gene" Broemmelsiek, Jr. (CHE, 1947), 89, died Feb. 4, 2017, in Baton Rouge, La. He retired as a senior engineer with Ethyl Corporation after being a plant manager for Doll Paper Company and an engineer for Shell Oil.

William G. Cornell (CHE, 1947), 92, died Jan. 6, 2017, in Tigard, Ore. He was a plant supervisor for Union Carbide and later retired as an engineer with Northern Petrochemical.

Fred W. Burdett (ME, 1949), 95, died Nov. 11, 2016 in Appleton, Wis. He retired as vice president of manufacturing for Giddings and Lewis.

Paul S. Collignon (ME, 1949), 91, died Nov. 11, 2016, in Indianapolis. He was the chief patent attorney for Naval Avionics, and later had his own law practice.

Paul Gottfried (EE, 1949), 89, died Jan. 26, 2017, in Evanston, Ill. He was a reliability and safety systems consultant for a variety of companies, including the Department of Defense, NASA and Disney.

Gordon C. Fowler Jr. (ME, 1951), 87, died March 9, 2017, in St. Joseph, Mich. He retired after more than 30 years as an engineer with Clark Equipment.

James D. Dunlop (EE, 1952), 87, died Feb. 19, 2017, in Ormond Beach, Fla. He developed the nickel-hydrogen battery that has powered satellites, the Hubble Space Telescope and International Space Station. His prototype battery is on display at the Smithsonian Institution.

Howard K. Pedigo (CE, 1953), 84, died Jan. 12, 2017, in Plainfield, Ind. He was executive vice president of the Universal Tank & Iron Company (1964-1985) and chief engineer for the Indiana Department of Resources (1985-95).

William W. White, Jr. (CE, 1957), 82, died Oct. 31, 2016, in Charlotte, N.C. He built steel plants throughout the world as a project manager for Midrex Technologies.

Barton D. Hartsock (ME, 1958), 80, died Jan. 12, 2017, in Tampa, Fla. He was owner of Southern Equipment Corporation.

William E. Kuchar (EE, 1959), 79, died Dec. 8, 2016, in Milwaukee, Wis.

Jacque R. Dhooge (EE, 1960), 79, died March 30, 2017, in Overland Park, Kan. He retired as executive vice president for Creative Controls, and had a patent for the platter projectors featured in drive-in and indoor movie theaters across the country.

Daniel P. LaGatta (CE, 1960), 79, died Dec. 24, 2016, in Winchester, Mass. He was president emeritus of Geotechnical Engineers Inc.

Bruce A. McDowell (CHE, 1960), 79, died March 28, 2017, in Goshen, Ind. He worked 28 years as an engineer for Miles Laboratories.

Don Rumble (ME, 1960), 81, died Dec. 10, 2016, in Flemington, N.J. He retired after a 36-year career as an engineer with Public Service Enterprise Group.

Lee R. Brda (CE, 1962), 78, died Dec. 30, 2016, in North Fort Myers, Fla. He retired as manager of Ford Motor Company's worldwide technical marketing operations.

Don L. "Robbie" Robinson (EE, 1962), 76, died Feb. 15, 2017, in Decatur, Ill. He retired after a 38-year career with Illinois Power Company.

Jerry T. Nickerson (CE, 1963), 76, died March 13, 2017, in Cincinnati, Ohio. He retired as vice president of Southern Ohio Fabricators.

James E. Dunn (EE, 1965), 74, died Dec. 4, 2016, in Colchester, Vt. He was a systems network coordinator and computer programmer for GE Healthcare.

Thomas W. Takacs (ME, 1966), 72, died Oct. 22, 2016, in Rotonda West, Fla. He retired after 30 years with Inland Steel.

Philip M. Gerhart (ME, 1968), 70, died Jan. 27, 2017, in Evansville, Ind. He was dean of engineering and computer science and professor of mechanical and civil engineering at the University of Evansville.

James P. Hancock (MA, 1969), 70, died Feb. 26, 2017, in Indianapolis. He retired in 2015 as an information technology manager for the State of Indiana, and also worked for National Cash Register.

Kenneth E. Kahl (CHE, 1974), 64, died Nov. 13, 2016, in Buena Park, Calif. He retired as a chemist with Dr. Pepper.

David L. Johnson (CHE, 1978), 61, died April 11, 2017, in Indianapolis. He was a process development manager for Eli Lilly & Company.

Donald B. Akers (EE, 1984), 54, died Dec. 6, 2016, in St. Charles, Mo. He was an engineer with Boeing in St. Louis.

David L. Steward (EE, 1984), 54, died Jan. 11, 2017, in Bloomington, Ind. He was an engineer at the Naval Warfare Surface Center in Crane, Ind.

Matthew R. Dillon (CHE, 2010), 29, died Feb. 20, 2017, in Rosedale, Ind. He was studying for a degree in pharmacy at Indiana State University.

Mitchell D. Thieme (SE, 2011), 28, died April 1, 2017, in Fort Lauderdale, Fla. He worked for Randstad Technologies. His family has established the Mitchell Thieme Endowed Scholarship in his honor at www.rose-hulman.edu/give.

FRIENDS

Donald E. Smith, 90, died on April 23, 2017, in Terre Haute. He was an emeriti Rose-Hulman trustee who formerly was president and chief executive officer of First Financial Corporation.

John M. Blakley, 76, died Sept 28, 2016, in Indianapolis. He helped lead Rose-Hulman's Indianapolis Board of Associates group for several years.

Rosebuds

Theresa O'Connor (CS, 2001) and wife Erin welcomed their first child, Erin, Oct. 19, 2016. The family lives in San Francisco, where Theresa is a software engineer at Apple.



Jason A. Caron (ME, 2002) and wife Kristin had their third child, Lincoln, Feb. 16, 2017. The family lives in La Plata, Md., where Jason is an integrated product team leader at the Naval Surface Warfare Center-Indian Head.

Aaron P. Bolner (CHE, 2003) and wife Andrea welcomed their first child, Adrienne, on Sept. 16, 2016. The family resides in Indianapolis.



Dianna Artigue (CHE, 2004) and husband **Kyle D. Overmyer (ME, 2009)** welcomed twins, Charlotte and Bridget, Nov. 10, 2016. The family resides in Carmel, Ind.

Kimberly A. Miller (Math, 2006) and husband **Spike Miller (ME, 2007)** had a child, Petra Rose, Nov. 17, 2016. The couple lives in Brookings, S.D., where they work for Daktronics. Kimberly supervises the manufacturing and service systems team for information technology project managers and business analysts. Spike is an engineering product owner for mechanical chassis.



Matthew W. Pepelea (ME, 2007) and wife Natalya had a daughter, Erena, Dec. 17, 2016. The family lives in Costa Mesa, Calif., where Matt is an engineering manager at Edwards Lifesciences.

William (Billy) D. Whitehouse (CPE, 2007) and wife Megan had their second daughter, Madelyn, Dec. 14, 2016. The family lives in Cincinnati.



Maria A. Fouts (BSME, 2009; MSEM, 2010) and husband **Dean N. Straub (CHE/CHEM, 2010)** had their third child, George, Dec. 19, 2016. Dean is a process engineer with Jacobs Engineering. The family resides in Katy, Texas.

Rebecca L. Winer (ME, 2009) and husband **Robert W. Warden (ME, 2009)** welcomed their first child, Brinley, Dec. 25, 2016. The family lives in San Antonio, Texas.



Lindsey M. Gault (BE, 2011) and husband **Chris A. Stemple (CHE, 2011)** had their first child, Neal, Jan. 31, 2017, in Hamilton, Ohio. Lindsey is an advanced design assurance engineer for Hill-Rom and Chris is a maintenance and logistics leader with Dow Chemical.

Tyler P. Kimbrell (ME, 2011) and wife Ashley welcomed son, Harrison, Oct. 10, 2016. He couple lives in Columbus, Ind., where Tyler is an assembly systems leader with Cummins Engine.



Alexis P. Bledsoe (CHEM, 2013) and husband **Cyril (Cy) B. Rybicki (EE, 2012)** welcomed twins, Haven and Xander, Dec. 5, 2016 in Bloomington, Ind. Alexis is a senior production supervisor for Boston Scientific and Cy is a test engineer at Technology Service Corporation. The family lives in Bloomington.

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Weddings



Scott C. Wright (CHE, 1986) married Elena Patsenka on Sept. 29, 2016, at Rose-Hulman's White Chapel and again on Jan. 5, 2017, in Minsk, Belarus. He is a retired lieutenant colonel in the U.S. Army and now is an associate professor for project management in University of Wisconsin-Platteville's

School of Business. Officiating the ceremony was Robert Wilkins (CHE, 1986). Other Lambda Chi Alpha fraternity brothers participating in the ceremony were Dick Weigel (CE, 1986), Eugene J. LeBoeuf (CE, 1985) and Jeff Myers (EE, 1987). The couple resides in Mount Horeb, Wis.

Timothy J. Hayes (CE, 2001) married Elene Eliopulos in Sacramento, Calif., on Oct. 1, 2016. He is an engineer for Torani. Alumni participating in the ceremony were Joe Kramer (CS, 2001) and Bob Ladisich (CE, 2001).



Jason R. Strobel (CHE, 2004) married Angie Fulton on Jan. 5, 2017, on the island of Curacao. Jason is a senior project manager at CET Inc. The couple resides in Culver, Ind.

Jordan C. Crafton (CS, 2007) married Sarah MacPhail on Oct. 1, 2016. He is employed with UniFirst Corp. in Indianapolis, where the couple resides.



Calvin M. Bueltel (BSCH, 2010; MSEM, 2011) married Jamie Shifflett on May 21, 2016. He is an engineer with Alcoa Howmet. The couple resides in Smithfield, Va.



Andrew J. Bomar (BSME, 2011; MSME, 2013) married **Kate E. Pippins (BSBE, 2010; MSBE, 2013)** on July 9, 2016, at Rose-Hulman's White Chapel. Andrew is an engineer with Mainstream Engineering and Kate is a physician assistant for MAB Vascular Surgery. The couple lives in Rockledge, Fla.

Andrew W. Schmidt (ME, 2012) married **Alison M. Chartier (CHEM, 2015)** on Nov. 5, 2016, in Indianapolis. He is a Six Sigma Black Belt for Cummins Engine. She is an analytical chemist for Eli Lilly and Company.



Drew M. Robertson (ME, 2014) married **Marissa C. Artmayer (CHE, 2014)** on Oct. 15, 2016, in Avon, Ind. Drew works at Eli Lilly & Company while Marissa is employed at Matrix Technologies. Alumni participating in the ceremony were Katherine Moravec, Ranjana Chandramouli, Denise Phua, Simon Burns, Harrison Coons and Garrett Meyer.

Nathan W. Jarvis (SE, 2015) married **Jaclyn R. Smith (BE, 2016)** on Dec. 3, 2016, in Lebanon, Ind. He is a software engineer for Progressive Insurance and she is a test engineer for Empirical Testing Corp. The couple resides in Colorado Springs, Colo.



STORY BY
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Waves of the Past—and Future

STUDENTS FIND THEIR VOICES ON RADIO

The 1987 movie “Good Morning Vietnam” featured radio funny man Adrian Cronauer (played by Robin Williams) delighting American G.I.s with an irreverent take on the life and times of the Vietnam War.

In similar fashion, student disc jockeys for radio station WMHD brought comedy relief to the campus’ student body through such shows as “Radio Free Terre Haute” and “The Saturday Morning Special,” as they served up an eclectic offering of commercial-free alternative music, sports and entertainment programs over the years.

Radio has a rich history at the institute. Terre Haute’s first commercial radio station, WRPI, was licensed to Rose Polytechnic Institute in 1927. That license later was transferred to another station in the city, and the campus station took a low-frequency independent status, broadcasting from studios located in the basement level of Baur-Sames-Bogart residence hall.

Bill Jurasz (EE, 1989) worked late into the night trying to design and build a headphone amplifier for the campus radio station. He was among several former staff members to take up this technical challenge.

That location was the perfect place for students to let their creative juices flow and get lost in a world that has become more special throughout the years.

“WMHD saved my life,” asserts former DJ and show host Michael Garretson (EE, 1989), who found the station on his first day on campus as a freshman living in BSB Hall. “The one- to two-hour shifts each week were at the core of most folks’ experiences. But, to me, the station provided more. It was community... Entering the broadcast or production studio, or just the office, provided stress relief, and a way to let off steam and leave school behind for a while—sometimes a long while.”

That was definitely the case in October of 1985 when freshman Gary Tyrrell (EE, 1990) pushed the limits of creativity and comedy when he developed and helped host Rose Aid, a virtual concert/telethon that strived to raise money for student scholarships (similar to the popular worldwide Live Aid supporting African famine relief).

“That night seven digits burned themselves into my memory and have never left: 877-2623, the station’s studio telephone line,” he says. Then, he adds with a chuckle, “We ended up raising about four bucks.”

As one of the only radio stations playing music affectionately referred to as “sleeveless heavy metal,” WMHD DJs were the first to broadcast songs by heavy metal heavyweights as Helloween, Grim Reaper and Armored Saint. This helped staff members build relationships with grateful record labels and build a loyal local audience. On one occasion station manager Jim Grey (MA, 1989) and music director Michael Ray (EE, 1993) got a special invitation to interview Grim Reaper founder/guitarist Nick Bowcott following one of the band’s concerts in Chicago.





When not in the classroom, Jim Grey (MA, 1989) could be found on the air as a disc jockey and general manager for WMHD in studios located on the basement-level floor of Baur-Sames-Bogart residence hall.

"The show rocked," Grey recalls. "Afterwards, we were escorted to the tour bus, where Nick awaited. He sat down before us and answered all of Michael's questions thoughtfully and thoroughly. He treated us like we were from *Rolling Stone*, instead of being two 20-year-old students from a 160-watt radio station in Terre Haute, Indiana."

The station's playlist also included album-oriented rock, music from the 1960s and 1970s, and jazz—whatever compact disks or albums station leaders could manage to get from a local record store or music CD production plant.

Matt Sheehe (CS, 2001) played "whatever music I was in the mood for" on his "The Saturday Morning Special" show (from 10 a.m. to 1 p.m.), which he managed for most of his campus career. "It was a great way to shake off a long week and just have some fun," he says. Those fun times included the station taking on "The Monkey" slogan that still sticks with today's online broadcasting operation. "WMHD also is considered one

The campus radio station's popularity for playing a variety of musical styles and shows was featured in Terre Haute media, with hosts (from left) Jeff Darnell (ME, 1990), Rob Hochstetler (EE, 1991), Bill Eccles (EE, 1992) and Bobby Woolf (CS, 1990).



of the first stations in Terre Haute where you could hear Dr. Demento and Bon Jovi. It is where electrical engineering professors David Voltmer and Jack Derry hosted a Sunday night "Rose's Pickin' Parlor" show featuring bluegrass music. And, it is where the weekly live public affairs "Elephant Talk" call-in show featured a lively debate between mathematics professor Alfred Schmidt and English professor Peter Parshall about coeducation. Tyrrell refers to that program, in particular, as "the best hour of radio in my career."

"When I wonder what [popular radio show hosts] Ira Glass or Jad Abumrad feel after a particularly good hour of radio, I can almost convince myself that I came close to that feeling once."

Channels

The Tribune-Star September 10-16, 1989



WMHD-FM remains a step ahead

WMHD

Back On Air... Online

After a three-year hiatus, WMHD is back "on the air" through online broadcasting at wmhdradio.org. This makes the station's music and other programming accessible 24 hours each day to listeners—and alumni—throughout the world. The station has a broadcasting room, recording studio and booth, and a storage room in the southwest corner of the basement level of Baur-Sames-Bogart residence hall.

"Conventional radio may be considered dead, but WMHD is alive," says station manager Valerie Grafton, a junior physics student. Twenty students are responsible for hosting shows, selecting music for broadcast, promoting the station's campus activities and managing the recording studio.

The station is still true to its heritage of alternative music, showcasing cutting-edge rock, hip hop, jazz and classical songs.

And, Grafton points out that WMHD Online's inaugural show had a "21st Century Silliness" dank memes theme. Some things never change.

AUDIO LINK:



Hear what's happening on campus and on the minds of today's RHIT students at wmhdradio.org

Echoes

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PARTING SHOT

Our beautiful campus was once again in full splendor throughout the spring season. One particular highlight was the blossoming cherry tree orchard, near the White Chapel, which celebrates the institute's relationship with Japan's Kanazawa Institute of Technology. See more scenes by photographer Bryan Cantwell on pages 28-29.



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