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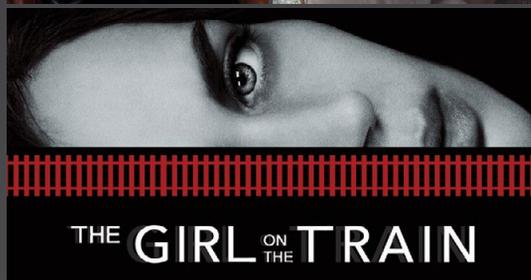
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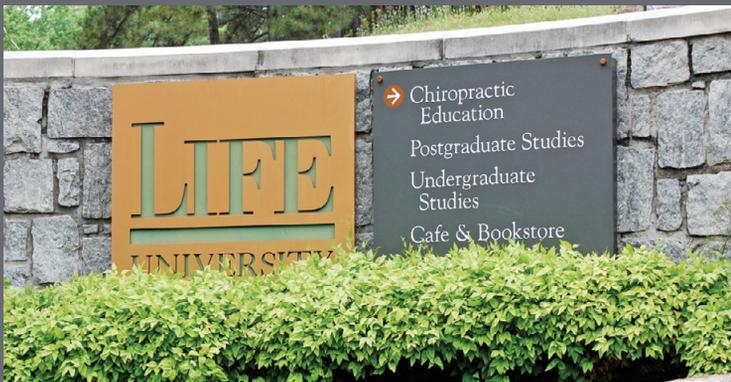
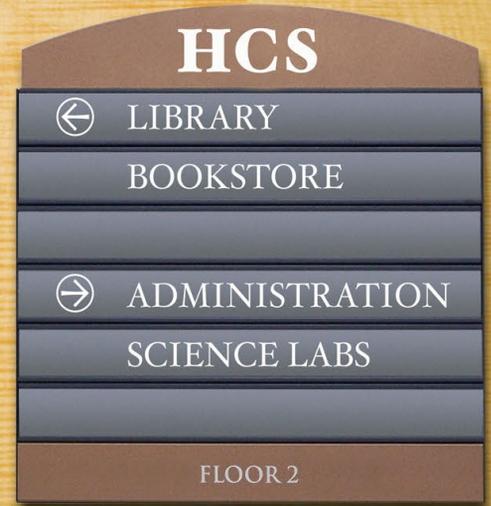
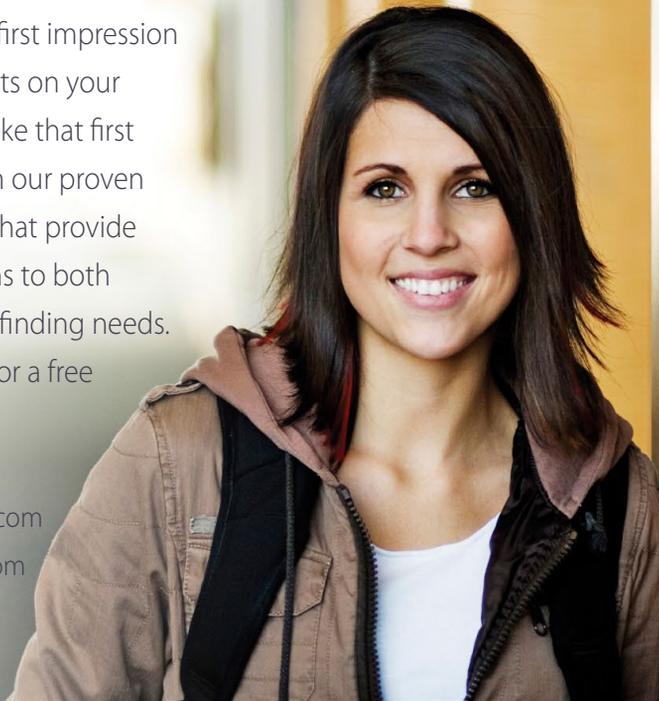


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GEORGETOWN'S GELARDIN NEW MEDIA CENTER

by Krista Lazarus Gilliland

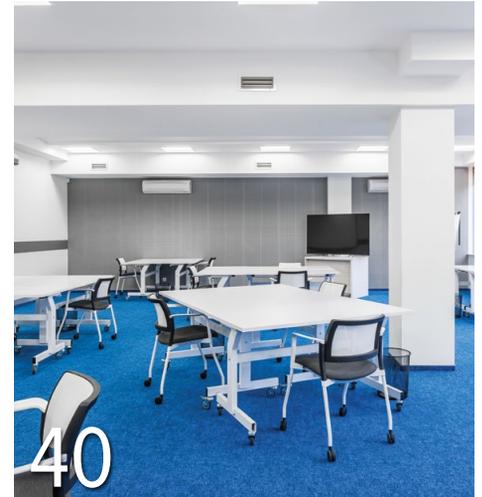
Georgetown University's Gelardin New Media Center meets a wide range of their students' multimedia needs. The New Media Center boasts a production studio, a Maker Hub, Virtual Reality (VR) stations, and more.



MULTIDISCIPLINARY SCIENCE BUILDING AT NOTRE DAME

by Peter Coffey

Today's science buildings often incorporate multiple disciplines, each of which needs different work spaces and instrumentation. The buildings themselves must adapt to support the needs of each new group.



MOVING LIGHTING CONTROLS TO THE 21ST CENTURY

by Michael Johnson

We carry computers in our pockets that are more powerful than the computers NASA used to send people to the moon, but we cling to analog technology for dimming our lights. The future of lighting is 0-10 volt dimming.



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16 EMERGENCY EGRESS AND SINGLE-POINT-OF-FAILURE SYSTEMS: SQUIRRELS, RAIN, AND MAN-MADE DISASTERS

by Daren Hatfield

Power loss within a facility is never a question of if but when, so precautions are taken to protect occupants against such an unpredictable event. Unobstructed corridors and signage to a building's exit are important, but less effective in a room in complete darkness.

EDITOR'S LETTER

I have spent a great deal of time and energy, both in these opening letters or in personal debates, arguing against the perception that millennials are lazy, entitled, and narcissistic. Admittedly, this is a simplification that skews toward the Pollyanna. When I reflect on past semesters, I undoubtedly focus on the positive experiences. It is much like a trip to Disneyworld in that sense. When I return home, I don't remember the slow-moving lines, the grumpy parents, or the exhausted children trying to stay awake to appreciate the fireworks experience that cost their parents a small fortune. Instead, I remember the thrills, the exhilarating seconds on a roller coaster, the pleasantly terrifying tower-drop, and the sweet moments between children and the iconic Disney characters.

Thus, the parallels between the slowly weaving lines or the moments of outright exasperation exist in teaching too: The conversation where a student insisted that because I didn't say I required three *different* sources then his use of the *same* source three times should not be penalized, the student who proclaimed that his self-evaluation of his writing was the true reflection of his work—not my evaluation of his writing—or the student who said she was an “A” student...period. Therefore, any grade I assigned that was not an A was clearly an error on my part. While I would love to say those are the only three negative anecdotes I can pull from twenty years of teaching, we all know I'd be lying.

I would have imagined as well, based on purely anecdotal evidence and discussions among my colleagues—particularly those at private colleges or universities—that academic entitlement has dramatically increase over the last decade. However, Debra Lemke, Jeff Marx, and Lauren Dundes—all from this month's featured college, McDaniel College—produced a recent study that suggests otherwise. In “Challenging Notions of Academic Entitlement and Its Rise among Liberal Arts College Students,” they explore the idea that students are becoming increasingly “self-important, narcissistic, and entitled.” They note, “Excoriation of the ‘Me Generation’ includes reports of students pressuring faculty to succumb to relaxed academic standards as well as students’ consumer/customer-oriented mentality.”

As this notion impacts academic entitlement, they focus primarily on the notion of students' expectations of a reward that is not based on achievement. Working from a seminal text by Greenberger et al., they highlight numbers that seem to justify the alarm in higher education: that over two-thirds of students surveyed expected that “trying hard” should be reflected in higher grading, and a shocking one-third believed attending most classes should net them a B for the course. The results were replicated by Schaefer et al. in a study that highlighted another disturbing trend: Eighty percent of students believed that merely completing “most of the reading” for a class meant they deserved at least a C.

However, Lemke, Marx, and Dundes argue that the perception of a growing issue with academic entitlement is not reflective of reality, nor does easy acceptance of this trend as truth begin to address the “multifaceted nature of this phenomenon.” They add that students of both genders expect participation, improvement, and effort (PIE) be reflected in their grade, perhaps because this reward reflects the “cultural lore that hard work leads to success (or mastery).”

They recommend that we explore ways to cultivate student engagement that is meaningful and “can operate synergistically with mastery on the job.” In short, they encourage a pedagogical approach that does reward “academic sweat equity” in order to motivate students to continue to work hard as they enter the work-force after graduation.

Finally, in a word of advice for their colleagues at other college and universities, they suggest this approach: “Faculty should recognize that they teach more than content. They also teach life skills. Life outside of college is less about whether students have learned how to excel on tests and graded assignments of their particular instructors. Learning is a developmental and lifelong process; when students leave college, they need to be able to return to the control and agency afforded by PIE.”

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PUBLISHED BY FLAHERTY MEDIA
PO Box 1903, Pelham, AL 35124
Toll Free: 800-705-5280
Fax: 855-239-8093

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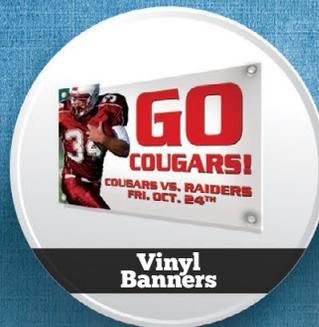
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Although detective stories as a literary genre were generally considered to begin in the 19th century with Edgar Allan Poe and then develop after the syndication of the Arthur Conan Doyle Sherlock Holmes stories, Dr. Bendel Simso of McDaniel College and her assistants have transcribed, edited, and posted over 1500 detective stories, forgotten pieces that demonstrate how the genre developed, as they explore the roots of modern detective fiction. Bendel-Simso, Charles A. Boehlke, Jr., Engaged Faculty Fellow and Professor of English, is leading this web-based project—the Westminster Detective Library—that identifies, catalogs, and publishes all short detective fiction that was published prior to 1891 in the United States.

PROFESSOR SPOTLIGHT

by Rachel Clevenger

Exploring the Roots of Detective Fiction at McDaniel College

Detective Fiction Improving Real-World Police Work

In 2007, Bendel-Simso was approached by Dr. LeRoy Lad Panek, Professor of English at McDaniel, as they shared an interest in detective stories, and because she's an Americanist, he knew she could approach their shared passion with some fresh angles and insights. Panek has authored ten books on detective fiction; he ultimately co-authored two books with Bendel-Simso. She is the co-editor of *Early American Detective Stories: An Anthology* and co-author of the 2017 *Essential Elements of the Detective Story, 1820-1891*.

Bendel-Simso's fascination with detective fiction stems from many academic interests, one of which being the way early detective fiction would propose seemingly bizarre approaches to solving a crime, ideas that years later would become an integral part of police work. For instance, dentist Rodriguez Ottolengui, author of "The Phoenix of Crime," presents a character who suggests a presumably far-fetched approach to solving a crime: analyzing bite marks. In addition to being one of the first to use x-rays in dental exams and pioneer methods for fillings, Ottolengui is considered by many to be the first fiction writer to use dental filling patterns in order to identify

a corpse. Gardener P. H. Foley in *The Journal of the American College of Dentists* notes that interest in the tale was revived a few years later when a young girl's body was found in Yonkers, NY. The local sheriff, familiar with Ottolengui's story, asked a dentist to create a chart of her teeth, which led to her identification.

On a similar note, in "The Long Arm" by Mary E. Wilkins Freeman and Joseph Chamberlain, published in 1895, the amateur sleuth who is investigating her father's death suggests dissecting the house into a grid to be explored. The story's heroine notes, "Tomorrow I begin my search. I shall first make an exhaustive examination of the house such as no officer in the case has yet made in the hope of finding a clue. Every room I propose to divide into square yards, by line and measure, and every one of these square yards I will study as if it were a problem in algebra. I have a theory that it is impossible for any human being to enter a house and commit in it a deed of this kind and not leave behind traces which are the known quantities in an algebraic equation to those who can use them."

In essence, though the idea was widely ridiculed as ridiculous by readers and critics at the time, Freeman and Chamberlain are the geniuses behind what we see today in modern detective shows such as "CSI: Crime

Scene Investigation" in any of its many incarnations—with the premise that some trace of the crime would be left behind, even in a room that appears to offer no evidence. However, French detective Edmond Locard—known as the "Sherlock Holmes of France"—is credited for the "every contact leaves a trace" concept, a basic principle of modern forensic science, known as Locard's Principle. He shared his theory in a seminal text *L'Enquête Criminelle et les Méthodes Scientifiques*, which was published twenty-eight years after "The Long Arm" was released. While truth may be stranger than fiction, detective fiction was often ahead of the real-world techniques for solving crime.

Debunking a Reigning Myth

In short, Bendel-Simso explodes the "reigning myth" that nothing of great import was growing from detective fiction between Poe and Arthur Conan Doyle. In this lost era, she explains, when detective fiction was a popular form of entertainment, America was "both poor and huge," an environment where books were expensive, but newspapers were not.

As Bendel-Simso, Panek, and their student assistants began digging into the archives, they found hundreds of short stories that were relatively or completely unknown. While she acknowledges that the quality of the writing



was as varied as the subject matter, and that some are both “wretched” and even “incredibly racist” at times, she is excited by the way these pieces clearly show a “genre being developed.”

Interestingly, the editors of the papers were not schooled in the best way to publish the stories, and often the story’s twist would be revealed in a headline—or the paper might offer a summary of the entire story before the opening lines.

In addition to watching the genre grow, Bendel-Simso is drawn as well to the nature of the crimes that served as popular topics. Rather than the murder-mysteries the modern reader expects in crime fiction, the stories focused on forgeries, shoplifting, and the challenges often faced by wards.

One focused on a canine jewel thief, and many others offer “ridiculous stories with sleepwalkers.” Many of them, nearly half she would guess, are anonymous pieces written as if memoirs by “fake” detectives.

Bendel-Simso’s fascination with detective fiction stems from many academic interests, one of which being the way early detective fiction would propose seemingly bizarre approaches to solving a crime, ideas that years later would become an integral part of police work.

The Irony of Stolen Crime Fiction

Complicating the research into all these unexplored short stories is that America was not yet concerned with copyright law, so papers would “get anything and steal it.”

Some stories appeared under different titles more than thirty times. As the project grew over a decade, they began to get more financial support—both from the college and from an Andrew W. Mellon grant.

She was able to hire assistants for archival research, so students could help her locate, transcribe, edit, and ready the stories for digital publication. As students were able to travel with Bendel-Simso to delve into archival material, learning to work with microfiche for the first time and seeking new pieces in the original publications, they learned “both the tedium and excitement” of scholarly work.

“It was through working with Dr. Mary that I realized my passion for the powerful, small details of a work—the nuances of word choice and the subtle framing of punctuation. Here was a whole history of a genre—one no one was even looking for. And Dr. Mary was key in unearthing it.” — ANNE MATHEWS

Archival Diving with Dr. Mary

Camden Ostrander, a senior English major with a secondary education minor, is one of three McDaniel students who is currently working as an undergraduate research assistant on the Westminster Detective Library.

Ostrander explains that he’s never heard Bendel-Simso called anything other than “Dr. Mary,” which is an important distinction for him because he believes this title “captures the sense of both academic excellence and personal connection that she brings to the classroom.”

Additionally, Ostrander shares that Bendel-Simso’s support extends beyond the classroom

—she invited Ostrander and other student assistants to weekly dinners in her home in Westminster throughout the summer and they all stayed at her childhood home in Minneapolis, while doing archival research “deep in the University of Minnesota’s library.”

Unearthing the History of a Genre

Anne Mathews, a 2013 graduate of McDaniel, worked on the Westminster Detective Library while there, a project she enjoyed to such a powerful degree that the work inspired her current career as a copy editor at The Oxford Club. “It was through working with Dr. Mary that I realized my passion for the powerful,

small details of a work—the nuances of word choice and the subtle framing of punctuation,” Mathews explains. “Here was a whole history of a genre—one no one was even looking for. And Dr. Mary was key in unearthing it.”

Equally inspiring for Mathews is the way her mentor was passionate, enthusiastic, kind, and thoughtful—while also being “a spirited individual and a force to be reckoned with.” In short, Mathews adds, “There is no one better to have on your side.”

The Task and Honor of Documenting a Transition

Cassandra Berube is a 2014 graduate of McDaniel who now works as an associate editor at Paul H. Brookes Publishing Co. Her internship with Westminster Detective Library offered her the opportunity “to immerse myself in a fascinating topic to which I would not otherwise have been exposed.”

Fascinated by watching stories evolve and the layers of plot develop, as they were offered the chance “to read the evolution of this genre as it happened,” Berube feels fortunate to



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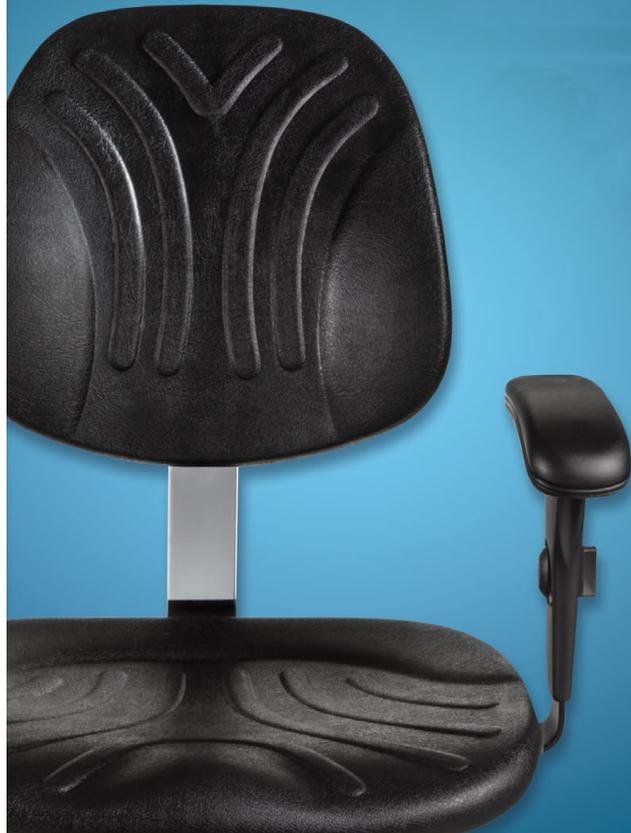
have been given the task and the honor of documenting that transition.

Berube notes of Bendel-Simso, “As a mentor, she engaged in intellectually vibrant discussions while encouraging me to create my own understandings of literature.” Because her work involves project management, Berube is benefitting from the critical thinking skills and painstaking attention to detail that the internship demanded.

Perhaps even more importantly, Berube learned from her mentor the “bravery to pursue your own opinions against the odds.”



ABOUT THE AUTHOR: Dr. Rachel James Clevenger earned her B.A. and M.Ed. degrees from Mississippi College. After finishing her PhD in Composition and Rhetoric, she taught and served as the University Writing Center Director for Birmingham Southern College and University of Alabama at Birmingham. Currently, she teaches Business Communications at Samford University.



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ATHLETIC FACILITIES AND FLOORING

By Ron Fenhaus

College Athletic Facilities: Starting with Quality Floors

A quality and well-designed sports floor can help bring a university to life. It can support optimum athletic performance, boost event turnout, encourage fitness and amplify school spirit—but it all starts with the foundation of a solid sports floor.

With any big purchase, you should understand your options and the factors that go into making an educated, informed decision. The athletic flooring industry has hundreds of different sports floor systems, each with varying levels of performance. Investing in a quality sports floor can make a big difference.

There are a variety of ways that sports floors contribute to creating vibrant sports programs and top-notch athletic facilities.

Better Flooring Performance for Athletes

When choosing a sports floor, it's important to consider who the primary athlete will be. For instance, the high amount of shock absorption required for a dance floor could tire out a basketball player quickly, but a small amount of shock absorption can lead to sore knees and ankles.

In the sports floor industry, standards exist to measure important performance characteristics. The Maple Flooring Manufacturers Association (MFMA) notes that five standards are commonly used to measure the performance and uniformity for competition sports

floors. These five common measurements can guide your decision and help you understand what flooring attributes matter most to your university.

Shock absorption measures the ability to absorb the impact of the athlete. A consistent sports floor makes players less likely to play tentatively, so the athletes can move across the court as they desire without any surprises to their bodies. Shock absorption can also be customized for synthetic floors including indoor tracks and auxiliary gyms.

Area deflection measures the amount of energy transferred through the floor upon impact. When two athletes are playing side-by-side, the proper amount of area deflection minimizes the floor vibrating and disrupting the other.

The American Society for Testing and Materials' (ASTM) guidelines for sports flooring safety describe vertical deflection as the amount of "give" that a sports surface provides. It measures the ability of the floor to adjust as an athlete jumps (or falls) on the court. Too much of it can hinder performance and stability.

According to the U.S. Environmental Protection Agency, people spend 90 percent of their time indoors. With that much time spent inside, it's essential to recognize the impact building materials used in new construction and renovations could have on students, faculty and the community immediately and over time.

A responsive floor that provides a good bounce is ideal for performance. This is described as ball rebound (bounce), which measures the accuracy and uniformity of a ball's behavior on the surface.

Surface friction, or traction, considers an athletic flooring finish's ability to control the sliding of athletes on a sports surface. While this characteristic is truly a function of the floor's finish versus the flooring system, quality sports floors consider these pieces holistically for safe and easy movement in all directions.

Before choosing a new floor, ask the flooring manufacturer for test results and request information regarding the criteria that matter

most to your athletes. The top performance standards to reference when examining your options and assessing your needs are ASTM F2772, MFMA PUR Standards, EN-14904 and DIN 18032 Part 2.

Improved Safety for All

When it comes to flooring, whether using hardwood or synthetic, quality materials and construction can influence an athlete's safety and wellbeing. And, while a quality floor won't prevent injury, it can help keep students safe.

The American Academy of Podiatric Sports Medicine (AAPSM) concurs. "Different playing surfaces can also have an effect on injuries.

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Indoor wood courts offer the most shock absorption and are considered the safest courts.” When comparing wood courts to the hardest options like concrete, AAPSM notes that hard sports courts can be the “most dangerous in relation to lower extremity injuries.”

Standards that tend to have the most impact on safety include shock absorption, vertical deformation and surface friction. These factors help make jumping, pivoting, running and even falling easier on athletes’ joints and ligaments.

Good shock absorption is more forgiving on an athlete’s body and helps reduce long-term

injuries. The same holds true for vertical deformation. When an athlete jumps on a sports surface, how does the floor respond? Not enough vertical deformation, or give, can lead to increased acute injuries over time. In fact, playing on hard surfaces—such as concrete, asphalt, tile, and tartan surfaces, as well as some of the newer synthetic surfaces—can lead to patellar tendinitis.

When it comes to the floor’s finish, the proper amount of surface friction is vital for keeping athletes safe. Excessive friction or grab on the finish can lead to twisted ankles, and not enough can make athletes slip and fall.

While your flooring manufacturer or dealer should help guide you through these conversations, they are important to understand to make an informed decision. Be sure that you are not only aware of ASTM F2772’s minimum requirements, but understand the ideal measurements for competitive sports.

For instance, ASTM F2772 criteria states shock absorption should be a minimum of 10 percent, although shock absorption greater than 22 percent is ideal for competitive sports. The higher the percentage, the higher classification is awarded to the surface. Anything under 10 percent is considered non-compliant.

Healthier Buildings: Indoor Air Quality

Only the most responsible sports surface manufacturers are well-educated when it comes to healthy building practices and indoor air quality. According to the U.S. Environmental Protection Agency, people spend 90 percent of their time indoors. With that much time spent inside, it’s essential to recognize the impact building materials used in new construction and renovations could have on students, faculty and the community immediately and over time.

A key role of all flooring, including sports flooring, in healthier buildings is reducing the emission level of VOCs in materials and adhesives. When VOCs reach a certain threshold, indoor air quality (IAQ) and health is compromised.

Poor IAQ can contribute to a condition known as sick building syndrome. It has been said that immediate effects of indoor pollutants are similar to the common cold or allergies. Symptoms may include irritated eyes, nose and throat, as well as headaches, dizziness and fatigue.

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following criteria and emissions requirements: 1) SCS EC-10.3-2014 Indoor Air Quality Standards; 2) California Specification 01350 Special Environmental Requirements; 3) Collaborative for High Performance Schools (CHPS); 4) USGBC LEED 2009 and v4 criteria for low emitting materials (Flooring and Flooring Adhesives). Look for suppliers and products with FloorScore® certification by visiting scsglobalservices.com.

Simpler Cleaning and Maintenance

The right sports floor can make your maintenance staff's job easier, and more importantly, keep bacteria buildup at bay. Flooring in a weight room or locker room, for instance, is another location where the right sports floor will truly make a difference over time.

Rolled rubber may be more desirable at first, but over time, the porous surface can lead to odor and bacteria collection. It will only be a few years after your fitness facility begins to smell of sweat, which will cause you to replace your floor much sooner than anticipated.

Commercial carpeting or carpet tiles are inexpensive, but can absorb sweat and stain easily. Since it's harder to clean, the carpet fibers can be a breeding ground for allergens and be very irritating to people dealing with indoor allergies.

To get the most out of your investment, consider non-porous floors like synthetic pad and pour floor systems. They are easier to clean because of the smooth, monolithic top coating.

Amplified School Pride

When students and staff are proud of their team and university, their school spirit shines. School-inspired, thoughtfully designed floors bring the whole experience together and add to part of a student's connection with the university.

Choose a manufacturer that truly cares about your school pride and has experience making it come to life through the design of the floors.

With any epoxy floor surface, school colors can be creatively incorporated into your locker rooms and bathrooms. Different stains and usage of various wood grain can also create a bold, contrasting appearance between game lines adding to the visual impact of a maple floor.

Quality Facilities: Built From Bottom Up

Investing in a sports floor also means investing in your student athletes. Before you make your next sports floor purchase, determine what

characteristics matter most to your university and its students, and make sure you understand the factors that go into high-performing floors.

Take time to find a flooring manufacturer that understands your goals and takes the time to bring your university to life through the little details that make a big difference.



ABOUT THE AUTHOR: Ron Fenhaus is the vice president of sales at Action FloorSystems, LLC, a company that specializes in high-performance sports surface systems to accommodate any application. With more than 20 years of experience in the field, Fenhaus brings insight and innovation to each new project.

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SAFETY AND SECURITY

By Daren Hatfield

Emergency Egress and SPOF: Squirrels, Rain, and Man-Made Disasters

On January 3rd of this year, an errant squirrel took momentary command of a major university in California by chewing through electrical wiring and knocking out power to the main campus facilities. The loss in power resulted in canceled classes and programs for the day until the needed repairs could be implemented.

Only a week later, Mother Nature's sense of irony was on display when it "pulled the plug" during CES, the premier consumer electronics show, in Las Vegas. Excessive rain the day before caused a transformer flashover that plunged thousands of CES participants into unexpected darkness. Fortunately, in both cases, occupants were not in immediate danger and remained relatively safe until normal power could be restored, but these situations illustrate the unpredictable nature and timing of power outages, and particularly the inherent dangers of designing your emergency lighting system to a Single-Point-Of-Failure (SPOF) common when using generators or large central inverter systems.

Only a Question of When

The event of a power loss within a facility is never a question of if but when it will occur, therefore precautions are taken to protect occupants against such an unpredictable event. Unobstructed corridors and signage showing the shortest route to a building's exit are important, but how effective are they when a room is in complete darkness?

Emergency lighting is the crucial element that ties many of a facility's safeguards together. National, state and local safety codes outline requirements to provide occupants with emergency illumination along the path of egress. How we comply with these national and local codes is often an exercise of finding the solution that meets application, budget, and architectural constraints and preferences. Regardless of preference, the question must be asked: how do you address or avoid SPOF within your emergency lighting system?

Failure of Simple Tactics

Often, a simple tactic to deliver emergency lighting is to use an onsite generator - when normal power is lost, the generator kicks on and provides a dedicated source of AC power to the facilities emergency lighting fixtures. Anyone can immediately pinpoint the SPOF exposure in such a system, but in truth, the potential for failure extends beyond the generator itself.

One of the most harrowing examples of this occurred during the World Trade Center bombing of 1993. When terrorists intending to collapse the North Tower of the WTC detonated a bomb within the parking structure,

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the resulting explosion collapsed several steel-reinforced concrete floors. Power was lost to the building, but the generator remained intact. The problem occurred when water mains that were broken by the blast flooded the switching mechanism responsible for delivering the generator power to the emergency lighting system.

Even though the generator was functioning, thousands of people needed to be evacuated from the building in utter darkness—a process that took hours to complete.

The need to address SPOF became apparent in this situation. Restoration of the World Trade Center, as well as subsequent construction

of the Freedom Tower at One World Plaza, implemented a different solution for providing emergency egress lighting in the stairwells. Instead of relying on a generator system (or the attached switchgear) for emergency illumination, individual battery backup units, commonly referred to as emergency ballasts, were installed within existing fixtures along the paths of egress to create a system of almost infinite redundancy.

Miniature Emergency Systems

The emergency ballasts remain in a charged state, ready to deliver auxiliary power to the individual fixture when a power loss occurs.

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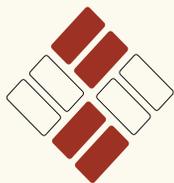


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The advantages of such a system become clear: emergency illumination is no longer dependent on a single supply source. Each equipped lighting fixture became its own miniature emergency system, detached from the risks of SPOF of the larger, centralized system.

Obviously, each individual fixture contains its own inherent points of failure (what if the lamp is 'burned out,' the fixture electronics are faulty, or the emergency battery fails to charge?) but as a whole, paths of egress remain illuminated even if one or two fixtures don't perform. An additional benefit is that integral emergency battery systems utilize existing light fixtures, eliminating the need for extra wall or ceiling mounted hardware.

To be fair, there are additional challenges and responsibilities incumbent when eliminating SPOF with this type of arrangement: diligence must be taken when applying the technology to ensure compatibility as well as adequate performance, and Life Safety code dictates regular testing of each individual unit to make sure it performs properly during an emergency.

Emergency Ballasts and Drivers

Many facility owners, however, find the gain in system confidence well worth the extra effort. From a cost standpoint, emergency ballasts and drivers are significantly less than the investment required for larger generator or UPS systems—not only in regard to initial installation but also in system maintenance and replacement expense.

A trade-off will always exist between balancing simplicity with eliminating SPOF. Other options for emergency egress lighting exist, such as unit inverter equipment, that strike a middle ground between generators (one solution with higher SPOF risk) and individual battery systems (multiple units with perceived infinite redundancy).

Unit inverters remove the emergency supply from the lighting fixture itself and reside between the distribution panel and the emergency lighting fixture(s) to operate a limited number of fixtures during an emergency power situation. Unit inverters offer their own advantages such as full light output and wider load compatibility but with the caveats of increase in cost.

SPOF: Real but Avoidable Threat

Regardless of how emergency lighting is supplied, SPOF is a real and unavoidable threat that must be taken into consideration for any Life Safety system. Even though a single-point-of-failure is a bit simpler to fix after the problem has occurred, that is little or no consolation to building occupants stranded in darkness at an inopportune, or possibly even critical, moment.

Take the time to recognize SPOF in both your normal and Life Safety systems, and challenge yourself to ask the question "Can the intended occupants in this facility afford a SPOF?" This will help your system to not only avoid an unwanted emergency event, but also be prepared when failures—and squirrels—happen.



ABOUT THE AUTHOR: Daren Hatfield heads Marketing Projects for IOTA, a leader in emergency lighting innovation for commercial and public spaces. Since 1999, he has worked alongside multiple manufacturers to deliver Life Safety solutions in a continually-shifting technical industry. He can be reached at hatfield@iotaengineering.com.

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GELARDIN NEW MEDIA CENTER

by Krista Lazarus Gilliland

Georgetown University's Gelardin New Media Center, can be found on the first floor of the Lauinger Library, and it specializes in providing the assistance and equipment necessary to meet a wide range of their students' multimedia needs. The New Media Center boasts a production studio for student videos, a Maker Hub with an Idea Lab for teaching students to create new products and for groups to collaborate, several Virtual Reality (VR) stations, a Multimedia CoLaboratory room which offers editing services for student productions, and all of this comes with the ability to sign up for instruction and training courses to assist with the innovative technology that the Gelardin New Media Center provides.

Students are encouraged to experiment so that they can develop and test new ideas. These rapid prototyping tools are important to the students at Georgetown because, according to Mrs. Marhanka, “You never know what kind of problem they are hoping to solve and which new technology could spark a solution.”

Beth Marhanka, Director of the Gelardin New Media Center, states, “Our New Media Center, located in the main campus library, is open to every program, department and school at Georgetown. Our users come from every department and program, from history and music to biology and business. I’m truly proud that the library is able to provide these amazing technologies to everyone on this campus.” Faculty, staff, and students have the ability to come in and use the media center for classes, collaboration, and experimentation.

Production and Editing

The Gelardin New Media Center has all of the technology required to edit and produce full-length documentaries as well as short interviews. Students may reserve the studio and its equipment for up to two hours at a time. The production studio includes a green screen, proper lighting, and all essential equipment for shooting in-studio interviews. If necessary, students may check out equipment to complete a project or assignment.

When asked about what usually gets students excited about the New Media Center, Mrs. Marhanka mentioned that there are over 600 video equipment kits, including GoPros, dSLR cameras, flash kits, and lavalier microphones. She says the media center has everything students could possibly need to create a podcast, documentary, or other type of digital media product.

Mrs. Marhanka also mentions that the variety of equipment that the New Media Center offers is what makes it such a unique place for student engagement. The center has been used many times by faculty, staff, and students to promote ideas that have a social impact. “Several faculty have produced podcasts, including one by history professor Marcia Chatelain about the killing of Freddie Gray. Students have created documentaries about issues like mass incarceration, homelessness and slavery. It’s a wonderful thing to see how they are taking the important topics they’re learning about in their courses and turning them into impactful stories that people outside of academia will find compelling.”

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The Maker Hub

The Gelardin New Media Center's Maker Hub opened in October of 2016 and offers classes for students to learn how to make new products using different technology and tools.

They sponsor events and "Skill Share" sessions for students to learn new things together. Students are able to get help on projects, learn new skills, and work with other students to see their ideas take shape.

There are classes on 3D printing, laser cutting, vinyl printing, digital embroidery, and many other ideas that students wish to share with one another. Students are encouraged to come to the Maker Hub to use the advanced tools needed for the fabrication and creation of new, inventive products.

They are encouraged to experiment so that they can develop and test new ideas. These rapid prototyping tools are important to the students at Georgetown because, according to Mrs. Marhanka, "You never know what kind of problem they are hoping to solve and which new technology could spark a solution."

The Maker Hub also has an Idea Lab where students can work with manipulatives, whiteboard tables, PC projectors, and other equipment for working with real-world problems while trying to find innovative solutions.



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The Virtual Reality stations are located in the Idea Lab, and they allow students to try new things without leaving the library. Students must set up a consultation about VR before they are able to use the various devices and technology. From military simulations to video games, the VR stations can assist students with navigating difficult situations. They are able to ride virtual roller coasters, travel to museums around the world, and practice medicine through this innovative technology.

The software to build virtual worlds and create their own 360° images for the VR headsets can also be found in the New Media Center. Students are encouraged to schedule time with the VR technology through the media center's website.

CoLaboratory, Multimedia Training, and Classes

A Multimedia CoLaboratory classroom is available for independent computer use and for groups to meet and edit their work. There are four stations for students in the CoLab that feature large monitors and tables for groups. An instructor's station has projectors and screens for classes to use. This room is great for editing audio and video content, teaching classes, and teleconferencing with others.

The Gelardin New Media Center offers classes, consultations, and training for all of the software, tools, and stations they offer. Students must learn to use the technology effectively before checking an item out of the library or before they are allowed to use certain technology in certain multimedia rooms within the media center. Students are required to preview a series of slides and take a quiz about using the spaces and technology provided.

An Innovative Place to Learn

Throughout Georgetown University's Gelardin New Media Center, students are encouraged to learn, produce, and grow as they create new ideas that may promote social justice or develop new techniques for practicing medicine.

The center's Maker Hub with Idea Lab make it a one-of-a-kind media center that motivates students to try new things and provides the equipment and support to be great innovators, communicators, and to, "Discover, Design, Share, and Inspire."

Please visit www.library.georgetown.edu/gelardin to learn more about Georgetown University's Gelardin New Media Center.

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*—Nick Page, Educational Technology IT Manager,
University of Notre Dame, Mendoza College of Business*

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McCOURTNEY HALL

A Multidisciplinary Building FOR PROBLEM-BASED SCIENCE

by Peter Coffey

Research and, more recently, teaching approaches to science are increasingly problem focused, not discipline focused. This means that today's science buildings often incorporate multiple disciplines, from chemistry and biology to engineering and computational work, each of which needs different work spaces and instrumentation. As the problems studied change, the composition of the project teams change, and the buildings themselves have to be able to adapt to support the needs of each new group.





Problem-Focused, Team Approaches

Problem-focused, team approaches to science are a big departure from the past where science buildings—or the labs within them—were dedicated to biology or chemistry or physics, and expected to stay that way for the life of the building.

What does that mean for the design of these new buildings? How can a lab building possibly accommodate economically whatever science or engineering discipline is the priority of the day?

McCourtney Hall of Molecular Science and Engineering

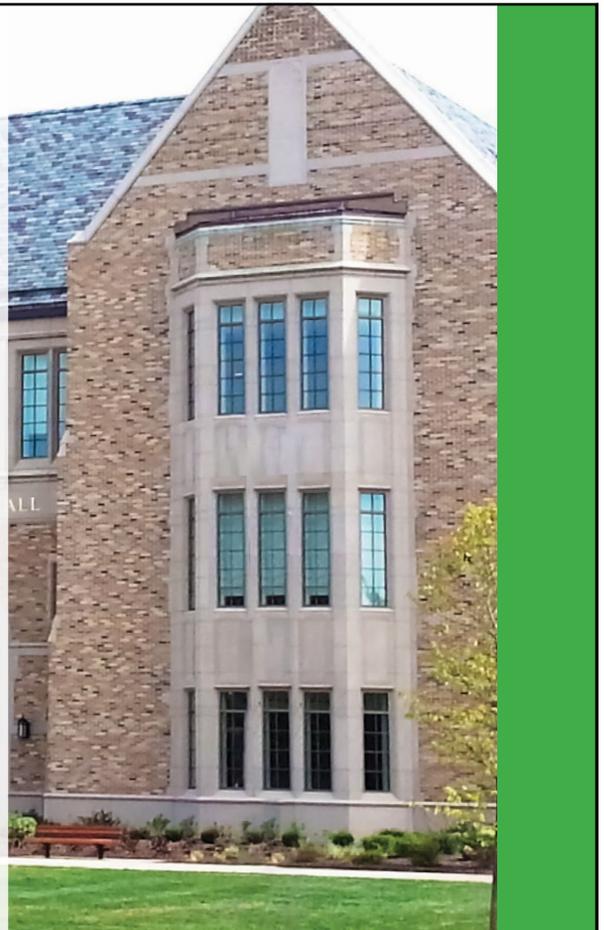
A new building at the University of Notre Dame—the McCourtney Hall of Molecular Science and Engineering—highlights the challenges and creative solutions to building a modern, multidisciplinary science and engineering building.

Notre Dame committed some years ago to expand its already substantial scientific program, with the goal of enhancing its capabilities in analytical sciences and engineering, chemical and biomolecular engineering, and drug discovery.

Sustainable Vacuum Utility at Notre Dame

The University of Notre Dame's new McCourtney Hall of Molecular Science and Engineering is a research facility built around the University's vision of multi-disciplinary research neighborhoods. Designed by BSA LifeStructures, it supports the collaborative, ever-evolving nature of cutting edge STEM research, which requires facilities that are both adaptable and sustainable. VACUU·LAN® local vacuum networks help achieve both objectives at McCourtney Hall.

- **Sustainable:** VACUU·LAN networks reduce power consumption at McCourtney Hall by 55% over a comparably sized central system, based on initial power consumption data measured by Notre Dame Facilities personnel. This equates to 20 MW-hr. per year in energy savings.
- **Adaptable:** VACUU·LAN networks are easily reconfigured to adapt to researchers' needs. Networks can be expanded and capacity can be added quickly and at minimal cost. Within months of occupancy, four labs in the reserved shell space were outfitted with networks to accommodate new researchers.



The university already had numerous science and engineering buildings distributed about the campus. The new initiative would require not only new research space but also new research faculty who would be recruited to the university and organized as problem-based, cooperative research teams.

Developing Research Neighborhoods

The university decided to develop a new East Campus Research Complex with “research neighborhoods” that would permit the kind of interdisciplinary research that Notre Dame believes is so important. The notion was to co-locate scientists and engineers with overlapping interests; imagine polymer chemists who are working with engineering groups that will test these new materials in real-world applications.

Conversely, imagine the engineering team identifying critical applications and presenting those needs to the polymer chemists as a research objective. The university envisioned bringing these disciplines together in a building that not only provides a setting most

Problem-focused, team approaches to science are a big departure from the past where science buildings—or the labs within them—were dedicated to biology or chemistry or physics, and expected to stay that way for the life of the building. How can a lab building possibly accommodate economically whatever science or engineering discipline is the priority of the day?

conducive to innovation, but also one that can evolve with the science and engineering challenges undertaken.

Bringing Disciplines Together in Innovative Setting

McCourtney Hall was the product of that vision, and named for a generous donor with long ties to the university. The 219,500 GSF building, with 100,000 SF scheduled for lab space, was designed by BSA LifeStructures and completed in 2016. Because Notre Dame planned to recruit new faculty to the

building, as well as relocate some faculty from other buildings on campus, some 40% of the lab space was reserved as shell space for later build-out.

BSA LifeStructures employed numerous approaches to support the multidisciplinary program while maintaining the building’s ability to respond to program changes in the future:

• **A collaborative core:** The L-shaped building locates faculty offices, conference rooms and informal spaces at the junction of the

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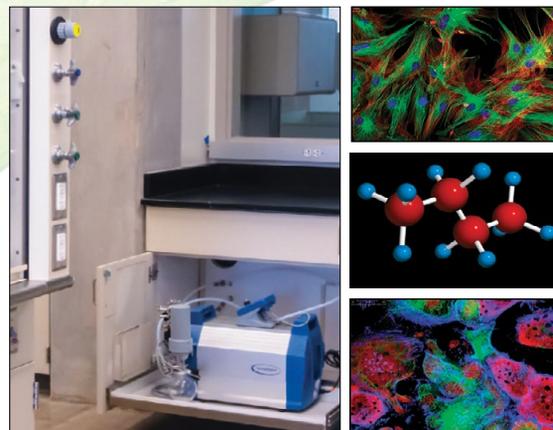
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two wings to create an environment that encourages informal interaction and collaboration.

- **Open, configurable labs:** Lab spaces are open, with broad sightlines and modular, moveable casework that can be rearranged as needed to accommodate project teams with different instrumentation, storage and works-surface needs. The open spaces encourage collaboration. “Flex space” can be assigned to either laboratory or lab support functions as needed.

- **Creative approaches to lab utilities:** To ensure versatile use of lab space, air supply and exhaust ductwork was designed to maximize the number of fume hoods possible on each floor, so that any type of lab could go on any floor in the future, as needed. To avoid excessive, potentially under-utilized utility investments, the building employs a mix of central and local approaches to supply. Certain utilities—such as natural gas—were designed for

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Vacuum is typically used intermittently in most labs. If produced in-lab and only as needed by that lab, on-demand vacuum production by small, local pumps saves energy and extends maintenance cycles. At Notre Dame, early monitoring of the local vacuum system usage suggests future energy savings of greater than 50 percent compared with a central vacuum system designed to serve the same number of users.

central supply, but with point-of-use delivery only to those labs that needed them. Other utilities, such as the lab vacuum systems, were provided as in-lab, local networks that are installed only where the need is clear.

Modular Vacuum Systems

The modular vacuum systems illustrate how a departure from traditional practice can help achieve both technical performance objectives and the adaptability goals of a problem-based organization of research or teaching.

By installing the vacuum only where needed, the university avoids overbuilding of a utility that may well be needed in a chemistry or biology lab, but may not be needed in a physics or computational lab.

At the same time, should vacuum be needed for a new research program in a space where it is currently not provided, the installation can usually be accomplished in a day or two per lab. Lab-by-lab installation also prevents any risk of inter-lab cross-contamination through vacuum lines.

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The local network approach to vacuum also solved a problem that had plagued another science building at Notre Dame. The central vacuum system in the Stepan Chemistry Hall had to be shut down several years before when solvents were occasionally sucked into the system, damaging the pumps and leading to expensive repairs.

Improving Lab Safety and Operating Efficiencies

Scientists needed to buy their own pumps, hitting departmental budgets. The local vacuum networks installed in McCourtney Hall rely on chemical-resistant pumps and



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The fundamental planning vision—a building that can accommodate the varied and changing needs of a wide range of scientific and engineering disciplines—has produced a building that can be quickly and economically outfitted for new faculty with new research problems to solve.

tubing, and ensure that the entire building vacuum system is not at risk should someone inadvertently aspirate corrosive solvents into the lines. Net, a technology chosen largely to address the need for adaptability in a multidisciplinary facility also overcome a longstanding maintenance challenge and should provide continuing operating savings.

Other utilities that are typically supplied as fixed, whole-building systems but could be supplied modularly deserve investigation when the varied needs of multidisciplinary teams call for specialized local requirements.

Examples include the following:

- modular electrical raceways that permit delivery of electricity of the needed voltage

—120V, 240V, 480V—anywhere in a lab, eliminating the need for invasive rewiring when instrumentation changes.

- point-of-use ultrapure water systems and in-lab gas generators or cylinders instead of piped gases. Both of these eliminate the cost and inflexibility of building-wide piping systems.

- filtered fume hoods, which operate without ductwork needed by fixed hoods, permitting the hoods to be relocated as needed. While most commonly used for teaching labs, filtered fume hoods can be adapted for specific project requirements and can lower long-term energy costs.

An early test of the adaptability the new McCartney building to an unpredictable research program occurred when the Notre Dame science-recruiting effort found quick success. Within a year of occupying the new building, the university has already had to fit-out 25 percent of the reserved lab space for four labs for new research teams.

The fundamental planning vision—a building that can accommodate the varied and changing needs of a wide range of scientific and engineering disciplines—has produced a building that can be quickly and economically outfitted for new faculty with new research problems to solve.



ABOUT THE AUTHOR: Peter Coffey has served since 2009 as Vice President at VACUUBRAND, INC., where he has been working to bring to North America energy- and water-saving lab vacuum technology developed by VACUUBRAND of Germany. Mr. Coffey holds degrees in biology, natural resources management, and business.

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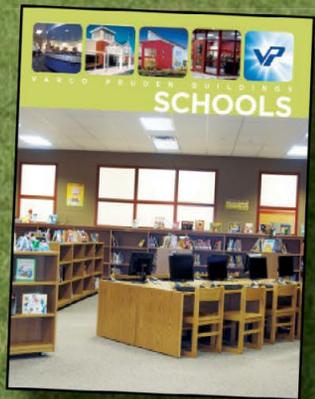
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Moving Lighting Controls into the 21st Century

by Michael Johnson

We moved into the 21st Century over 17 years ago. We can ask “Alexa” to play us songs, lock the doors and order pizza. Everywhere you go people are talking about “the Internet of Things.” You carry a computer in your pocket more powerful than the computers NASA used to send people to the moon. So why are we still clinging to analog, 20th Century technology when it comes to dimming our lights? The technology I’m referring to is called 0-10 volt dimming.

DALI provides two-way communication between the light fixture and what's controlling it. DALI fixtures not only receive commands, but acknowledge they received the command and then confirm that the command was executed.

DALI fixtures are also capable of reporting if something has failed on the fixture and their run time.

If you work in facility operations or maintenance you are probably familiar with the term 0-10v. For those of you who aren't as familiar, 0-10v was developed as a way to dim florescent lighting, and it is one of the oldest dimming standards still in use. With 0-10v, a control device sends a simple, analog signal that ranges from 0v to 10v. In most cases 0v will cause the fixture to dim to its lowest possible level, while a signal of 10v will cause the fixture to go to its maximum light output.

I often hear people defend the use of 0-10v systems saying things like: "It's proven technology, it's rock solid and it works!" And all of that is true, just as all of that was true for the car I drove in HighSchool, a gold, '73 Plymouth

Valiant. Sure it only had an AM radio, no A/C and did I mention it was gold? But it started every morning and got me where I needed to go. But do I still drive it?

In the course of my lifetime we've moved from an analog world to a digital world. The move from analog lighting to digital lighting is through DALI.

DALI Explained

DALI (Digital Addressable Lighting Interface) is a communication standard designed specifically for lighting. DALI defines how each component in a lighting control system communicates and gives each fixture a unique address. DALI is also an "Open" standard. Why is that

important? As an open standard any manufacturer can create devices that communicate using DALI.

For example a DALI driver from one manufacturer will work with control stations, sensors, etc. from any other manufacturer using DALI. The standard has also been recently upgraded to what is now called DALI2 (backward compatible with the original standard) which now assures that a DALI certified component from one manufacturer will work with components from other manufacturers.

Advantages of DALI over 0-10v

Intelligence and Communication 0-10v

0-10v based systems send one-way analog signals to the fixtures they control. The signal sent is simply a change in voltage from 0 to 10 volts. The problem starts with how each driver interrupts that signal. You could have two seemingly identical LED fixtures but with drivers produced by different manufacturers. What 2v means to driver "A" could be something totally different than what it means to driver "B".

One driver may go all the way to off at 0v while another may only dim down to 10%. If you have multiple fixture types and want all of

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them to dim to 50% you may have to send different 0-10v values to each type of fixture. 0-10v is also only one-way communication and for lack of a better word creates “dumb” devices. Fixtures can only receive commands and cannot report back that the command has been received. They also cannot report if there is a failure on the fixture, how long they have been running and other valuable data.

DALI

DALI systems send digital commands that tell the fixture exactly how to dim and operate. A command to dim to 50% percent sent to any and all fixtures in a space, no matter what type and from any manufacturer will dim to exactly 50% of their maximum output. DALI also provides two-way communication between the light fixture and what’s controlling it. DALI fixtures not only receive commands, but acknowledge they received the command and then confirm that the command was executed. DALI fixtures are also capable of reporting if something has failed on the fixture and their run time.



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Installation and Wiring

Installation of a 0-10v based system is easy! You run two wires from the sensor, switch or panel outputting the 0-10v signal and then just daisy-chain them from fixture to fixture. Easy!

However, believe it or not, installing a DALI based system is even easier. You still use just two wires and you still daisy-chain them from fixture to fixture. But unlike 0-10v, you can land either wire on either input on the driver. With 0-10v you have to make sure you land the same color wire on the same input on each and every fixture. Cross a wire and at best the system won't work, and you'll have to spend extra time going back to every fixture until you find the mistake. At worst you end up replacing multiple fixtures. For those of you planning to retro-fit your lighting, those existing wires currently being used for 0-10v can easily be re-purposed for DALI. DALI doesn't require any special cables.

Creating Groups and Zones

If you are designing a system with more than one zone, a 0-10v system can actually be up to 60% more expensive based on the need for additional wire, conduit and 0-10v output devices. In addition, because each fixture in a DALI system has a unique address, you can segment out any of the fixtures that are part of the daisy-chain group and have them dim to different levels. With 0-10v every fixture in the group will receive the same command.

Aren't there other systems that can do the same thing?

There are—sort of. Lighting control manufacturers recognized that they needed to provide systems that allow each fixture to be addressable and have the ability to be regrouped through software.

There seemed to be two choices, adopt DALI or create their own proprietary protocol. While the adoption of DALI would seem to be the way to go, old habits die hard. The urge to create proprietary systems is strong and the idea of locking an institution in with a proprietary system is compelling. Ultimately, many of them chose to create their own communication protocols and structures.

But they were still limited when it came to the drivers in the fixtures. They had just two choices, DALI or 0-10v. Since they weren't going to use DALI, they had to make-do with 0-10v. This means that in order to have each fixture addressable they have to install a 0-10v output module on each and every fixture. This does make the fixture addressable, but it still doesn't make the fixture "smart" or provide two-way communication and feedback from the driver.



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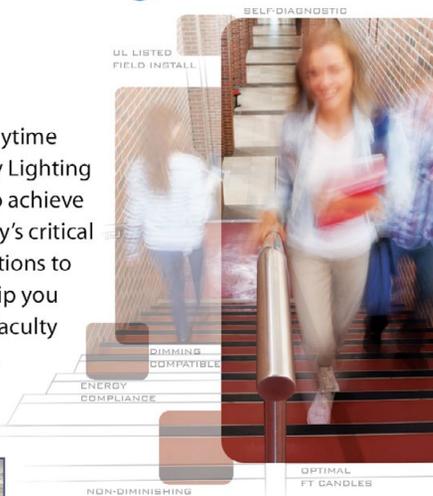
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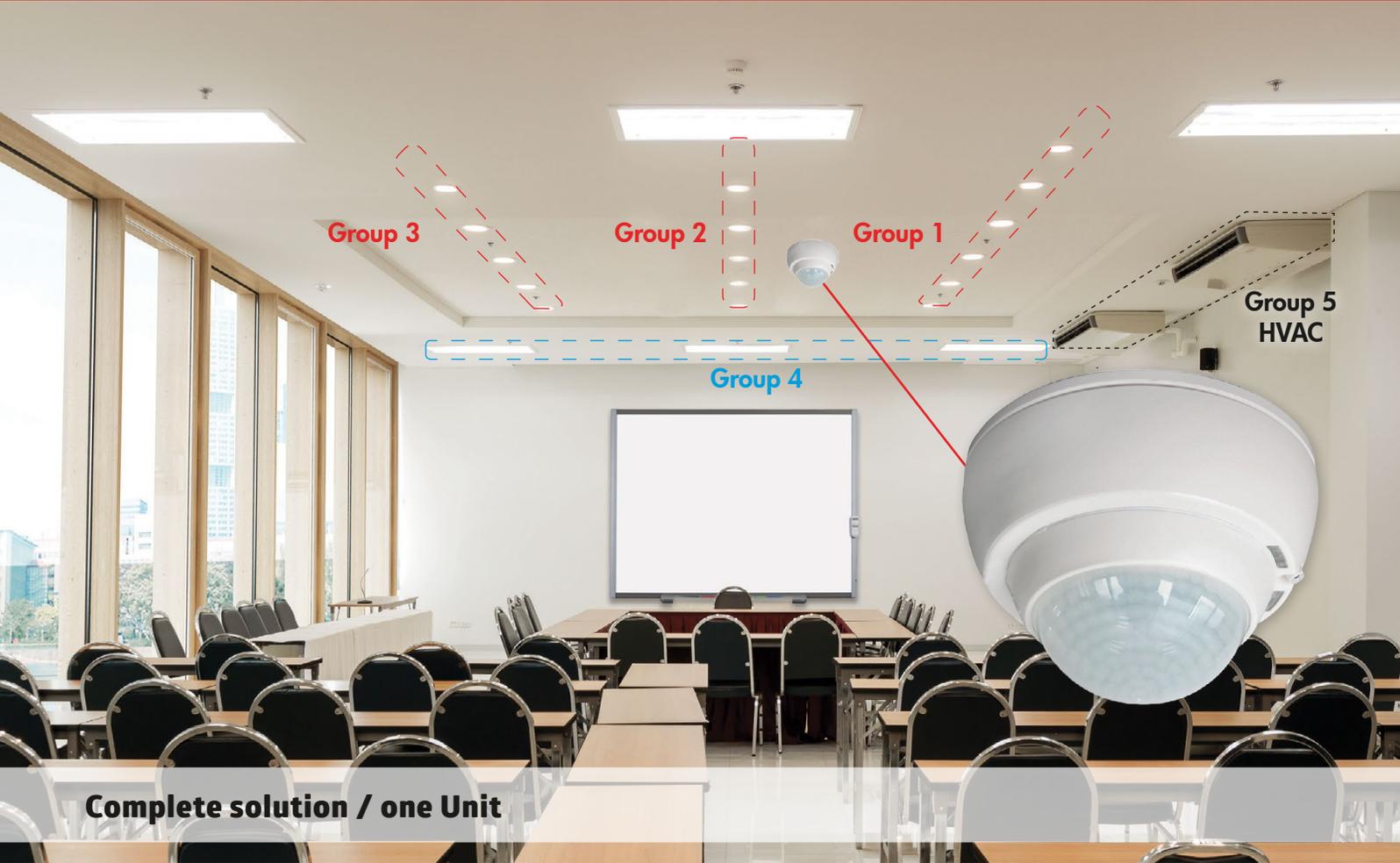
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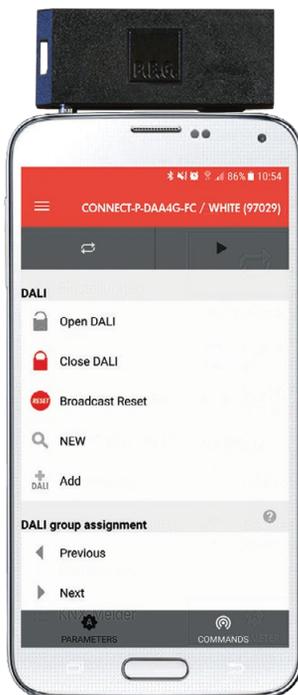
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DALI is a globally accepted, open, digital communication protocol specifically designed for lighting. As we move into the age of the Internet of Things, embracing open communication standards will be vital to any company's success.

What about Wireless?

Put simply, it is important to remember two things about wireless controls: 1) It is possible to use DALI on a wireless system and there are a growing number of wireless systems that use DALI. 2) Wireless systems that don't use DALI still have the same issue as other priority systems that use 0-10v drivers.

Is being an Open Standard that important?

It is not, if you are 100% satisfied with the technology and capabilities from just one manufacturer. If one system or manufacturer can meet all of your needs and requirements—and if you feel comfortable getting pricing on additional or replacement equipment from only one source.

Why is DALI not more common in North America?

Actually, it's very common. It's just not always called DALI. When it comes to manufacturers of DALI products in North America, there are 3 camps: those that talk about and present DALI as their solution; those that use DALI, but because so many people don't understand what DALI is don't use that term; and those that have taken the DALI standard and tweaked it, so that it is no longer proprietary and will only work with their components.

With an open DALI based system, as long as your LED fixtures have a driver certified to the DALI2 standard (and every major driver manufacturer produces DALI drivers) you have total control now, and into the future. When

you are presented with a lighting controls system or solution, you now know to ask the following questions: Is your solution based on DALI? And is it the open DALI2 standard?

Conclusion

DALI is a globally accepted, open, digital communication protocol specifically designed for lighting. As we move into the age of the Internet of Things, embracing open communication standards will be vital to any company's success.

The age of analog and restrictive proprietary protocols is coming to an end. Open standards like DALI even the playing field, allow building owners to select the most optimal components for their needs, and do not lock them in to a single vendor. The use of common communication protocols forces companies to be more innovative when it comes to product design, and it puts a greater emphasis on design assistance and customer support.



ABOUT THE AUTHOR: Michael "MJ" Johnson is a 17-year lighting controls industry veteran who has served in leadership roles with Lighting Control & Design, Acuity Brands, Lumenergi, Lumen Controls and now as VP of Sales and Operations for B.E.G. Controls.



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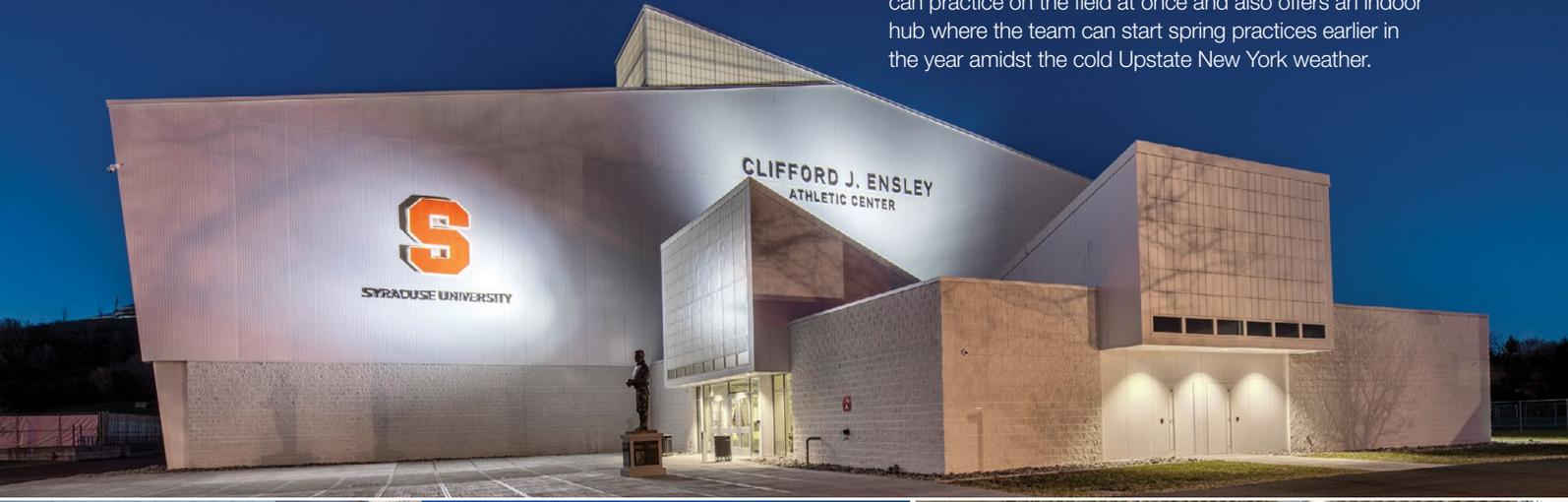
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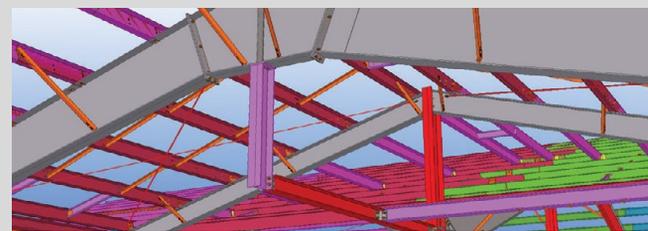
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