

Winter 2016

# Winter 2016

Echoes Staff

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WINTER 2016

# HIGH-TECH SLEUTHING

# Echoes

ROSE-HULMAN INSTITUTE OF TECHNOLOGY



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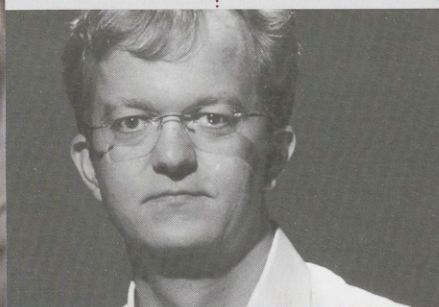
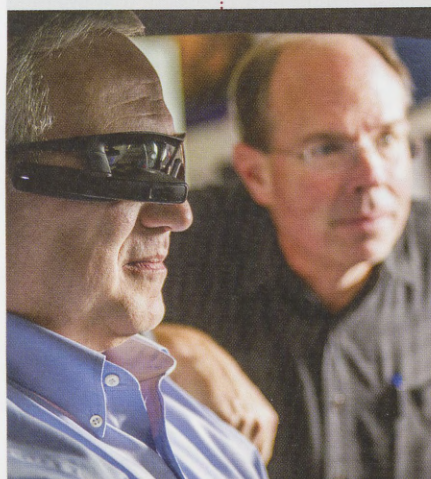
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**PRIME**  
**17 YEARS**

Biomedical Engineering  
Chemical Engineering  
Civil Engineering  
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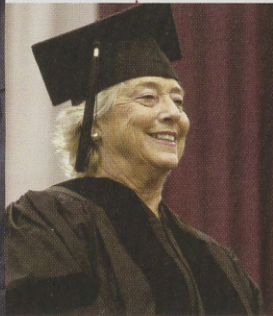
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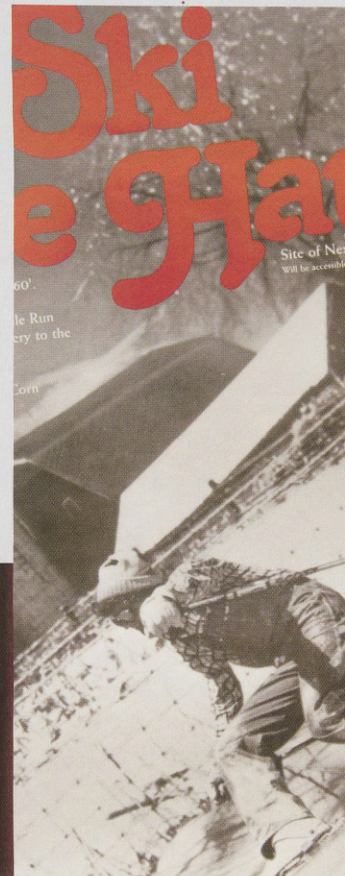
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**I**t doesn't take Sherlock Holmes to detect that something is different with this issue of *Echoes*. The reason for the change is elementary, my dear Watson: It was time. We haven't made any significant design changes to the publication in the 14 years since we adopted a magazine format in the fall of 2001.

Your meticulous investigation will reveal new fonts and more white space on the pages, which give the magazine a cleaner look and enhance readability. And, with a fulltime photographer on staff for the first time, we now have a stronger selection of photos to help tell our stories.



BY **JIM CONWELL**,  
PRESIDENT  
[conwell@rose-hulman.edu](mailto:conwell@rose-hulman.edu)

Redesign and re-engineering are familiar concepts for Rose-Hulman alumni. As you well know, products, services, and operations need to be retooled as technology, knowledge,

and needs change. As an institution, we have always sought continuous improvement; now we have a fresh impetus in Rose Reimagined.

Introduced a year ago, Rose Reimagined is our expedited process for exploring fresh approaches at Rose-Hulman, and it is already bearing fruit. After a great deal of collaboration, research, and discussion among the faculty, we now have our first concept entering the development phase: an undergraduate degree program in Engineering Design. This program

represents a departure from our traditional academic offerings in both focus and structure. Engineering Design, emerging as a specialty in its own right, has been conceived as a team-taught, project-based program involving peer-to-peer mentoring and the blending of technical and liberal arts requirements.

Students coming out of the program will have mastery of engineering concepts along with more extended experiences in applying those concepts and working in teams than we are able to achieve within the structural confines of our traditional engineering programs. The program also will be specifically designed to develop creative problem-solving skills and big-picture thinking. Of course, all of these elements already exist in our programs today; however, in reimagining engineering education and starting a program from scratch, we will be able to emphasize those skills that are becoming more critical to career success today.

Engineering Design requires a new configuration of academic space to integrate teaching, projects, and smaller group meetings most effectively. In contrast to a series of individual classrooms and labs along a hallway, this program calls for large, collaborative work hubs—surrounded by labs and other facilities to support the learning activities.

With one new concept on its way toward full development, Rose Reimagined will continue to be our engine for transformative change—moving trail-blazing ideas from concept to reality. New academic programs will be an important part of the mix, but we also are looking to re-engineer operations and practices that no longer serve us effectively. We welcome ideas from all areas of our Rose-Hulman community, and as alumni, your perspective and input will be especially valuable to this process. We encourage your feedback!

## Echoes: Spruced Up and Mobile-Friendly

We hope you like the new look of *Echoes* while enjoying the features you've come to expect. Many of the preferences expressed during our recent readership survey are incorporated in this issue, and we'll continue to use your feedback as we develop future issues. In addition to the printed magazine, we are introducing a digital option through [issuu.com](http://issuu.com), a hosting site for periodicals. You can find *Echoes* at [www.issuu.com/RoseHulman](http://www.issuu.com/RoseHulman), or download the free issuu mobile app to follow Rose-Hulman and put *Echoes* in your reading "stack."





If our email inbox is any indication, the fall issue of *Echoes* was one of our readers' all-time favorites. We received several kudos through email, along with many compliments during Homecoming festivities. The response to our special "Back to the Future" retrospective section was especially enthusiastic, as alumni remembered and shared their own memories and tales with us.

## THANK YOU FOR YOUR KIND WORDS.

We had as much fun hearing your stories as you did telling them, and we would love to hear even more! Share your Rose-Hulman (or Rose Poly) escapades, favorite faculty stories, or fond memories with writer Stacey Muncie at [muncie@rose-hulman.edu](mailto:muncie@rose-hulman.edu), and you just might see them in a future issue.

### Calling Mr. Shagnasty

"I just received the Fall 2015 *Echoes*. Lots of memories came rushing back. The cutest memory: the short article about the class of 1965 and Bolivar Q. Shagnasty on page 9.

I seemed to recall Bolivar. So I looked up my 1961 *Modulus*. Sure enough, Bolivar was a freshman. See page 131, where his picture shows up out of alphabetical order as the final freshman. That would place him in the class of 1964! Unless, of course, Bolivar was a 5 year man.

The class of 1961 was heavily involved in the editing of the 1961 *Modulus* and was well known for executing many similar pranks. I'm pretty sure Carter & Smith were responsible. Our freshman year Rosie disappeared for a while—a few were disciplined for that prank.

Bolivar didn't seem to be around before 1961, but I could be mistaken.

Anyway, I thoroughly enjoy each and every issue of the *Echoes*. Keep up the great work."

—Russ Archer (MA, 1961)

### Making Mom Proud

With regard to his being featured in the story "Gone Fishin'," **Bob Bagby (ME, 1980)** quipped:

"My mother was extremely proud. Nice *Echoes* overall. Really neat to see some of the historical stuff."

### This Guy is a Real Payne

And, we got some help identifying the football player featured in this photo from alumnus Carl Herakovich:

"Thought you might like to know that the football player on the top right of page 24—receiving the ball—is Bill Payne. Bill and I played together for several years. However, he was not on the 1958 team. We are still friends and have exchanged Christmas cards for all these years."

—Carl Herakovich (CE, 1959)

### The More Things Change

Alumnus Don Lundgren shared his Shutterfly Share site that compares the Rose Poly he remembers with the Rose-Hulman of today, through photos contrasting the old with the new, at <https://rhit.shutterfly.com>. He also included a very nice compliment:

"The Fall/2015 issue of *Echoes* was the best one I have seen in the 49 years since I graduated in 1966."

—Don Lundgren (EE, 1966)





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

# NEXT-GEN LAW ENFORCEMENT

**COMING SOON TO  
AN AGENCY NEAR YOU:  
CONNECTED OFFICERS,  
DRONE TECHNOLOGY**



We're getting closer to replicating the Hollywood-themed RoboCop—a part-human, part-robot police officer—as public safety departments across the country become armed with an arsenal of high-tech tools for smarter ways to keep their communities safe and their officers secure. And, Rose-Hulman alumni are behind many of these advancements in crime-fighting.

The Connected Police Officer, part of Motorola Solutions' Next Generation Public Safety program, features smart belts with sensors that detect when a gun or Taser is pulled from the holster; smart glasses to capture crime scene images and provide text messages from dispatchers; and drone technology to provide broadband connectivity and a bird's-eye view of crime and fire scenes.

Meanwhile, real-time intelligence computer consoles will give a department valuable data to address community crime-fighting priorities, and uniform vests with biometric sensors will monitor an officer's heart rate to detect potentially dangerous situations.

"Technology is part of police officers' lives, and Motorola Solutions technology is providing a platform that interfaces with existing systems and provides officers with more information than ever before," says St. Louis Metropolitan Police Chief Sam



Dotson. “In today’s technological world, officers and citizens are demanding it. Ultimately we have a safer community and focused resources because of the technology.”

Aspects of this technology were developed by Randy Ekl (EE/CPS/MA, 1983), director of advanced systems technology, and Bruce Mueller (EE, 1987), director of wireless research, in the Chief Technology Office led by senior director Bruce Oberlies (EE, 1982) at Motorola Solutions’ offices in Schaumburg, Illinois. This trio has earned 70 patents for advancing technological projects.

“Where there is a need for safety and helping officers do their job better, that’s where we’re looking to provide assistance,” says Ekl, leader of the team on the smartbelt project. “The key is keeping officers clearly focused on what’s happening in front of them, and keeping them connected with others who can provide valuable assistance, if necessary. Every second is crucial in these intense situations. Hopefully, we’re giving them the ability to do their jobs better.”

Mueller adds, “Ultimately, at the end of the day, we want every police officer to come home to his or her family safely. Technology is a large part of what we do; we’re Motorola, and we have a heritage of making amazing things real. But we never forget that

there’s a human element—saving people’s lives—to all those cool and exciting things.”

Motorola Solutions has been a significant player in America’s public safety industry, receiving continuous feedback from public safety leaders, law enforcement officers, and firefighters about what’s needed to improve response times, increase citizen engagement, and maximize the use of taxpayer dollars—with the overall goal of producing a safer community. These customer-Motorola “invention sessions” begin the new product development process.

“Officers won’t tell you what they want. You need to notice what they need,” said Oberlies, adding that the 18-month product development cycle for these newest tools was a global effort involving team members from Illinois, Florida, and Malaysia, along with third-party vendors.

After making demonstrations at trade shows, Motorola recently began field-testing the Connected Police Officer smart glasses, along with the belt features. Data from this system flow to customized high-tech consoles at law enforcement

(CONTINUED ON NEXT PAGE)



JUSTICE  
GOGGLES



## HIGH-TECH SLEUTHING

**HELPING PUBLIC SAFETY:** Alumni Randy Ekl and Bruce Mueller (in background) are directors of divisions within Motorola Solutions' Chief Technology Office that's helping bring technology advances to law enforcement.

(CONTINUED FROM PREVIOUS PAGE)

agencies. On the horizon, a new drone-based communications system may offer even more promise. It has been demonstrated for some departments, and showcased at trade shows. For example, this system would enable rapid deployment of public safety Long-Term Evolution (LTE) systems such as those that are currently being tested by first responders within the City of Calgary, Canada, and providing police with high-speed broadband capabilities to quickly access data, images, and videos. The Calgary Police Service is able to collect and analyze information from a variety of sources and securely distribute it to officers on the front lines of protecting the public.

"Reliable and uninterrupted communications is a mission-critical priority in emergency situations,

**EXPLAINING TECHNOLOGY:** Tim Ekl discusses how smart glasses and smartbelts are changing the face of law enforcement.



and having access to high-speed data via our own broadband spectrum will significantly contribute to all emergency services, providing a coordinated response to ensure public safety," says Chief Constable Roger Chaffin of the Calgary Police Service. "Coordinated and reliable communication in emergency situations can ultimately help save lives. The need for reliability is one key reason we rely on our own private radio networks for voice communication rather than cellular phones."

Says Mueller, "We are constantly improving public-safety technology, helping put police officers on the street where they need to be, and where they want to be."

Not only is law enforcement interested in these new tools, but investors as well. Silver Lake, a tech-specializing private equity firm, infused \$1 billion into Motorola this fall to support the company's "Safer Cities, Thriving Communities" initiative.

Other Rose-Hulman alumni playing a role in Motorola Solutions' successes include Scott Mottenen (EE, 1987), vice president of infrastructure development, and Scott Carney (EE, 1977), recently retired as director of applied technology.

"We have a really talented team doing some amazing things," Mueller says. "I love the really geeky stuff. I'm driven to use technology to help others and keep communities safe. There's a can-do attitude here that I learned during my days at Rose-Hulman. It's a culture that keeps everyone motivated and looking forward."







**A CONNECTED OFFICER:** Tim Ekl shows how technology from the new smartbelt keeps track of when and where a police officer pulls a gun from the holster. The location can be found on the computer screen at headquarters.

## Features of Motorola Solutions' Next Generation Public Safety technology products include:

### SMARTBELT

A smartbelt will relay a message to the department's central dispatch with an officer's location within moments of a gun, handcuffs, Taser, and/or mace being pulled from the holster. Also, smart glasses would automatically capture a photo to reveal the situation to commanders. Dispatchers could then send text messages that would display on the eyeglass lenses, keeping the officer from looking away from the scene.

### HELP FROM ABOVE

A tethered drone powered through a generator or another ground power source could be released from a fire truck or police car to hover up to 400 feet in the air over a fire or crime scene indefinitely. The 6-pound drone, serving as a highly portable Long-Term Evolution (LTE) base station, could provide broadband connectivity, and support streaming video and communication services to locate fire hot spots, criminals, and injured persons.

### REAL-TIME INTELLIGENCE

Public-safety headquarters will be enhanced by having real-time intelligence—including crime reports, video from public and privately owned cameras, and gunshot sensors—so that police can quickly react to a crime in progress, and possibly predict future trouble spots in a community. The various consoles can be customized for each department's needs.



HIGH-TECH SLEUTHING

Cover Story

# INVESTIGATING FAILURE

**TEST RUN:** Wolf Technical Services engineers Zach Wagner and Melissa Montgomery test products for safety and reliability at the company's facility in Indianapolis.



**SURVEY SAYS:**  
Wolf forensic engineers Aaron Tolly and Allison Tharp use surveying equipment to measure elevation changes that may have played a role in a motor vehicle crash.



## Alumni Use Engineering, Science Skills to Unravel Crash-Site Mysteries

STORY BY  
**ARTHUR  
FOULKES**  
PHOTOS  
BY **BRYAN  
CANTWELL**

A relatively inexperienced motorcycle rider was approaching a long, arching right-hand turn on a tree-lined two-lane highway. Riding about 30 mph on a clear day, the rider underestimated the turn and found himself drifting closer to the centerline, the other side of which was occupied by a large utility truck coming in the opposite direction.

In a terrifying instant, the motorcycle and truck connected like two cymbals, their side-view mirrors breaking and flying off with a loud bang. There was also the sound of metal scraping as the vehicles tried

to occupy the same physical space. In a flash, the cycle was down, the rider badly hurt, and the truck had skidded to a stop.

These details were not provided by an eyewitness. Rather, they were deduced days later, based upon skid marks, blood stains, gouges in the roadway, and other physical evidence gathered at the scene. Those are the tools of forensic engineering—the sometimes unsettling business of using on-scene evidence and scientific principles to figure out how and why an accident took place.

“The first thing in forensics is to collect all the evidence,” says Bill Dickinson, a mechanical engineer at Wolf Technical Services, an Indianapolis-based engineering services firm where about 25 percent of staff members have Rose-Hulman degrees.

These specially trained forensic engineers use their expertise in physics, mathematics, and engineering to analyze and reconstruct motor vehicle and other incidents. Their findings can ensure fair results in court cases, and keep accidents or product failures from recurring.

“It feels good to know that you are helping people,” says Melissa Montgomery (BE/ME, 2013; MSBE 2015), one of five Rose-Hulman graduates at Wolf. She focuses on injury prevention, including seat belt and child restraint investigations.

(CONTINUED ON NEXT PAGE)



## HIGH-TECH SLEUTHING

(CONTINUED FROM PREVIOUS PAGE)

## LESSONS LEARNED FROM THE SCENE

Wolf's Rose-Hulman-educated engineers are on call 24 hours a day, including weekends, to lend assistance whenever accidents take place. Earlier this year, Allison Tharp (OE, 2012) and Jessica Ellis (ME, 2009; MSOE, 2011) investigated a fiery head-on automobile crash in Wisconsin. Again, based on their investigation, it was apparent one vehicle drifted across the center line just before impact.

"You learn a lot from actually being at the scene," says Ellis, who lends her optics expertise to investigate night-time and pedestrian crashes.

At the crash site, the engineers get busy taking photographs and measurements, recording gouge and skid marks in the roadway, and examining the crashed vehicles. Most cars today come equipped with "black boxes," that record useful technical vehicle and occupant information, notes Tharp, who specializes in incidents involving reduced visibility. Tharp has developed computer models and field measurement techniques that enable scientists to determine headlamp intensity at any forward point in a field of vision. She also has developed a headlamp mapping and measuring laboratory inside Wolf's already state-of-the-art facility.

Once all the data are collected, the forensic engineers start putting the pieces of the puzzle together to reverse engineer the accident. Because their findings will face potential cross-examination in court, the scientists must have a firm grasp on their facts and full confidence in their findings.

"You have to be very precise," says Zach Wagner (BE, 2009), who specializes in low-speed incidents and failure analysis of biomedical devices, such as implants. He also is considered a ballistics expert.

## SCIENCE HELPS UNCOVER THE TRUTH

In many cases, the results of an accident investigation are a mixture of good and bad news for those involved, Wagner notes. Even Wolf's clients may sometimes not like what they learn.

"The truth is the truth," Wagner says. "Our job is to do the science."

Aaron Tolly (ME, 2010) is another Rose-Hulman engineer on the Wolf team. Tolly is developing a restraint system for mobile air crews to improve the safety of military personnel, as well as a robotic arm that will align probes for eddy current inspections on steam condensers and heat exchangers found on large Navy ships. Stuart Nightenhelser, Wolf's chief executive officer, says, "[Wolf's Rose-Hulman alumni] are not afraid to tackle things they have never done before."

Wolf's expertise extends well beyond forensic engineering. The company also specializes in design engineering, product development, and product testing for commercial and government clients. It works with all branches of the military.

In addition to knowing the science behind their work, Rose-Hulman graduates have a strong ability to communicate their findings to others, Dickinson says. "Clear communication is one of the primary skills necessary in our work," he says. "We speak to two very different sets of people in accident reconstruction: attorneys and jurors, neither of whom have much training in engineering."

**WOLF PACK:** Rose-Hulman alumni make up about a quarter of Wolf Technical Services, Inc. This group includes (from left) Melissa Montgomery, Allison Tharp, Aaron Tolly, Jessica Ellis, and Zach Wagner. "Georgie," a human skeleton model used for biomedical research, is seated in a crashworthy seat for troops developed by Wolf engineers.



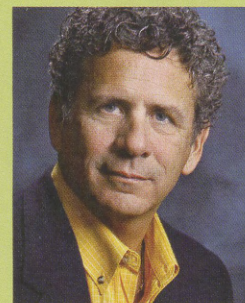




**MULTIDIMENSIONAL:** Jessica Ellis (top photo) and other forensic engineers at Wolf Technical Services use 3D modeling and computer simulation to reverse engineer accident scenes. Below, Ellis and Allison Tharp use Wolf's headlamp mapping and measuring lab to better understand nighttime visibility in accident investigations.



## Lessons From Tragedy Lead to Safety Improvements



Engineers investigate failures to make sure they don't happen again.

That's why forensic specialists examined the fatal collapse of a massive temporary stage rigging over the grandstand at the Indiana State Fair in 2011. The hulking metal structure, loaded with audio and lighting equipment and weighing more than 70,000 pounds, collapsed during a violent storm just before the start of a country music show. Seven people died and dozens were injured.

At the time, David Hannum (ME, 1981) chaired the Indiana Fire Prevention and Building Safety Commission, a voluntary body that, among other things, writes all state building codes. The State Fair disaster was one of several high-profile cases the commission addressed during his tenure; however, this case had special meaning, because a very close family friend was among those killed, he says.

"Our job was to figure out what went wrong and whether there needed to be a permanent change in Indiana code."

Investigators found the approximately 12-year-old rigging fell because there was no law requiring inspection of the set-up procedures. Over time, with annual assembly and disassembly, those techniques got sloppy so that, finally, the rigging didn't comply with its original design criteria, he says.

"For instance, if small parts broke or were misplaced, the erectors may or may not substitute a part of equal performance," Hannum says. No inspections meant such things were never caught. On top of that, audio and sound equipment attached to the rigging got larger and heavier over the years; such added weight was never contemplated in the original design, he adds.

Within eight months of the collapse, Hannum and the other commissioners voted unanimously to require engineer inspections of temporary structures, closing a loophole in state law. They also crafted the rules to allow smaller events to avoid cost-prohibitive requirements while still retaining public safety.

"The biggest improvement is if there's something over the head of the public, it will be certified as safe," Hannum told the news media at the time the commission issued its rules, which have since been copied in other states. "It's not going to fall under any normal set of circumstances."

*Hannum, a Rose-Hulman trustee, is chairman and chief executive officer of the family-owned C.H. Garmong & Son, Inc.*





# SECRET IS OUT

**Former NSA  
Technologist  
Will Ackerly**

**Striving to Protect  
Your Emails**

STORY  
BY DALE  
LONG

**WILL ACKERLY SPENT THE FIRST EIGHT YEARS OF HIS PROFESSIONAL CAREER UNDER A SHROUD OF SECRECY AS A TECHNOLOGIST WITH THE CLANDESTINE NATIONAL SECURITY AGENCY (NSA). HIS COMPUTER PROGRAMMING SKILLS HELPED AMERICA TRACK WORLDWIDE TERRORISTS AND HIGH-TECH THREATS, AND KEPT THE GOVERNMENT ONE STEP AHEAD OF DEVELOPMENTS IN CLOUD COMPUTING, ENCRYPTED COMMUNICATION, AND DATA PROTECTION.**

Now in the private sector, Ackerly has turned his attention to inventing technology that can protect your email and data from criminal hackers desiring to steal it.

And, the secret is out on his work. The 2004 electrical engineering alumnus has been featured in numerous media, including *Fast Company*, *PC Magazine*, *Time*, and *Computerworld*. He also was named one of *Fortune*'s 2015 "40 Under 40," alongside technology leaders changing the way we live. (See sidebar.)

## **SO, WHAT'S THE BIG IDEA?**

Ackerly's startup, Virtru, is setting a new standard for digital privacy, and is the first company to make email privacy accessible to everyone. Its single plug-in empowers people and businesses to control who receives, reviews, and retains their digital information—wherever it travels, throughout its lifespan.

Emails are hard to protect because very rarely does any single person or system control the only copy. Any given email will have copies made and stored in at least four different places: the sender's computer, the sender's service provider, the recipient's computer, and recipient's provider. Ackerly points out that unless the email is encrypted end-to-end, a rarity in the computer industry, there are at least four different places for a hacker to reach out to get a stored copy, let alone intercept copies of email in transit.

"The number and sophistication of the players are increasing dramatically, and the rules of the game are changing very quickly as well," says Ackerly, from Virtru's offices in downtown Washington, D.C. "Cloud computing is changing the reality of cybersecurity postures and architectures, and there is a ton of catch-up that everyone needs to do here. For instance, there is no good standard for monitoring the activity across different cloud providers a company may be using. It is a fundamental gap when you're relying on



third parties to protect your data using their perimeter-based protections.”

Virtru’s edge is that it works within the Gmail, Outlook, and Yahoo webmail interfaces, and doesn’t need an external client, which was no small engineering feat, according to Ackerly. Email messages are encrypted in the Trusted Data Format (TDF), on which he authored a paper in 2008 while working for the NSA.

The technology is patented, and for now the company is focusing on email, but encryption for texting and Instant Messaging is on the horizon.

### FREE FOR ALL

“What gets me up in the morning is offering great security and privacy to individuals, and it is something I’ll always insist on being offered for free to all users,” Ackerly says. “Our bread and butter is offering email and file security to companies that need to share sensitive personal or otherwise regulated data... What makes Virtru better is that we focus on the user experience, so that we make using the strongest encryption as easy and unobtrusive as we can.”

Like many technology-based entrepreneurial enterprises, Virtru started in a household basement with just three employees—Will’s brother John, old Rose-Hulman friend Jon Gilpin (CS, 2003), and former NSA colleague Reuven Gonzales. Will paid salaries out of his pocket until investors jumped on board.

Today, there are 28 full-time employees (several with NSA ties) joining with contractors to serve approximately 1,000 companies, including several of the nation’s largest banks, privacy think tanks, and media enterprises. Virtru has attracted a little more than \$10 million in capital from a mix of angel investors and venture capitalists, including Bessemer Ventures, with fellow alumnus Felda Hardymon (MA, 1969), and New Enterprise Associates.

“It is gratifying to see that we are meeting a need felt by our early

customers with a data-centric security approach,” Ackerly says.

The future is even more promising. Ackerly predicts the next growth spurt will help Virtru accelerate development of a way to control files and documents regardless of where they go, with particular attention to Google Drive and going into markets with a strong need, such as retention of video recorded by police body cameras. This is sensitive data that can help ensure transparency and accountability, but is presently cost prohibitive to store with traditional systems currently available. Ackerly hopes to help reduce these costs by a factor of 10.

A recent 12-page profile published in *Fortune* (“The Anti-Hacker,” October 1, 2015) classified Ackerly as “an idealist as much as an entrepreneur,” and he was called a “Whiz Kid” in the magazine’s “40 Under 40” profile. These are characterizations that the Rose-Hulman alumnus accepts rather graciously. After all, NSA colleagues once pinned him with the affectionate “Will-bot” nickname for being considered half-man, half-robot. He wrote his first computer program at age 7, and he hacked into his school’s computer system in the eighth grade.

### A GEEK AND A NERD

“I’m very much an introvert, and so I might never fully get used to the recent media attention. I self-identify as a geek and a nerd,” he says. “I think anyone who graduates from Rose-Hulman is at serious risk of getting tagged a ‘whiz kid.’”

Later, he adds, “What I find so fun and exciting about being an engineer today is that the tools available out there today—virtual, like virtual private clouds; physical, like 3D printing; or inexpensive powerful computers, like Arduino or Raspberry Pi—combined with the kind of skills we’ve accumulated (through Rose-Hulman and work), allow us to pursue solutions to problems we see out there in a way that would have been utterly impossible in the past.”

## Power and Influence

The role of Will Ackerly (CS, 2003) as an innovator and rebel in technology tied him for No. 21 in *Fortune*’s 2015 “40 Under 40” list of the most influential young people in business. (September, 2015, issue and website) “The 40 Under 40 is a measure of power and influence,” the magazine proclaims.



Joining Ackerly on this year’s list were Tesla Chief Technology Officer JB Straubel, Facebook Chief Security Officer Alex Stamos, General Motors Vice President of Finance and Treasurer Dhivya Suryadevara, Whole Foods Market Chief Information Officer Jason Buechel, Periscope co-founder Kayvon Beykpour, and Girls Who Code founder Reshma Saujani. Past lists featured such tech hotshots as Michael Dell (Dell Computers), Jeff Bezos (Amazon), and Marc Andreessen (Mosaic/Netscape).



## Sid Stamm: Cybersecurity Ed

PREPARING STUDENTS TO DEVELOP SAFER SOFTWARE

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

Today's headlines have brought a plethora of new material for computer science and software engineering professor Sid Stamm to discuss in his weekly sessions with students interested in the growing field of cybersecurity.

However, Stamm argues that instead of producing more cybersecurity experts, colleges need to address the pressing need for safer software—produced by engineers, inventors, and leaders who are aware of security risks and take this into consideration while doing their jobs.

That's why the 2003 computer science alumnus has returned to campus after serving nearly seven years in software development with Mozilla, a developer of Internet-related software and standards. For nearly two years he was the lead architect and engineer on security and privacy for the popular Firefox web browser, helping to define, implement, and maintain the software's security features.

Also, his doctoral thesis, from 2009, focused on "Anticipating and Hardening the Web against Socio-Technical Security Attacks."

"Companies are hungry for security experts, but they need to be patient and thoughtful about whom they hire," Stamm says. "The best security engineers first deeply understand computing systems. They will not necessarily come with experience using a company's tools or have a degree in security. Instead, they will appear as inquisitive and adaptable, and will learn how to apply the fundamentals of security to any situation. These are future-proof engineers who keep up with a rapidly evolving environment."



And, Stamm asserts that graduates with a degree from Rose-Hulman, like him, will possess those valuable computing skills.

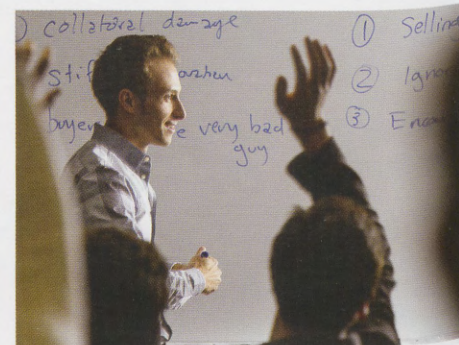
The institute is ahead of the curve, he contends, because it already offers students a security class and encourages extracurricular activities, like the annual cyberdefense competition. (Former team members are now working in cybersecurity areas for corporations and government agencies.) In addition, other classes encourage rigorous testing and touch on security principles, which improve the quality of software the students build.

"Rose-Hulman produces very high-quality software engineers and computer scientists.

My vision is to make them even better by folding security into our curriculum in concert with the other topics we already teach," Stamm says. "Cybersecurity changes rapidly, and we need an evolving curriculum to help our students constantly be prepared...It should be natural for our engineering graduates to build security-preserving products without any formal training in cybersecurity."

Personally, he was enthusiastic about returning to his alma mater to become a full-time professor, after spending a portion of the 2014-15 academic year as a visiting part-time faculty member while continuing to work for Mozilla.

"This is what I have wanted to do since I graduated in 2003. The Rose-Hulman students are really amazing and challenge me to be at my very best every day."



**BACK IN CLASS:** Associate professor Sid Stamm, a 2003 computer science alumnus, once was the lead architect and engineer for security and privacy for Mozilla.



## Students Bring Improved Sanitation, Better Health to Village in Ghana

Flushing a toilet is something you take for granted if you live in a developed country. But, for about one-third of the world's people, improved sanitation, with at least a sturdy latrine, is unavailable.

Thanks in part to members of Rose-Hulman's Engineers Without Borders chapter, that statistic will slowly improve. A group traveled to Gomoa Gyaman, a small village in Ghana, in August to supervise the construction of a 10-stall concrete latrine for use by local villagers. Rain collected on the roof will provide water to service two hand-washing stations.



Only about 14 percent of Ghana's population of 25.5 million has access to improved sanitation, according to the World Health Organization. Improved sanitation greatly reduces the spread of infectious diseases, including many that are often fatal for children.

"These kinds of experiences make our students better citizens of the world," says Gustavo Garcia, associate professor of Spanish and EWB's faculty advisor on the trip.

## Park Service

STORIES BY  
ARTHUR  
FOULKES

SENIOR SANDERS PARK AIMS TO MAKE A DIFFERENCE IN HIS COMMUNITY AND WORLD



**DRIVEN TO SERVE:** Sanders Park is an active volunteer with several campus, community, and international service projects. He is co-president of the Engineers Without Borders organization.

If you Google senior Sanders Park, you might think he spends most of his time winning golf matches for Rose-Hulman's men's golf team.

But, if you meet him, you will wonder when he has time to visit the practice range.

Park, a civil engineering major, is passionate about serving others. He is co-president of the campus' student chapter of Engineers Without Borders (EWB), volunteers building wheelchair ramps for those in need, assists with Indiana Special Olympics, and helps assemble bicycles for the Bikes for Tykes community service project.

"I love helping people," he says. "It's exceptionally rewarding."

While in middle school, Park and other students visited a nursing home in his hometown of Alpharetta, Georgia, to play Bingo with the residents. That experience triggered a desire to serve others that has never gone away.

Late this summer, Park joined five other Rose-Hulman EWB members for two weeks in a small village in Ghana, West Africa. The students used

their engineering skills to design and construct—with significant help from villagers—a 10-stall, concrete latrine that will bring improved health conditions to the local population. (See sidebar story.)

"Being able to change people's lives is incredible," Park says.

After graduating from Rose-Hulman, he plans to attend graduate school and then pursue a career as a structural engineer with a special emphasis on designing earthquake-resilient structures for the developing world. He studied earthquake engineering at Lehigh University through the George E. Brown, Jr. Network for Earthquake Engineering Simulation.

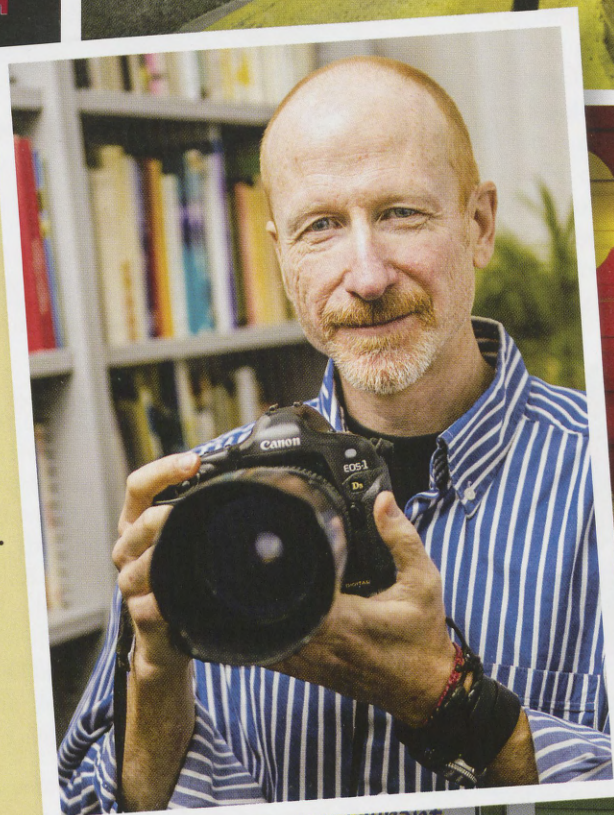
And, of course, Park remains Rose-Hulman's No. 1-ranked men's golfer, with a school record-low 66-stroke tournament round score, and is one of the best competing in the NCAA Division III/non-scholarship level.

But his true passion is finding ways to make a positive difference in people's lives. Among other things, he says, this summer's trip to Ghana taught him that "no matter how young or old, anyone can make a difference."



# *A Mano / By Hand*

**BY JOHN GARDNER**  
**PROFESSOR OF SPANISH**



## HAND-PAINTED

commercial signage has all but disappeared from the United States, but remains a vibrant, predominant form of advertising elsewhere in the world. "A Mano/By Hand," is a photographic study of the art of hand-painted signs in rural communities in the Dominican Republic.

John Gardner, professor of Spanish, has taken seven trips to the region since 2009, including accompanying Engineers Without Borders student chapter members as they worked on humanitarian projects in the country. During these excursions, he interviewed many of the self-taught practitioners of this vivid, colorful, yet vanishing art form.







His study reveals the many and eclectic influences on the art, including graffiti, long-standing traditions in signage, contemporary typography, practical necessity, and socio-linguistic factors such as regional accent.

(MORE PHOTOS NEXT PAGE)







**JOHN GARDNER'S WORK  
WILL BE FEATURED  
AT THE NATIONAL  
CONVENTION OF THE  
POPULAR CULTURE  
ASSOCIATION IN  
SPRING 2016, IN  
SEATTLE, WASHINGTON.**





## Istanbul (Not Constantinople)

STORY BY  
STACEY  
MUNCIE

### STUDENTS DELVE INTO HISTORY, CULTURE, AND TOPOGRAPHY DURING EYE-OPENING ADVENTURE

On a chain around Nick Tully's neck hangs a memento. He pulls it from his T-shirt and shows off the round pendant, a Turkish amulet believed to ward off the "evil eye." The senior mechanical engineering major picked it up on his recent trip to Istanbul, the culmination of *To the City: The Urban Topography of Istanbul*, a course taught by Assistant Professor of Art History and Archeology Andrew Findley.

The travel opportunity, facilitated through the Department of Humanities and Social Sciences and the Office of Global Programs, was open to a limited number of the students who had successfully completed the course during the spring quarter. Findley says the goal was to combine the studies of historical culture, topography, and art history in a way that would connect engineering students to the humanities. Findley and Associate Professor of Geography Mike Kukral accompanied the group.



ANCIENT TWIN: Professor Andrew Findley poses with a statue to which he looks eerily similar.

"Actually being in the presence of things that they studied helped them to more easily comprehend the built environment. They saw firsthand how archeology works and how topography is studied," Findley says. He was especially pleased, he adds, by how adept the students were at connecting their own studies in engineering to the subjects.

[CONTINUED ON NEXT PAGE]



LOOKING UP: Students from Findley's *"To the City: The Urban Topography of Istanbul"* marveled at the art, architecture, and culture of the Turkish city's landscape.



## GLOBAL IMPACT

(CONTINUED FROM PREVIOUS PAGE)

Tully says that he brought home far more than simple trinkets from the international experience.

A native of East Patchogue, New York, Tully had never traveled internationally when he signed up for Findley's class. Although he admits that he was a little apprehensive about the prospect of a two-week trip with a group of students he didn't really know, he felt the experience would be "something I could take with me and make my own" as he prepared to enter his senior year and began to make decisions for his future. But Tully says he didn't anticipate the effect the experience would have on him as he recalls one particularly striking instance during his time in the city.

"We were walking through a street of downtown Istanbul—an area with a lot of Syrian refugees. Ten to 15 kids came up to us, and they were smiling and hugging us. All I could think was these kids aren't in

school. They don't have the opportunity to better themselves—I wish I could do more to help," he adds.

Interim Vice President for Academic Affairs Rick Stamper (ME, 1985) says that opportunities for international experience are becoming increasingly important for future engineers and scientists—those who will be in a position to drive change and solve problems in an increasingly connected world.

"Engineering is a global business now. Any engineer in the future is going to have to work comfortably in an international setting. Equally or more important is the broad educational experience. The international experience helps students develop their sense of empathy and gives them a fresh perspective from which to view their own culture," Stamper says.

Unfortunately, not all students have the financial means to take advantage of such opportunities. For the Turkey trip, however, Stamper says the Office of



**EXPLORATION AND EXPERIENCE:** The city of Istanbul provided a rich cultural backdrop to the experiences that brought course lessons to life.

Academic Affairs was able to use previously donated funds to meet a portion of the financial need for some students. Supporting international student experiences like this one is important, he says, because "it's a fabulous educational experience—both a practical educational experience and personal development, and that's what we're trying to do."

For Tully, the trip was an eye-opener; one he says he wishes he'd had sooner. As a result, he's now considering service in the Peace Corps after graduation. And he offers this piece of advice for students considering an international experience: "Don't be afraid to get outside your comfort zone because that's where you actually learn the most about yourself."



## From Phonathon Caller to Campaign Director, New Advancement VP Has Done It All



STEVEN BRADY

Steven P. Brady, a successful higher education fundraising professional whose career began as a student phonathon caller, has a new title to add to his resume: vice president for institutional advancement at Rose-Hulman.

Brady is senior director for major gifts and director of the Fueling Innovation fundraising campaign at Illinois Institute of Technology (IIT). He has helped the Chicago-based institution reach its milestones in a \$250-million campaign that is set to conclude in December 2016.

"Steve has a wealth of knowledge in all aspects of institutional advancement, is familiar with building valuable relationships with STEM professionals, and has led successful teams that support a

higher education institution's short- and long-term financial objectives," says President Jim Conwell.

As vice president at Rose-Hulman, Brady will oversee operations involving elements of fundraising, alumni affairs, and corporate and foundation giving. He will begin on January 1, 2016.

Starting as a phonathon caller and student phonathon manager while attending Webster University in St. Louis, Brady moved into a full-time position as Webster's phonathon coordinator after his graduation in 1996. He later served as director of the College Fund at St. Joseph's College in Rensselaer, Indiana, implementing a successful faculty and staff giving program and designing strategies to raise alumni donor participation by 11 percent over the course of six years.

Brady joined IIT in 2006 as a major gifts officer but was soon asked to

serve as acting director for alumni relations. A year later, he moved into a role as senior director for major and planned gifts, where he developed the process, policies, and procedures for prospect management that remain in use at IIT today.

Brady assumed an additional role as associate campaign director in 2010, and became the campaign director in 2013.

Advancement executive Doug Smith has been serving as interim vice president for institutional advancement while Rose-Hulman conducted a nationwide search for a permanent replacement to Rickey N. McCurry, who left earlier this year to become vice president for development and alumni affairs at the University of Tennessee.

## Banner Years

Alumni returning to campus for this year's Homecoming may have noticed an extra tribute to our heritage throughout campus. Special banners displayed prominently along sidewalks showcase the rich traditions, visionary leaders, and important milestones marking Rose-Hulman's heritage from 1874 to the present.

The collection, titled "Our Journey," describes those elements that make Rose-Hulman unique. Visitors can learn more about the history of the institute by using a smart phone to scan each banner's QR code. You may also pick up a printed guide to the banners at the Welcome Desk in Hatfield Hall.

But the path doesn't end with these banners. We continually add our stories to those of previous generations. New history is being written in the present-day stories of faculty and staff members

who are committed to excellence as they educate the newest generation of bright young minds. And, it continues through the lives of students and alumni as they each make their mark on Rose-Hulman and the world.

As our journey continues, there is one constant: We hold fast to our roots.

Read about Rose-Hulman's ongoing journey at [www.rose-hulman.edu/ourjourney](http://www.rose-hulman.edu/ourjourney)





## Biomathematics Major Fills Need for Life-Science Problem Solvers



**BLENDING MATH AND SCIENCE:** Mathematics professors (from left) Dave Goulet, Allen Holder, and Yosi Shibberu have worked with faculty colleagues in science and computer science to develop the new biomathematics major.

An increasing number of problems in the biological sciences are being solved using sophisticated math and computational tools. Rose-Hulman has added an academic major in biomathematics to give students the analytical tools necessary to use applied math in support of the life sciences.

The biomathematics major blends applied mathematics, the fundamentals of biology, and computational analysis. Students also will be introduced to the fields of computational biology, mathematical biology, bioinformatics, systems biology, and biostatistics.

Understanding complex biological systems requires not just sophisticated data analysis, but also a strong background in theoretical and applied mathematics, according to Dave Goulet, assistant professor of mathematics.

“The biomathematics major at Rose-Hulman is designed to help students analyze the physical world through mathematics and computer science in ways that will advance human understanding and the well-being of our world,” he says.

Mathematics Professor Allen Holder points out that while the major is primarily designed for students wishing to pursue a post-graduate degree in the mathematical biosciences, the study of biomathematics is growing, and there is the potential for graduates to go directly into industry as mathematicians, theoretically interested biologists, human geneticists, pharmaceutical researchers, or as other health professionals.

“Our biomathematics majors will be well prepared for post-graduate study or a rewarding career in the quantitative life sciences,” Holder says.

## Fall Career Fair Sees Record Number of Employers, Alumni Reps

Just three weeks into the academic year, swarms of students and representatives from a variety of employers filled the Sports and Recreation Center for the Fall Career Fair. The event, held the week of Homecoming, saw 266 companies in attendance—the largest amount to date—and provided an opportunity for alumni representing those companies to recruit the next generation of engineers, scientists, and mathematicians. The following day, more than 1,400 interviews were conducted as a result of the connections made, with companies snapping up students for internships and full-time employment.





# Bailey

# Challenge

BY PROFESSOR EMERITUS  
HERB BAILEY

Almost all "good" problems have been posed and solved many times throughout the centuries. This issue's Problem 2 has been around for a long time, and I first saw the Fall 2015 Bonus as Problem No. 1936 in *Mathematics Magazine*. This problem sought the sum of the areas of the infinite sequence of nested circles, with each tangent to the unit circle, the given line, and the preceding circle.

## WINTER PROBLEM 1

Sally ate 483 grapes in 21 days. Each day she ate two more grapes than the previous day. How many grapes did she eat on the 15th day?

## WINTER PROBLEM 2

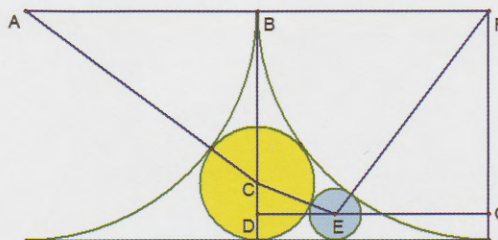
A pioneer moving West had a goose, a bag of corn, and a fox. He came to a river. The ferry was large enough to carry him and only one of his possessions. If he were to leave the fox and the goose alone, the fox would eat the goose. If he were to leave the goose and corn alone, the goose would eat the corn. How did he get himself and his possessions across the river?

## WINTER BONUS PROBLEM

We call the finite sequence  $\{a_0, a_1, a_2, \dots, a_n\}$  *curious* if  $a_i$  is the number of  $i$ 's in the sequence for each  $i=0, 1, \dots, n$ . For  $n=3$ , the sequences  $\{1, 2, 1, 0\}$  and  $\{2, 0, 2, 0\}$  are examples. Find all possible curious sequences for  $n=4$ .

## SOLUTION TO FALL BONUS PROBLEM

The yellow circle is tangent to two unit circles and a given line. The blue circle is tangent to one of the unit circles, the yellow circle, and the given line. Let  $A$  and  $F$  be the centers of the two unit circles. Let  $C$  and  $E$  be the respective centers of the yellow and blue circles, with  $R$  and  $r$  their respective radii.



Let  $B$  be the intersection of the unit circles,  $D$  the projection of  $E$  onto the line through  $BC$ , and  $G$  the projection of  $F$  onto the line through  $DE$ . Thus in the right triangle  $ABC$ , we have  $BC = 1 - R$ ,  $AC = 1 + R$  and  $AB = 1$ . Applying the Pythagorean Theorem gives  $R = 1/4$ . Similar calculations for right triangle  $FGE$ , with  $FG = 1 - r$ ,  $FE = 1 + r$ , gives  $EG = 2\sqrt{r}$ . Finally, for right triangle  $CDE$ , with  $CD = R - r$ ,  $CE = R + r$ ,  $R = 1/4$  and  $DE = 1 - EG$  gives  $r = 1/9$ . Thus the area of the blue circle is  $\pi/81$ .

Send your solutions to [Herb.Bailey@rose-hulman.edu](mailto:Herb.Bailey@rose-hulman.edu) or to Herb Bailey, Department of Mathematics, Rose-Hulman Institute of Technology, 5500 Wabash Ave., Terre Haute, IN 47803. Alumni should include their class year.

More than 50 persons from a variety of graduating classes correctly solved the fall problems. Congratulations to the following solvers:

**ALUMNI:** B. Hirschfield, 1954; B. Hall, 1955; J. Moser, 1956; A. Sutton, 1956; H. Brown, 1957; D. Bailey, 1959; J. Dhooge, 1960; R. Archer, 1961; J. Ray, 1961; J. Tindall, 1961; N. Hannum, 1962; C. McCoy, 1962; A. Cleek, 1964; S. James, 1965; B. Kevorkian, 1966; D. Wray, 1967; R. Dutton, 1969; W. Pelz, 1971; D. Hagar, 1972; T. Nelson, 1972; R. Kominiarek, 1973; M. Bailey, 1976; B. Hunt, 1976; P. VandeMatter, 1977; T. Greer, 1978; R. Priem, 1979; J. Slupesky, 1979; R. Joyner, 1980; S. Nolan, 1981; R. Roll, 1981; M. Taylor, 1982; T. Moore, 1983; K. Shafer, 1983; D. Burdette, 1984; L. Beckham, 1986; M. Carter, 1986; D. Price, 1986; B. Wright, 1986; D. Johnson, 1987; M. Lancaster, 1987; C. Abdnour, 1989; A. Murray, 1989; S. Berndt, 1990; E. Cegielski, 1990; B. Burger, 1991; J. Harris, 1991; R. Hochstetler, 1991; P. Kimmerle, 1991; C. Schlimm, 1991; P. Murfey, 1993; D. Sowder, 1993; J. Kimmerle, 1994; M. Pilcher, 1998; B. Zabel, 1998; S. Corbin, 2002; B. Hirsch, 2004; B. Ross, 2004; J. Lange, 2005; J. Przybylinski, 2006; D. Schoumacker, 2010; M. Schoumacker, 2010; D. Straub, 2010; and W. Bro, 2011.

**FRIENDS:** T. Cutaia, S. Hagness, J. Ley, E. Kimmerle, N. Kominiarek, T. Kulbago, J. Marks, L. Metcalfe, and D. Voltmer.



## YOUTH MEETING MATH CHALLENGES

Ashlyn Roehm, a fifth grade student, became one of the youngest Bailey Challenge solvers this spring. She is the daughter of Jason Roehm (EE, 2004). Bailey sent a special note to the young solver, hoping she continues to showcase her problem-solving skills.

Jason sent a thank you note to Bailey. It included the following statement:

"I wanted to express my most sincere thanks to you for the encouraging message that you wrote her in response to the answer that she sent in. It is great for her to hear stories from others (besides her parents) who share her interest for mathematics.

"People like you, those who have a love for math and science and who enjoy sharing it with others, are what make the Rose-Hulman community special. Although it feels like a long time since I've been on campus, I am thankful that I and my family are connected to such a great institution. Keep up the good work, and thank you for your contributions over your decades-long relationship with Rose-Hulman."

Distinguished emeritus mathematics professor Herb Bailey has always encouraged the next generation of scientists, engineers, and mathematicians—in the classroom, authoring test questions for the annual Rose-Hulman High School Mathematics Competition, hosting after-school tutoring, and through his quarterly Bailey Challenges.



# ROCKET MAN

## ABE SILVERSTEIN

### Makes Aviation Hall of Fame for Opening Space Horizons

STORY BY  
DALE LONG  
PHOTOS BY  
RON KAPLAN  
AND MIKE  
ULLERY

AS A PIONEER OF AMERICAN AIR AND SPACE EXPLORATION, ABE SILVERSTEIN WAS A CREATIVE ENGINEER WHO WISHED TO LET HIS WORK SPEAK FOR ITSELF.

THOSE CONTRIBUTIONS SPEAK VOLUMES, MAKING HIM WORTHY OF ENSHRINEMENT POSTHUMOUSLY IN THE NATIONAL AVIATION HALL OF FAME (NAHF) CLASS OF 2015, WHERE HE JOINS A PANTHEON OF AVIATION DIGNITARIES THAT INCLUDE WILBUR AND ORVILLE WRIGHT, CHARLES LINDBERGH, WILLIAM BOEING, AND AMELIA EARHART.

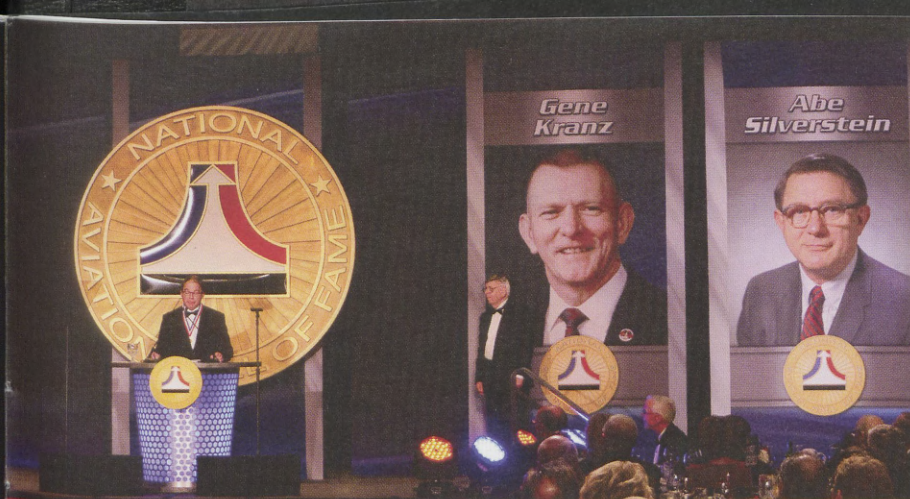
**S**ilverstein (ME, 1929; MSME, 1934) played a leading role in developing the National Aeronautics and Space Administration (NASA), where he launched the nation's satellite programs and its first manned space flight missions. He also spearheaded the Mercury and Apollo projects, both named by Silverstein, along with the Gemini program.

The Terre Haute, Indiana, native also made significant technical and managerial contributions in the development of the nation's early jet engines, created large supersonic wind tunnels for aviation research, and advocated the first practical application of the

liquid hydrogen engine, which would form the basis of the revolutionary Centaur rocket, propelling the technological space race that eventually put man on the moon. The engine also sent the Viking explorer to Mars, Pioneer to Jupiter and Saturn, Voyager to Uranus and Neptune, and New Horizons past Pluto.

"Abe was a visionary leader who was the right man, in the right place, at the right time," says fellow 2015 NAHF inductee Gene Kranz, former director of NASA mission operations for the Apollo and Space Shuttle programs. (Kranz commanded mission control for the celebrated Apollo 13 flight.)





**CENTER OF ATTENTION:** Abe Silverstein's son, David, talks about his late father and his many contributions to aviation and America's Jewish community during this year's National Aviation Hall of Fame induction ceremony in Dayton, Ohio.

In early 1961, the administration of first-year President John F. Kennedy sought Silverstein's technical insight on how space exploration could capture the imagination of the American public. In response, Silverstein told NASA administrator James Webb that "we could go to the moon." When asked how long that would take, he replied, "We could do that by the end of the decade." Silverstein's prediction found its way to the White House and, four days later, on May 25, 1961, President Kennedy appeared before a joint session of Congress to declare: "I believe we should go to the moon."

Later in 1961, Silverstein was asked to manage the Apollo program, but he decided to return to his first love: working with engineers and scientists on innovative projects for the launch vehicle program. He also favored avoiding the political and public power struggles associated with America's fledgling space program. He would spend the rest of his 40-year government service career as director of the Lewis Research Laboratory in Cleveland, Ohio (now NASA's Glenn Research Center).

The work of Silverstein and his team helped achieve President Kennedy's promise on July 20, 1969, when Neil Armstrong took the first human steps on the moon's surface. Armstrong was one of several young engineers, scientists, and aviators hired and mentored by Silverstein for the Lewis Lab to keep America's space program ahead of the technological curve.

Silverstein was known among his peers for quickly grasping the essence of a problem, proposing a likely solution, and delegating the task to experts for a resolution. This off-the-cuff acumen and decisiveness inspired intense loyalty from staff and colleagues. He would not hesitate to call meetings in the evenings or on weekends, but knew nearly every employee by name and took a genuine interest in the work that they were performing, according to former colleagues.

"Abe was a real dynamic guy who got the best out of others. As an engineer, he was technically sound, and as an administrator, he wouldn't ask you to do something that he wouldn't do himself," says former Lewis Laboratory colleague Erwin Zaretsky, retired chief engineer of materials and structures. "The phrases 'No' and 'Can't do' weren't in Abe's vocabulary. When he said something would get done, it got done."

Abe retired in 1969, shortly after Armstrong's historic moon walk, and he moved into the private sector, making several technical contributions in pollution controls as a vice president of the Republic Steel Corporation in Cleveland. He served as a Rose-Hulman trustee from 1977 until 1991.

At the time of Silverstein's death in 2001, former NASA Administrator Daniel S. Goldin stated, "[Silverstein] was a man of vision and conviction... His innovative, pioneering spirit lives on in the work we do today."

Silverstein's work has been recognized widely. Besides the recent NAHF induction, he was recognized with the prestigious Guggenheim Medal for his significant contributions to the advancement of flight. Other major achievements include the Rockefeller Public Service Award, NASA Medal for Outstanding Leadership, the American Society of Mechanical Engineers' Spirit of St. Louis Medal, the Air Force Exceptional Civilian Award, and the American Institute of Aeronautics and Astronautics' Louis W. Hill Space Transportation Award. He also was bestowed an honorary degree from Rose-Hulman.

**FAMILY LEGACY:** Abe Silverstein's son, David, and daughter, Judy Cook, represented the family at the special night, known as the Oscar Night of Aviation, honoring their late father.

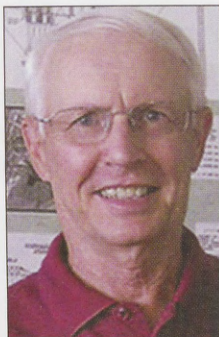




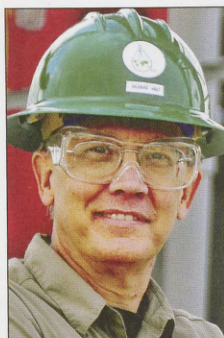
## CLASS NOTES

### 70s

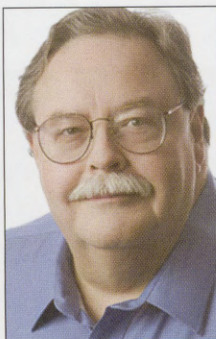
**Mark E. Killion (CE, 1971)** continues to be a productive engineer in retirement, being awarded his second patent for an automated hydraulic Ratchet Pawl System for constructing large hyperbolic cooling towers for nuclear power plants. His first patent was for a hydraulic derrick and radial beam scaffold system, used to construct the world's largest concrete smoke stacks. He worked for Custodis Construction Company before starting his own consulting practice in his hometown of Paris, Illinois.



**Richard Haut (ME, 1974)**, senior research scientist at the Houston Advanced Research Center (HARC), has been recognized as a distinguished member of the Society of Petroleum Engineers (SPE). This is an honor bestowed on one percent of 143,000 SPE members. He heads several projects aimed at securing energy for future needs, including HARC's environmentally friendly drilling systems program.



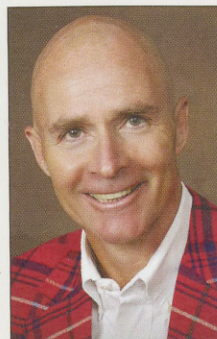
**Michael J. Hileman (CHE, 1975)** has formed a planning and optimization team within HSB Solomon Associates to help refineries and chemical plants around the world improve performance. He is a vice president with the company, serving as project executive for major consulting engagements. He has more than three decades of experience working in and analyzing the petroleum industry, through work for Atlantic Richfield, Charter Oil Company, and Ultramar.



**David Dahl (CE, 1976)** has retired after 39 years at Midwestern Engineers, where he served as chief executive officer and director of engineering. He is past-president of the American Council of Engineering Companies (ACEC) of Indiana, and received the ACEC Indiana's Consulting Engineering of the Year Award in 2005.

**Jeffrey S. McCreary (EE, 1997; HD, 2004)**

is interim chief executive officer of Isola, a global material sciences company. He has been an Isola board member since 2006. As an independent management consultant, McCreary has more than 30 years of broad-based semiconductor industry leadership and significant boardroom experience.



### 80s

**Joseph E. Haniford (ME, 1980)** is the new senior vice president for specialty alloys operations for Carpenter Technology Corporation. He oversees approximately 3,800 domestic and international employees and accounts for \$2 billion in annual revenue. Haniford previously retired as a vice president with Alcoa.

**Jay Bartlett (EE, 1984)** is chief

executive officer of Wabash Valley Power Association, an energy generation and transmission cooperative providing wholesale electricity to 23 electric distribution cooperatives and their nearly 350,000 customers throughout northern Indiana, and parts of Illinois and Missouri. He formerly was president of Prairie Power Inc. in Springfield, Illinois, and assistant general manager and chief utilities engineer for Springfield's municipal water, light, and power operations.



**Gregg Duffey (ME, 1984)** an intellectual property/patent litigator, has transferred to Winston & Strawn LLP's Washington, D.C. office. He represents clients before the International Trade Commission and federal courts, specializing in high-tech patent litigation cases.

**Ronald G. Bowman (EE, 1986)** is a lecturer in the Department of Electrical and Computer Engineering at the University of Alabama in Huntsville. He earned a master's degree at Clemson University.

**Kenneth M. Brennan (ME, 1988)** is the U.S. Defense Department's deputy director for services acquisition within the office of procurement and acquisition policy, with responsibility in acquisition-related technical and programmatic evaluation efforts. He formerly led the metrology and calibration project at Navel Surface Warfare Center at Crane, Indiana.

**James W. Grey (MA, 1989)** is director of quality assurance for MOBI Wireless Management, based in Indianapolis.

**Bradley Kicklighter (EE, 1989)** is an assistant professor of advanced manufacturing in the Department of Engineering at the University of Southern Indiana.

### 90s

**Robert S. Aronen (ME, 1991)** is managing director for Boulden International in Europe, and has been working with rotating equipment since 1992. He co-authored the paper "How to Extend Motor Life with PFPE Greases" for the *Plant Services* journal.

**Jerrold T. Carter (CS, 1991)** was named a 2015 Chief Technology Officer of the Year by *Indianapolis Business Journal*. He is chief

information officer for Indianapolis-based Wheaton Van Lines, Inc. Previously, Carter was vice president of development for Matrix Global Partners, vice president of Pepperweed Consulting, assistant vice president at Conesco, and a project leader at Eli Lilly and Company.





## Sapp Named Indiana Chamber's First Dynamic Leader of the Year

**Dustin Sapp (CPE, 2000)**, co-founder and chief executive officer of TinderBox, was the inaugural recipient of the Indiana Vision 2025 Dynamic Leader of the Year Award, presented at the Indiana Chamber of Commerce's Annual Dinner in Indianapolis.

TinderBox is a platform for creating, sharing, and tracking business proposals and marketing communications online. It is the third company Sapp has helped start in Indianapolis. He co-founded NoInk Communications in 2000 with several Rose-Hulman classmates, and in 2005 created Vontoo, Inc.—both successful startups sold to Silicon Valley enterprises. The Dynamic Leader of the Year Award is the latest honor Sapp has received for accomplishments in entrepreneurship.



**Frederick Schurger (EE, 1996)** is a board certified diplomate in chiropractic craniocervical junction procedures, and is currently in practice with the Upper Cervical Health Centers of America.

**Brandon M. Boone (CE, 1997)** is electric utilities manager for the town of Apex, North Carolina. He formerly was a project manager for Duke Energy Progress.

**Ryan Loftus (CHE, 1998)** has achieved Six Sigma Black Belt certification at DuPont's plant in Terre Haute.

**Jon D. Speer (CHE, 1998)** is founder and vice president at greenlight.guru, which produces compliance and risk management software exclusively for medical device companies. He blogs at <http://blog.greenlight.guru/author/jon-speer>.

**Phillip A. White (CS, 1998)** has been promoted to chief technology officer for Scale Computing, responsible for overseeing the underlying innovation behind the Indianapolis-based company's projects.

He previously was co-founder and executive of several startup technology businesses.



## 00s

**Steve M. Brewer (CS/MA, 2001)** is the chief technology officer for Lynx Technology Partners, an information security and risk management advisor. In his 15-year career, he has held senior technology positions in the software industry and has led multiple teams in developing leading software products and services.



**Jeremy Sewell (ME, 2001)** is acting vice president of Quality Switch, Inc., which won a 2015 President's "E" Award for significant contributions to the expansion of U.S. exports.

**Kelly K. (Sullivan) Noel (EE, 2002)** is the director of construction management at Milwaukee-based Aurora Health Care, the largest health care system in Wisconsin, with 15 hospitals, more than 150 clinics, and 70 pharmacies serving 30 communities throughout eastern Wisconsin and northern Illinois.

**Stephen L. Dora (EE, 2005)** was recognized among *Plant Engineering* magazine's 2015 Engineering Leaders Under 40. He is a project leader for plant planning at Toyota Motor Engineering & Manufacturing's operations in Erlanger, Kentucky. He has integrated technology into projects at Toyota plants throughout North America and authored several training courses related to power distribution and electrical systems.

**Justin Droba (MA, 2006)** was named Top Ace of NASA Johnson Space Center's applied aerosciences and computational fluid dynamics branch. This qualified him to receive the division's quarterly Excellence Award.

**Jacob Fuerst (CHE, 2006)** is the in-house doctorate-level metallurgist at Remington Outdoor Company's new facility in Huntsville, Alabama. He also authored the paper "LASER Additive Manufacturing of Titanium-Tantalum Alloy Structured Interfaces for Modular Orthopedic Devices," published in the *Journal of Materials*.



## CLASS NOTES

**Eric Volz (ME, 2007)** has been hired as senior associate attorney for Frost Brown Todd, an intellectual property law and litigation practice group in Cincinnati, Ohio. He earned his law degree from Indiana University.



**Michael Meyer (MA, 2012)** has co-authored papers while seeking his doctorate at Japan's Aizu University. Meyer's recent publications include two articles in *Systems, Man, and Cybernetics*, and one article in the *International Conference on Information Science and Control Engineering*.

**Angelica P. Cox (MA/ECON, 2015)** is a 2015 fellow of the Woodrow Wilson Indiana Teaching Fellowship program, studying at IUPUI for a career as a STEM teacher in high-need secondary schools throughout Indiana. She has been a summer engineering mentor, and K-12 tutor and tutor administrator.



**Thomas P. Foulkes (EE, 2015)** earned honorable mention honors for the Institute of Electrical and Electronic Engineers/Eta Kappa Nu's Outstanding Electrical and Computer Engineering Student of the Year Award. He was one of three finalists for this year's honor.

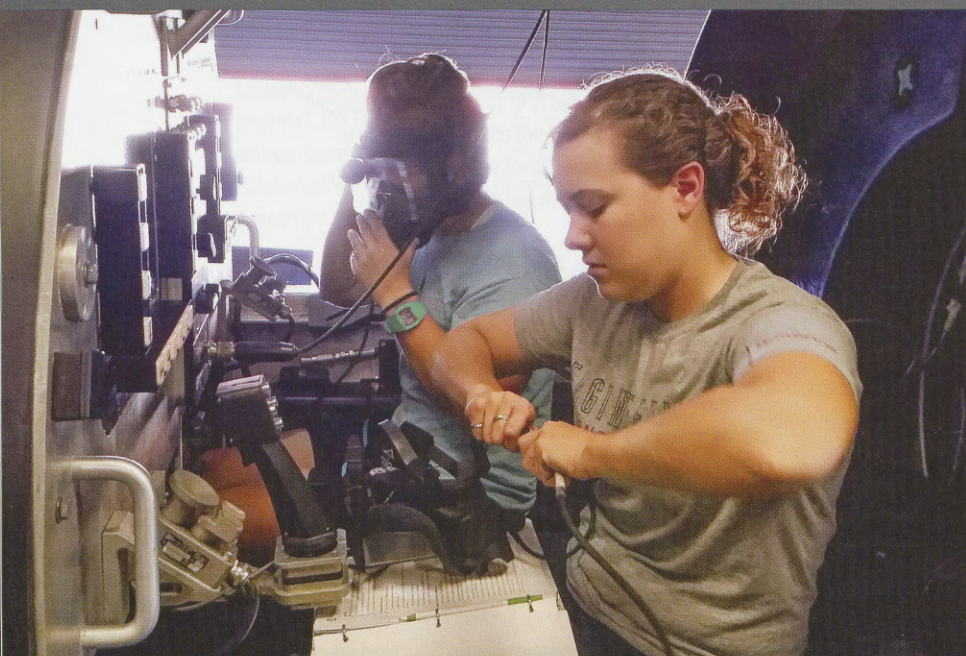
## 10s

**Katie A. Anderson (CE, 2010)** was presented her Ohio professional engineering license this fall in a statehouse ceremony. She is an environmental specialist at the Ohio Environmental Protection Agency.

## We Want Your News

Send news and photographs to [alumniaffairs@rose-hulman.edu](mailto:alumniaffairs@rose-hulman.edu)

## Raff Makes History on Female Underwater Vehicle Crew

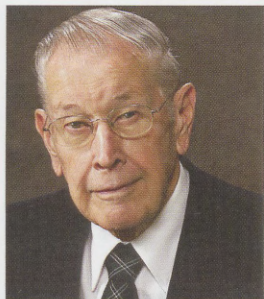


**Andrea Raff (ME, 2011)** used her diving and engineering skills to make history earlier this year as a member of the first female crew to drive a manned swimmer delivery vehicle. She joined Huntington Ingalls Industries' Undersea Solutions Group (USG) colleague Chloe Mallet in operating Proteus, an 8,240-pound submersible, in Florida's Saint Andrews Bay. The vehicle can be used for integrating and testing payloads, transporting and installing equipment on the sea floor, inspecting undersea infrastructure, and transporting a team of combat swimmers and cargo.

Raff, a certified rescue diver, has undergone extensive training with Proteus, and assists with its maintenance. "The two divers are sitting next to each other in fairly confined space, especially with scuba gear on," she says of the experience. "Both divers wear full face masks and have communication between each other and back to our dive supervisor. Navigation computer screens light up enough to see one another, but otherwise it is very dark. You can't tell you are moving forward unless the canopy doors are open, but you can feel the pitch and roll of the vehicle." Raff also co-piloted a dive with USG Vice President Ross Lindman that lasted about 30 minutes and went to a depth of 25 feet underwater.



## In Memorium



**David Mitchell (EE, 1948)**, 89, of Terre Haute, died August 5, 2015. He served as a Rose-Hulman trustee for several years, after being awarded an honorary degree from his alma mater in 1983. A successful businessman and engineer, Mitchell was a distribution designer for Detroit Edison, and was a member of the Westinghouse Corp. team that designed the first atomic engine used in the Nautilus submarine. He then spent the bulk of his career working with companies and subsidiaries of the Canadian International Power-owned Bolivian Power Company, retiring as president and chairman of its board of directors. He was a community leader wherever he lived, served as president of the U.S. Chamber of Commerce of Bolivia, and was appointed an honorary consul for Bolivia.

**Martin Babich (CHE, 1948)**, 87, of North Chicago Illinois, died September 13, 2015. He retired as assistant plant manager for Stauffer Chemical Company.

**James H. Bowman (EE, 1949)**, 91, of Indianapolis, died August 23, 2015. He retired from Indiana Bell as an engineering manager.

**George H. Stearley (EE, 1949)**, 95, of Sidney, Ohio, died September 9, 2015. He retired as a manager for Westinghouse Electric.

**Willard Wampler, Jr. (CE, 1949)**, 89, of Noblesville, Indiana, died August 2, 2015. He retired as a senior structural engineer with General Motors.

**Warren L. Allen (ME, 1951)**, 87, of Ogden Utah, died September 25, 2015. He was president of Allen & Associates Inc.

**Donald R. James (ME, 1951)**, 85, of San Bernardino California, died June 23, 2015. Donald retired as Manager of Product Development and Automation from Rohr Industries Incorporated.

**Dale E. Roeschlein (EE, 1956)**, 81, of Indianapolis, died September 22, 2015. He retired as president of Studio-D Inc.

**C. Richard Withem (CE, 1956)** of Pickerington, Ohio, died September 22, 2015. He was a civil engineer at Stilson Engineers before opening his own home inspection business.

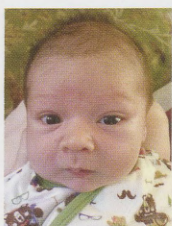
**Frank L. Larr, Jr. (EE, 1958)**, 80, of Westfield, Indiana, died July 26, 2015. He retired from the Naval Surface Warfare Center as an engineer.

**Donald W. Lucas (CE, 1959)**, 79, of Franklin Indiana, died August 14, 2015. He retired as chief highway engineering and department commissioner with the Indiana Department of Transportation, and director of government affairs for the Heritage Group.

**Daniel Kingery (EE, 1961)**, 75, of Cumberland Pennsylvania, died August 19, 2015. Daniel retired from Dynamics Corporation as their president.

**John Erins (ME, 1978)**, 69, of Wildwood, Missouri, died August 23, 2015. He was a consulting engineer with Erins Engineering.

## Rosebuds



**Michael Kosloski (EE, 1999)** and wife Brittany welcomed their first child, son Calder, July 2, 2015. The family resides in Mound, Minnesota.

**Jennifer (Shafer) Hepp (ME, 2004)** and husband Mark welcomed their first child, daughter Morgan, February 22, 2015.



**Jeremey Haefe (ME, 2007)** and wife Maggie welcomed a daughter, Ella, June 13, 2015. The family resides in Ithaca, New York.



**Andrew Steward (BE, 2009)** and wife Courtney welcomed their first child, daughter Sadie, May 12, 2015. The family resides in Cary, North Carolina.

**Kris Verdeyen (EE, 2000)** and wife Lauren Tunnell welcomed their first child, son Milo, July 30, 2015. The family resides in Houston, Texas.



**Michael Morris (ME, 2008)** and wife Kathy welcomed a son, Franklin, July 8, 2015. The family resides in Indianapolis.

**Rachael (Nestor) Halvorson (BE, 2009)** and **Ric Halvorson (ME, 2009)** welcomed their second child, a daughter, Sophia, in July. The family resides in Fishers, Indiana.





## Wedding

**Jon Nibert (CPE, 2012)** married **Jessica Lundin (CE, 2013)** September 5, 2015, in the White Chapel on the Rose-Hulman campus. Jon is a product development engineer at Ford Motor Company, while Jessica is a geotechnical engineer at Cardno ATC. The couple resides in Livonia, Michigan.



## New Faculty & Staff

ALUMNI RETURN TO CONTINUE CAREERS  
ON FACULTY, STAFF



**Gregory T. Neumann (CHE, 2010)** is assistant professor of chemical engineering after completing doctoral studies at the University of Notre Dame. He was a research and teaching assistant in the Department of Chemical and Biomolecular Engineering, assembling two reactor systems and developing new cerium containing hierarchical zeolite catalyst with applications in biomass upgrading reactions.

**Sid Stamm (CS, 2003)** is associate professor of computer science and software engineering. He brings a wealth of experience after serving as principal engineer/engineering manager/lead architect in security and privacy for Mozilla Corporation's Firefox product. He earned master's and doctorate degrees in computer science from Indiana University.



**Ghazal Hariri (CHE, 2003)** is a visiting assistant professor of chemical engineering. She earned a doctorate in chemical and physical biology from Vanderbilt University after achieving a master's degree in biomedical engineering from the college. She was lead researcher for four papers featured in peer-reviewed publications.



**Eric T. Liobis (CE/MA, 2012)** is assistant director of residence life, and **Kristen N. Latta (AB, 2011)** is assistant director of student services in the Office of Student Affairs, after serving as graduate assistants in those areas.



# Alumni Calendar

Check latest events at  
[rovestem.rose-hulman.edu/events](http://rovestem.rose-hulman.edu/events)

### DECEMBER 4

Alumni Reception,  
Glenn Miller Orchestra  
Christmas Show

### DECEMBER 13

Pittsburgh Steelers vs.  
Cincinnati Bengals Game

### MARCH 19

Rose On The Road:  
Phoenix, Arizona

### APRIL 25-30

Attitude Of Gratitude Week

### APRIL 30

Career Achievement Award  
Ceremony

### MAY 7

Indianapolis Mini-Marathon  
Alumni Tent

### MAY 27-28

Class Of 1966  
50-Year Celebration

**SAVE THE DATE**  
**Homecoming 2016**  
**September 30/  
October 1-2**



# A Life Filled With Joy

## FORMER FIRST LADY REMEMBERED AS CAMPUS CHEERLEADER, COMMUNITY ADVOCATE

During Sam Hulbert's legendary 28-year tenure as Rose-Hulman president, Joy Hulbert was a warm and welcoming presence on campus, and a loving and loyal companion to her husband and their family. She was known for her gracious hospitality and dedication to the well-being of Rose-Hulman's students, and was a fixture at athletic contests and campus events.

That shouldn't be surprising for a former college cheerleader.

"You couldn't separate Sam's job from Joy because she was so much a part of it," recalls longtime friend Joan Voltmer. "They were a fantastic team."

Joy died on July 23, 2015, in Naples, Florida, where she and Sam retired.

Joy was introduced to Sam, a graduate student, as she was completing her English undergraduate studies at Alfred University. The couple soon became inseparable on the small New York campus, eventually marrying in the fall following her graduation.



**HONORED BY ROSE-HULMAN:** Joy's contributions to the institute were recognized in 2004 with an honorary degree. The outdoor tennis complex is named in her honor.

"[Joy] has always been my best friend, and my toughest critic. We enjoy each other's company," Sam remarked in an interview before retiring from Rose-Hulman in 2004.

Joy supported Sam at every step along his professional career—from Clemson to Tulane, and eventually Rose-Hulman. She graciously welcomed

coeducation to campus, and, as a former sorority member in college, encouraged the addition of sororities at Rose-Hulman. Joy also served on the institute's Diversity Committee, the Vision to be the Best Campaign's Humanities Task Force, and the Hatfield Hall Planning Committee. In the community, she was a trustee for the YWCA, and was advocate for the Terre Haute Symphony Orchestra and Trees, Inc. community beautification group.



**SUPPORTING ROSE-HULMAN:** A former college cheerleader, Joy enjoyed being on the sidelines for campus activities throughout Sam's 28 years as a college president. She also enjoyed her family, including sons Greg and Jeff; daughter Samantha; and 10 grandchildren.

"Everybody enjoyed [Joy]. She was so much of a light of the community," Voltmer says. "I just admired her so much."

Joy also loved tennis, and was fiercely competitive in the sport. Rose-Hulman's lighted outdoor tennis facility is named in Joy's honor, recognizing her loyalty to the institute.

Joy was presented an honorary doctorate from Rose-Hulman in 2004 (along with Sam), and the Parents' Association presents the Joy Hulbert Award annually to a female faculty or staff member who has had a positive influence on campus life and a student's education.

Joy's advice to students, given in a 2004 interview, was, "when you go out into the community and into your job, envelop yourself in lots of different activities. You'll meet people who are interesting and different than yourself. Always learn from them."

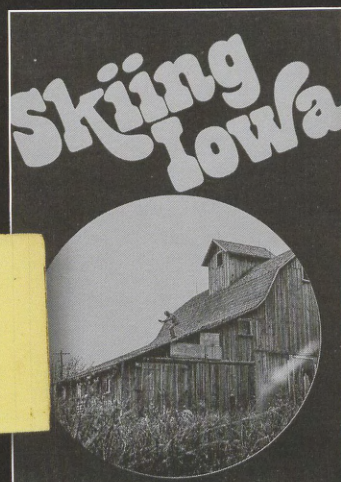


# From Nowhere To Somewhere

## Poster Vaults Rose-Hulman Out of Obscurity

**UNLIKE SOME SCHOOLS, THE ROSE-HULMAN OF THE LATE-1970S DIDN'T HAVE AN EXOTIC LOCATION OR A WIDESPREAD REPUTATION.** Situated on the outskirts of the town comedian Steve Martin had recently deemed the “most nowhere place in America,” the institute was a little-known all-male engineering college competing against bigger names and more happening cities. But as it turns out, the location was the perfect launching pad for a marketing piece still hanging around the world—literally.

STORY BY  
STACEY  
MUNCIE



Inspired by designer Richard Braley's "Skiing Iowa" poster, Rose-Hulman's Duncan Murdoch worked with Richard Braley to create the concept for Ski Terre Haute, as seen in this rough sketch.

**I**n those days, Rose-Hulman was recruiting students using the most high-tech method available: the U.S. Mail. Then-Dean of Admissions Duncan Murdoch wanted to create a recruitment piece that would stand out amongst the competition to really grab the attention of high school seniors.

“The only posters that we saw at the time that were distributed to high schools were typically from Western states and they always had a ski scene,” Murdoch recalls. It was during a visit to a marketing firm in Cedar Rapids, Iowa, that he found inspiration for a parody of those ultra-cool posters.

Designer Richard Braley had recently developed a poster to introduce himself to prospective clients

when he moved his business to California. “Skiing Iowa...it’s one of the things I’ll miss when I move to California,” the piece declared above a photo of a man (Braley himself) skiing down a barn roof.





One photo from the Ski Terre Haute shoot shows a would-be skier assuming the downhill position, spray flocking applied to his trousers for effect. A similar pose would be combined with the barn image to create the composite used for the poster.

Murdoch saw Braley's poster and wanted him to create a similar one for Rose-Hulman. Soon the concept for Ski Terre Haute—which would eventually capture the attention of students, as well as the *Washington Post* and *Los Angeles Times*—was born.

It's a common misconception that the photo was staged in the Terre Haute area on a blustery winter day. In fact, the image was a composite created from two photos—neither of which was taken in Indiana. According to Braley, the background was a stock photo, the skier was staged in the middle of the summer, and the two images were

combined through old school cut-and-paste methods. A realistic spray of snow beneath the skis was applied through photo retouching.

"We had to create this effect in the summertime with my neighbor's son," Braley says with a chuckle. "It was kind of odd because it was 90 degrees outside."

A behind-the-scenes original photo from the shoot shows the skier perched on a tilted piece of plywood, on the street in front of the green lawn of a brick ranch house. Look closely, and you'll notice another person crouching behind the skier, holding him up as he leans as if he were skiing. The person doing the propping is actually the photographer, Braley explains. It was Braley who took the photos.

Back in Terre Haute, Murdoch and a motley crew consisting of Jim Eifert, Chuck Howard, Tom Mason, Ron Reeves, and Tom Roper developed the back of the poster.

"A bunch of us were at one of the watering holes in Terre Haute and after a couple of beers we came up with some good ideas," Murdoch says.

"Along with a few playful jabs at Terre Haute, the back of the poster gloriously sings the praises of food in the campus mess hall "where scurvy has been virtually eliminated," and the faculty, 82 percent of whom "bathe weekly whether they need it or not." It also includes descriptions of majors, such as "chemical engineering—for the guy who wants to earn as much as a plumber, but can't get into the union" and "computer science—

be the first on your block to master computer games, swindle banks, and rule the world."

The posters were dropped into mailing tubes and sent to high schools and prospective students. Murdoch recalls, "A tube was not something a kid received in the mail, so it was pretty much guaranteed it would get opened."

Unique packaging may have gotten it opened, but the satire is what had Ski Terre Haute hanging in bedrooms, bars, and family rooms all over the place. It was frequently seen in local establishments, but Murdoch notes that they got requests for the poster from around the country. Braley also had requests for the poster—including one from an American in Saudi Arabia. And when Steve Martin returned to Terre Haute in 1979, rumor has it he took a few of them with him.

"That era of alums really appreciated it and I suspect that a lot of them still have copies of it hanging up in their family rooms," Murdoch adds.

The back of the poster included a description of majors.

## MAJORS

### CHEMICAL ENGINEERING

For the guy who wants to earn as much as a plumber, but can't get into the union.

### CHEMISTRY

For those who think the world's energy crisis will be solved by "gas coalification" . . . (converting natural gas back into coal).

### CIVIL ENGINEERING

If you've always been titillated by Tinkertoys, give a darn about dams and are serious about sewage . . . this is for you.

### COMPUTER SCIENCE

Be the first on your block to master computer games, swindle banks, rule the world.

### ELECTRICAL ENGINEERING

These guys design and build all the neat gadgets we can't live without: TV's, stereos, radar detectors, and Veg-A-Matics.

### MATHEMATICAL ECONOMICS

These guys predict full employment, lower taxes, no inflation, and an endless supply of 35¢ gasoline.

### MATHEMATICS

For guys who know you don't use a protoscope to rectify a curve.

### MECHANICAL ENGINEERING

Those are the guys who build perpetual motion machines and then hook 'em up to batteries.

### PHYSICS

If you like to accelerate your neutrons and shift your doppler, this is for you.

**WHAT ABOUT YOU?** Do you have a copy of Ski Terre Haute hanging in a place of honor? Send a picture with your poster to Stacey Muncie at [muncie@rose-hulman.edu](mailto:muncie@rose-hulman.edu). Be one of the first five to respond and you'll score a Rose-Hulman sweatshirt.



DevelopmentOffice@rose-hulman.edu

812-877-8217

Terre Haute, IN 47803

5500 Wabash Avenue

**ROSE-HULMAN**  
INSTITUTE OF TECHNOLOGY

Thank you for investing in the lives of  
students who impact the world. Your gift  
helps Rose-Hulman prepare its students  
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Contributing to the Journey



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

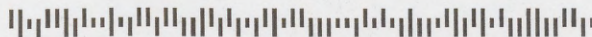


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**Your gift to The Fund for Rose-Hulman supports the institute's mission to provide its students with the world's best undergraduate science, engineering, and mathematics education.**

I/we want to advance Rose-Hulman's impact on the lives of its exceptional students and renowned faculty with a \$ \_\_\_\_\_ gift for one or more of these key initiatives:

- ☐ Rose-Hulman's Greatest Needs
- ☐ Other \_\_\_\_\_
- ☐ Student Scholarships

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Herman Moench Circle	\$25,000
Hulman Circle	\$10,000
Founders Circle	\$5,000
Trustees Circle	\$2,500
Presidents Circle	\$1,000
Deans Circle	\$500
Rose and White Circle	\$250
Century Circle	\$100

#### PRESIDENT'S G.O.I.D. CIRCLE

*Recognizing cumulative young alumni giving*

Gold	\$5,000
Silver	\$2,500
Bronze	\$1,000

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Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

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- ☐ Rose-Hulman is included in my/our estate plans.

Please send me information about:

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- ☐ Other tax-smart gift ideas

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- ☐ Credit Card: ☐ V ☐ MC ☐ D ☐ AE

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- ☐ Give online at [www.rose-hulman.edu/give](http://www.rose-hulman.edu/give)

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Echoes Winter 2015

**See a listing of all 2014-15 donors at [www.rose-hulman.edu/honorrollofdonors](http://www.rose-hulman.edu/honorrollofdonors)**



# Echoes

## ROSE-HULMAN INSTITUTE OF TECHNOLOGY

5500 WABASH AVENUE  
TERRE HAUTE, IN 47803

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### PARTING SHOT

#### Starting Their Journey in Tune:

A new tradition was started this fall as bagpipes serenaded the arrival of this year's freshman class. A bagpiper led the new students' procession from the Sports and Recreation Center to Hatfield Hall for the start of new student orientation—foreshadowing the special walk that this group will make on Commencement day in 2019. *Photo by Bryan Cantwell*



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