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Au
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WHO WOULD HAVE THOUGHT?

2010 - 2011 ANNUAL REPORT

 **CASE WESTERN RESERVE**
UNIVERSITY EST. 1826
think beyond the possible™

WHO WOULD HAVE THOUGHT...

The world doesn't float in a sea of ether.
Hand washing can stem infections.
Cholesterol contributes to heart disease.

Obvious, right? Not at the time.

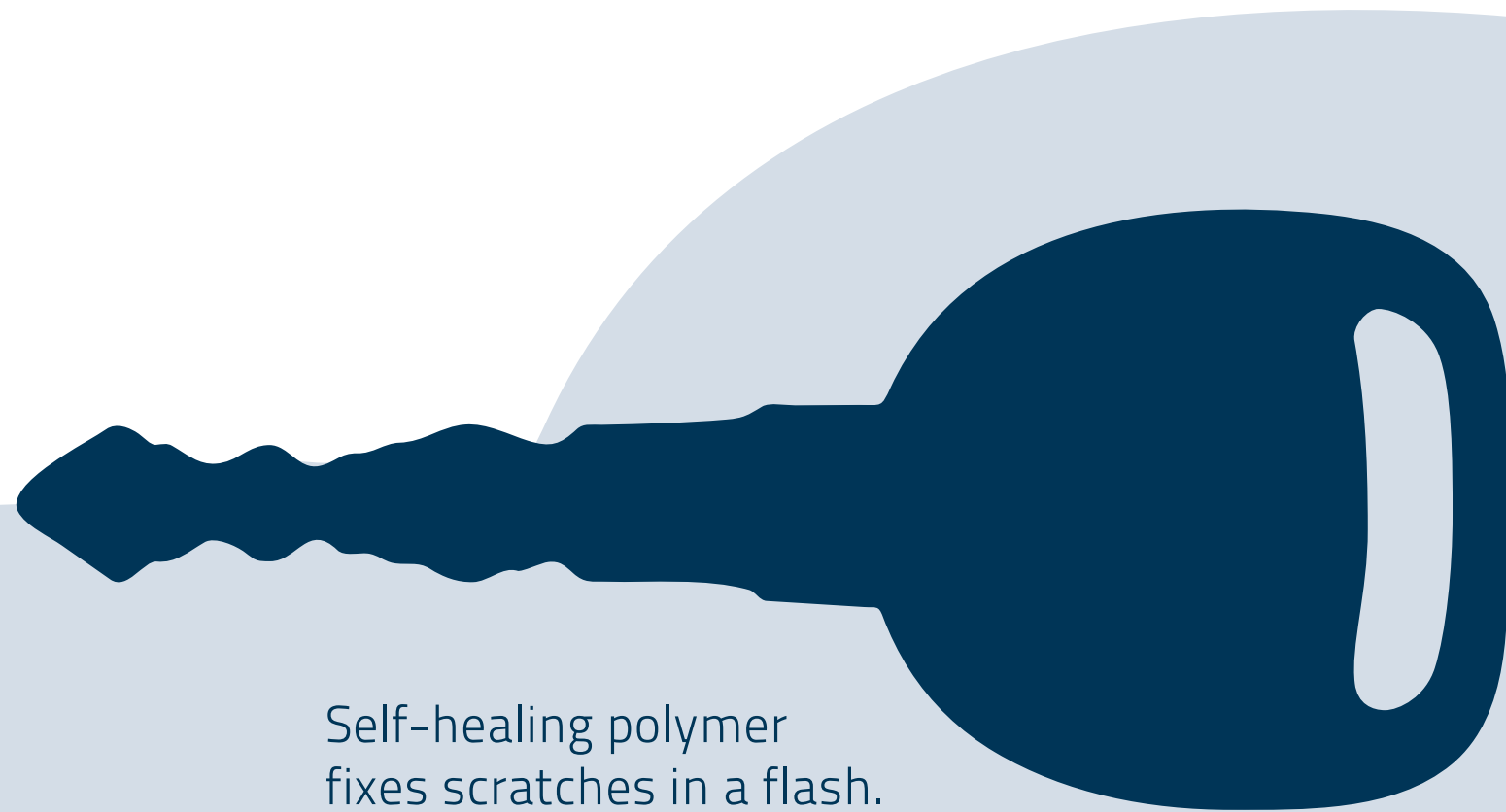
These ideas only became commonplace after faculty at Case Western Reserve University pushed beyond accepted wisdom to give rise to new knowledge. For nearly two centuries, we have made breakthroughs, challenged the status quo and searched for fresh perspectives and new truths.

As you will see in the pages that follow, we continued that tradition in 2010–2011. See here—
and online—just how much our bold approach helps shape what everyone thinks.

case.edu/whowouldhavethought



ULTRAVIOLET IS THE NEW BLACK



Self-healing polymer
fixes scratches in a flash.

Whether it's from the bump of a wayward shopping cart or the key of an angry passer-by, scratches to your car's paint job are practically inevitable.

But such dings may soon have a bright side, thanks to a self-healing polymer developed by macromolecular scientist and engineer Stuart Rowan, PhD, who found an unusual way to make scratches disappear—with just a flash of light.

Rowan created a compound different than conventional polymers, which consist of long, chain-like molecules. Rowan's material is composed of smaller molecules assembled into longer chains, using metal ions as "molecular glue."

Thirty seconds under intense UV light can make scratches a memory, as the light causes the polymer structures to become temporarily unglued, transforming the originally solid material into a liquid that flows easily. When the light is switched off, the material reassembles and solidifies again, restoring its original properties.

Rowan and his team are refining the coating for commercial applications and hope it may one day save not only your car, but perhaps your furniture and floors as well.



Bed rest might do more harm than good for some moms-to-be.

A prescription for rest may be anything but relaxing for more than 1 million pregnant women every year.

Complications ranging from early contractions to high blood pressure to bleeding could prompt a doctor to put expectant mothers on bed rest—a recommendation that can vary from telling her to “take it easy” to advising her to stay confined to a bed or couch for most or all of every day.

Nursing researcher Judith Maloni, PhD, RN, took a closer look at what happens physically and mentally to moms-to-be when they’re ordered on bed rest. Her findings may surprise mothers and doctors alike.

Bed rest frequently can lead to anxiety as the expectant mother worries over every contraction, Maloni found. The strictest bed rest guidelines—when she is confined to bed for nearly 24 hours a day—also can lead to bone loss and muscle atrophy, Maloni says.

What’s more, such confining conditions can bring on depression in some women, and mothers on bed rest often face relationship conflicts with partners and other family members who must serve as her caretakers.

Maloni hopes her findings can help women and their doctors make more informed decisions about risks when prescribing bed rest for pregnancy complications.

DOWNTIME HAS ITS DOWNSIDES



LOLS MAY BE NO LAUGHING MATTER

Teens who text frequently are more likely to engage in risky behavior.

Decoding the meanings behind teens' text messages is even trickier than you may have thought. Hidden behind the multitude of LOLs and BRBs, the TTYLs and <3s, is a message that is sure to make parents :(

Scott Frank, MD, a family physician and public-health researcher, wondered what we might learn from teenagers' busy thumbs.

It turns out that teens who send more than 120 text messages per school day—what he calls hypertexters—are more likely to engage in a variety of risky behaviors as compared with their more moderate peers. After controlling for such factors as race, gender and household structure, these ultra-social teens are 43 percent more likely to smoke cigarettes; twice as likely to have tried alcohol; 41 percent more likely to have tried illicit drugs; and three-and-a-half times more likely to have had sex, among other unhealthy behaviors. Almost 20 percent of the teens Frank surveyed were identified as hypertexters.

He found similar results among hyper-networkers—teens who log more than three hours per school day on social networking sites like Facebook and Twitter. About 11 percent of the teens Frank studied were considered hyper-networkers.

The correlation sends a message to parents and pediatricians: Talk with your teens about their tech habits.



DIGGING UP DIRT IS DENTIST RECOMMENDED

Dental researchers help unearth secrets of evolution.

The words “fossil excavation” are likely to conjure up images of Indiana Jones-style adventurers snooping around caves in the middle of a desert, wearing big hats and dusting off ancient remains with little brushes.

Images of a dentist in the throes of such an endeavor might not readily come to mind, but perhaps they should, says dental researcher Mark Hans, DDS, who joined an excavation team in Israel this year to help shed light on how the human head has evolved over time.

The site—a prehistoric Israeli cave discovered in 2010—houses remains of human ancestors who lived between 30,000 and 20,000 years ago and is the largest and potentially one of the most important archeological sites in Israel. Hans is helping to analyze teeth and parts of a skull previously found at the site. Expert dental examination of fossil remains from this era can help settle a dispute about the formation of the human chin—whether it became more prominent as our teeth recessed or if it is an entity that evolved on its own over time.

A wealth of fossils are likely still waiting to be unearthed at the cave, so Hans is making arrangements to have Case Western Reserve dental medicine students join the dig and subsequent analysis in future years.



HOMEWORK COULD FIX A HOME

Law students win landmark verdict in fraud case.

Falling victim to fraud can have dire consequences for a family and the surrounding community. But standing up against such a scheme can be an empowering and rewarding endeavor—not to mention a career-launching moment for future lawyers.

Such a case was taken on by the university's Milton A. Kramer Law Clinic, and the outcome was better than anyone would have imagined.

A local family turned to students at the clinic and their faculty supervisor, Andrew Pollis, JD, to restore justice after they fell victim to a fraudulent home-repair and financing scheme. The students tried the case before a jury, making it one of the few civil cases the clinic has seen that went to a full-blown trial. The family won a \$1.12 million verdict—\$9,000 more than the legal team had even asked for. It was the largest award in the clinic's history and included compensatory damages, treble damages under the Ohio Consumer Sales Practices Act and punitive damages. In addition, the trial judge tacked on \$50,000 in legal fees.

The case proceeded for three years, and several Case Western Reserve law students contributed throughout the process. Third-year students Brant DiChiera and Jennifer Hadley represented the clients during the trial.



GOLD COULD BE THE NEW STANDARD

Nanoparticles deliver cancer drugs more quickly and effectively.

A gold nanoparticle is less than 1/10,000 the width of human hair—hardly the makings of a fine necklace or earrings. To those with cancer, however, the nanoparticles are proving to be far more precious than any jewelry.

Injected alone, anti-cancer drugs can take days to gather and attack a tumor, but chemist Clemens Burda, PhD, added a spark to the process by introducing gold to standard treatments. His work shows that an anti-cancer drug loosely attached to gold nanoparticles can home in on tumors and be activated for effective treatment within two hours. This speedier method enables patients to receive lower doses of the toxic chemicals, thereby saving healthy tissue from damage and other harsh side effects suffered in traditional chemotherapy.

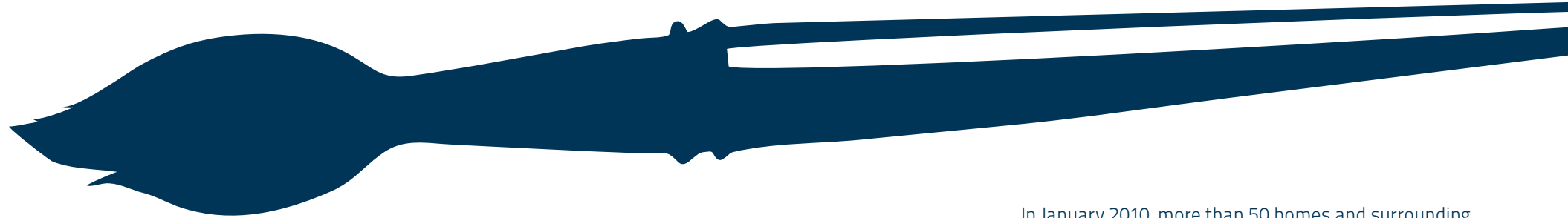
The lipid membranes of cancer cells draw the drug away from the gold. An external laser light switches on the photodynamic therapy drug silicon phthalocyanine, which breaks down and kills cancer cells, thereby shrinking the tumor. After delivering the drug, the gold particles pass through the kidneys and clear the body within a week.

Burda's promising initial results have led to additional grant funding to continue the treatment's development toward a clinical trial.

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HOME IS WHERE THE ART IS



Urban art therapy helps heal wounds.

If a single picture is worth a thousand words, then how valuable could a community-wide art project be? Richey Piiparinen, an expert in urban poverty and redevelopment, asked just that question and found the answer in a neighborhood rocked by devastation.

In January 2010, more than 50 homes and surrounding buildings in Cleveland's Detroit Shoreway neighborhood were damaged or destroyed in a natural gas explosion. The disaster resulted in further vacancies in an already disenfranchised area.

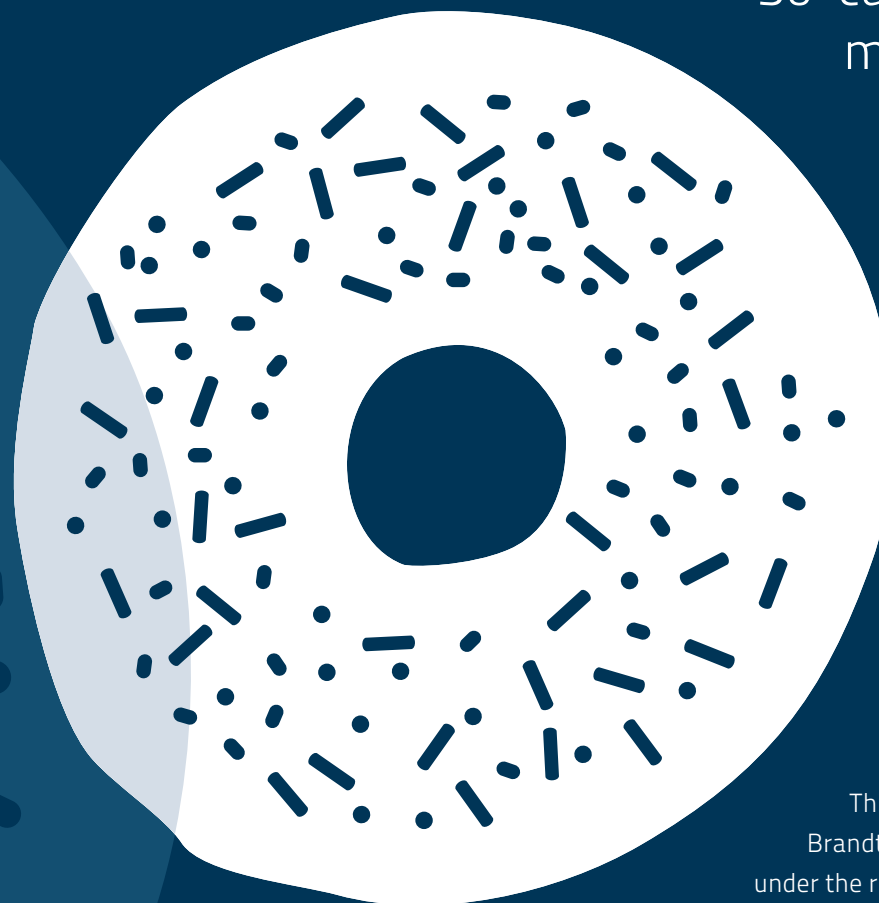
Piiparinen found a way to help community members heal from such loss by using visual and experiential art to get residents talking about issues of abandonment and loss. His W. 83rd St. Project turned a condemned home into an art installation that encouraged residents to think about their experiences before, during and after the explosion, and share their stories and feelings with their neighbors and community leaders.

This spring, the home will be deconstructed and reused to make tables and benches, and create a reading garden for local residents to enjoy. It will serve as a reminder that positive transformation can emerge even in the face of adversity.



ZERO MAY NOT BE SO ABSOLUTE

So-called trans-fat-free foods
may be ruining your diet.



When it comes to nutrition labels, shoppers generally fall into one of two camps: Those who read them, and those who would rather not know. Recently, a third category came to light: Those who, despite reading labels, still might not know what they're really eating.

Current regulations from the Food and Drug Administration allow for less than completely accurate labeling when it comes to trans fats, the dangerous diet-busters that have been linked to elevated cholesterol and an increased risk of coronary artery disease, sudden cardiac death and possibly diabetes.

This understanding led medical student Eric Brandt to ask, how many trans fats are flying under the radar and stealthily ruining our diets?

Food companies are allowed to round down when reporting trace amounts of trans fat, touting foods containing less than 0.5 grams as trans-fat-free. Brandt discovered that consumers can easily exceed the daily recommended value of 1.11 grams, despite their best efforts. Just three servings of deceptively labeled foods with 0.49 grams each of trans fat put a consumer over the recommended limit—though the labels would lead them to believe they were making healthful choices.

Brandt has called on the FDA to enact a more precise reporting and labeling system that would help shoppers get the accurate information they need to make informed decisions.



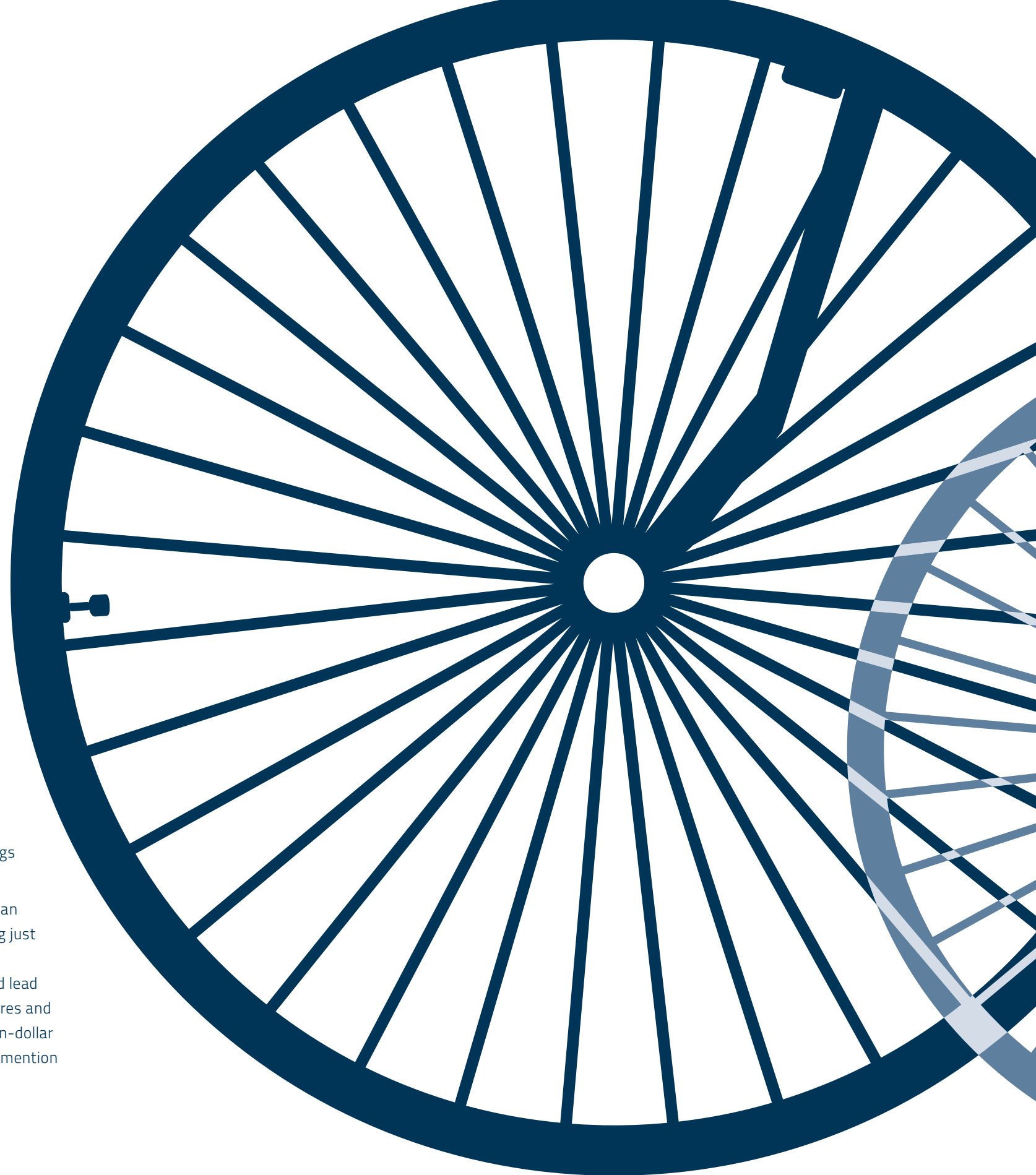
TWO WHEELS ARE BETTER THAN FOUR

Turning drivers into bikers could steer millions into the local economy.

Bicycling is a lifestyle. It's a way of showing that you're the kind of person who cares about the environment; you're the type who wants to remain active; and—it turns out—you're the sort who can help bring in millions of dollars to Cleveland's economy.

A group of Case Western Reserve MBA students recently wondered, what effect would changing a fraction of University Circle employees from drivers to bikers have on the local market? Their findings may surprise you.

Students Justin Held, Katharine Mann, Susanna Mohan, Leigh Orne and Tsung-Han Tsai conducted an economic-impact study commissioned by the GreenCityBlueLake Institute. They found that shifting just 3 percent of University Circle's 82,000 workers from cars to bikes could boost the local economy by as much as \$100 million. According to their report, enticing 2,000 individuals to pedal to work would lead to additional shopping for bikes, gear and apparel and also would spur the development of new stores and restaurants. On top of such benefits as fewer cars in an already congested district and a 1.6-million-dollar savings in health-related costs, they expect 500 new jobs to be born out of a biking boom—not to mention the environmental benefits of fewer exhaust pipes on the roadways.

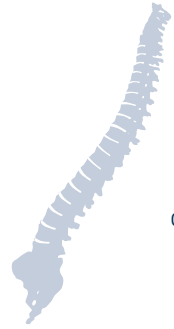


MORE THOUGHTS FROM AROUND CAMPUS



Case Western Reserve is counted consistently among the nation's best colleges, but being "trendy" is a new label.

Citing a nearly 45 percent increase in undergraduate applications in 2011, **The Huffington Post counted Case Western Reserve among its nine trendiest schools** of the year. The site called Case Western Reserve the school that "Flies under the Academic Radar ... but Shouldn't."



Researchers at Case Western Reserve made a significant step toward independence for paralyzed individuals who require ventilators to breathe. Jerry Silver, PhD, **restored breathing function in a model of upper spinal cord injury** by reestablishing lost nerve connections to the diaphragm.



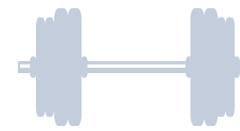
When it comes to understanding the origins of the moon, it's what's inside that counts. Geologist James Van Orman, PhD, and his team analyzed lunar magma returned to Earth by Apollo 17 and discovered 100 times more water trapped in volcanic crystals than had ever been measured previously. The findings show **the moon's interior contains as much water as the upper mantle of the Earth, raising questions about how the moon formed.** The discovery strengthens the theory that the moon and Earth have a common origin. Yet it also forces scientists to reconsider the current hypothesis that water and other elements were depleted when a huge impact in Earth's early history ejected material into orbit that became the moon.



The world's hardest material could help medical implants last a lifetime.

Chemical engineer Heidi Martin, PhD, and electrical engineer Christian Zorman, PhD, are **building electrodes that use a lab-grown diamond film that won't corrode in the body's harsh environment.** The team is designing sensors and stimulators for the human brain—devices that could measure chemical or electrical changes or stimulate nerves.

Left to right: Tomlinson Hall, Crawford Hall, Adelbert Hall, Adelbert Gym, wind turbine, Kent Hale Smith Building, Biomedical Research Building



A heart attack can be a wake-up call that it's time to get serious about getting healthy, but surprisingly few actually heed that message. Nursing researcher Mary Dolansky, PhD, RN, checked on 248 survivors of heart attack, bypass surgery or angioplasty who had completed a 12-week rehabilitation course. One year later, **only 37 percent of victims of cardiac events exercised three times a week** to keep their hearts healthy. Interventions might be needed to keep people exercising, says Dolansky.



Case Western Reserve is one of 37 universities that **joined a national effort to bring high-speed Internet services to universities and their surrounding communities.** Gig. U, the University Community Next Generation Innovation Project, is modeled on the success of Case Western Reserve's Case Connection Zone. The program hopes to draw new high-tech companies to participating universities and their neighborhoods.



Case Western Reserve faculty member David Mills, JD, **argued and won his first case in front of the Supreme Court.** With the help of co-counsel Chris Grostic, JD, and fellow law school faculty member Andrew Pollis, JD, Mills argued on behalf of an Ohio woman who sued the state prison system for failing to protect her from a guard's abuse. The court ruled 9-0 in his client's favor.



There could be another way to speed up your heart rate other than extra time on the treadmill. A laser might just do the trick.

A team of scientists, including pediatric researcher Michiko Watanabe, PhD, and biomedical engineers Andrew Rollins, PhD, and Michael Jenkins, PhD, **used an infrared laser to pace contractions in an avian embryonic heart, with no apparent damage to the tissue.** This noninvasive device could help researchers learn more about the relationship between heart rate while the heart develops and heart problems later in life.



Obtaining an identification card is, seemingly, a normal passage through life. But **lacking valid ID is keeping former prisoners from accessing public assistance programs**, says social work researcher Amy Blank Wilson, PhD.

Often, she says, ex-offenders' driver's licenses, social security cards and other major forms of ID are confiscated when they are apprehended and are never returned.

The Catch-22 of "it takes ID to get ID" can keep former prisoners from accessing programs like food stamps and Medicaid, which require clients to show ID.



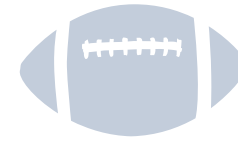
Half-hearted marketing efforts and gimmicky green initiatives are not enough for companies to prove their environmental friendliness, says organizational behavior expert Chris Laszlo, PhD. In his new book, *Embedded Sustainability: The Next Big Competitive Advantage*, he urges companies to think strategically about their eco-friendly habits. He argues the **only way to make companies competitive in today's economy is to incorporate environmental health and social value into their core business**, as they are drivers of innovation and a source of competitive advantage.



It turns out relaxing is exhausting—which could be why so many people struggle to unplug from work during vacation. **Just as thinking burns energy, stopping a thought takes significant power**—like stopping a truck on a downhill slope, say faculty members Daniela Calvetti, PhD, and Erkki Somersalo, PhD, and postdoctoral researcher Rossana Occhipinti, PhD.



Case Western Reserve erected one of the country's first campus-based research wind turbines this year. The 156-foot, 100-kilowatt **wind turbine will provide a portion of the Veale Convocation, Athletic and Recreation Center's power and will offer key opportunities for alternative energy research.**



Quarterback Joey Baum splits his time in the classroom between two majors—political science and international studies—and a minor in economics. Outside of class, the **football captain splits his time between helping in soup kitchens, Big Brother programs and other community-service programs.** Baum's impressive balancing act is a testament to his desire to keep academics, athletics and service active parts of his college experience.



Postmenopausal women may need to get a little closer to their dentists, according to a study by dental researcher Leena Palomo, DDS. She says **older women may need to see a dentist as many as four times a year** because they develop more plaque and may require additional cleanings.



Locally grown produce is sprouting up around campus dining halls and taking a bite out of Case Western Reserve's carbon footprint.

This year, the **university farm supplied more than 6,500 pounds of food to campus dining halls.** The farm also donated more than 800 pounds of produce to the Cleveland Foodbank.

The university farm uses organic gardening techniques and is just one source of locally grown food used by campus food provider Bon Appétit, which purchases about 27 percent of its food products from vendors within 150 miles of campus.



Case Western Reserve received \$23.5 million in gifts from Cleveland's prominent Williamson family. The commitments will support student scholarships, professorships and programs at the Mandel School of Applied Social Sciences, the College of Arts and Sciences, the Case School of Engineering and the School of Medicine—with a special emphasis on its Department of Nutrition—while paying tribute to and recognizing the distinguished legacy of the Williamson family in Cleveland.

Left to right: Thwing Center, Kelvin Smith Library, Peter B. Lewis Building, The Alumni House, the Village at 115



FINANCIAL AND STATISTICAL
HIGHLIGHTS JULY 1, 2010-JUNE 30, 2011

OPERATIONS*	Total operating surplus	\$4.5 million
	Total operating revenue	\$959 million
	Total operating expense	\$958.5 million
	Endowment funds (market value, June 30, 2011)	\$1,619 million
	Gifts and pledges from private sources	\$126.2 million

DEGREES AWARDED	Undergraduate	1,038
	Masters	944
	PhDs	202
	Other Doctorates (JD, MD, DMD, DNP, DMgt, DMA)	528

DEGREES BY SCHOOL (UNDERGRADUATE AND GRADUATE)	Case School of Engineering	510
	College of Arts and Sciences	645
	Frances Payne Bolton School of Nursing	261
	Mandel School of Applied Social Sciences	129
	School of Dental Medicine	96
	School of Law	251
	School of Medicine	396
	Weatherhead School of Management	458

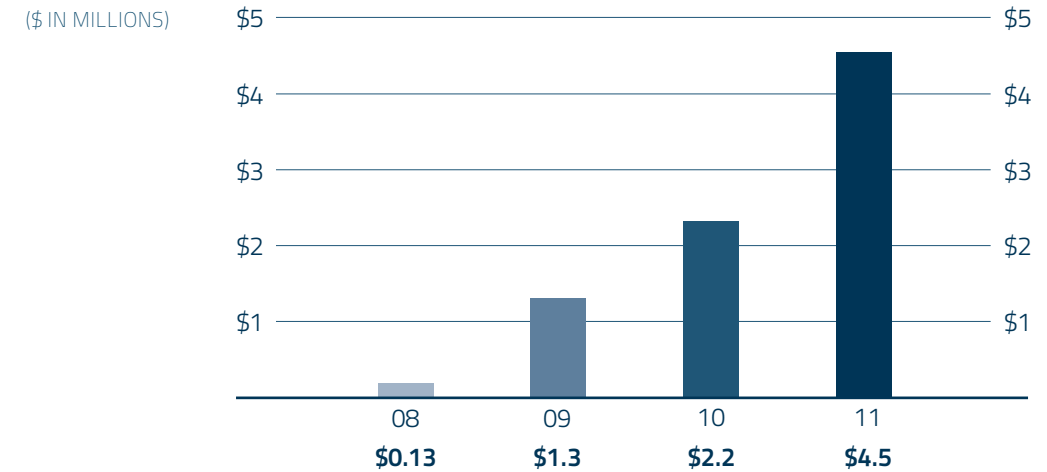
ENROLLMENT (FALL 2011)	Undergraduate	4,016
	Graduate and Professional	5,620
	States Represented	50
	Countries Represented	90

CAMPUS	Faculty (full-time)	2,843
	Staff (full-time and part-time)	3,210
	Campus Size	155 acres

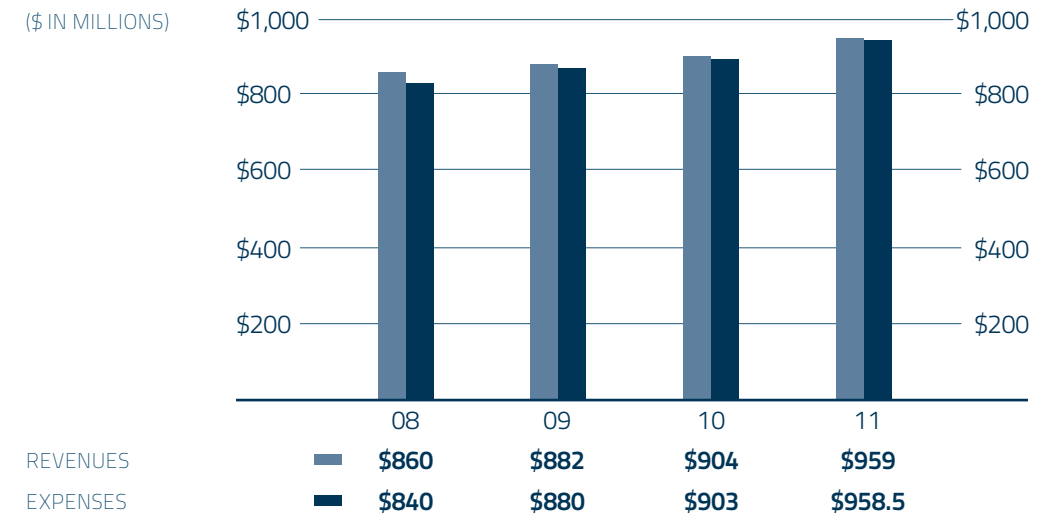
ALUMNI	Total Alumni	108,107
	Nobel Laureates	15

* Revenue, expense and operating surplus (deficit) figures per *Statement of Operations* (unaudited)
Endowment funds figure per university financial statements
Gifts and pledges figure per internal accounting (unaudited)
All figures rounded

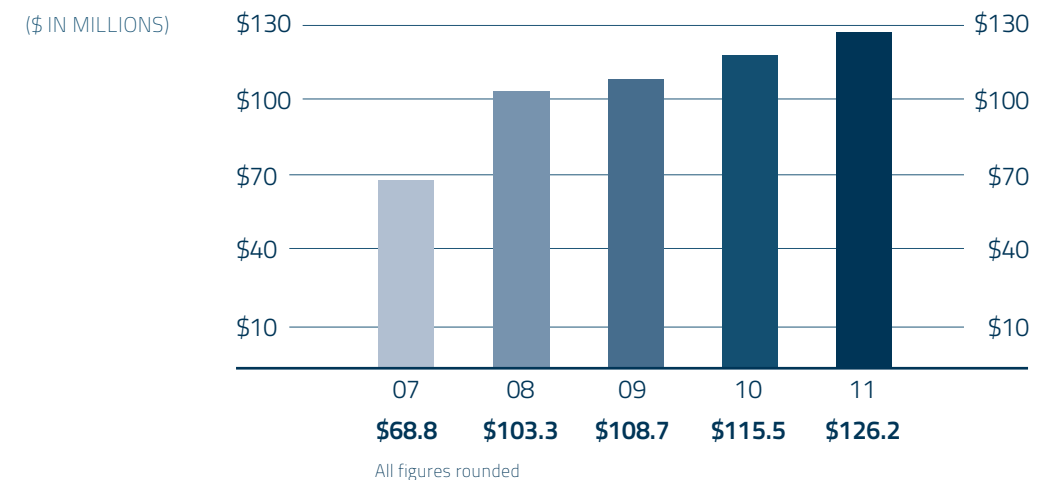
TOTAL OPERATING SURPLUS (DEFICIT) FISCAL YEARS 2008-2011



TOTAL OPERATING REVENUES AND EXPENSES FISCAL YEARS 2008-2011



GIFTS AND PLEDGES FROM PRIVATE SOURCES FISCAL YEARS 2007-2011

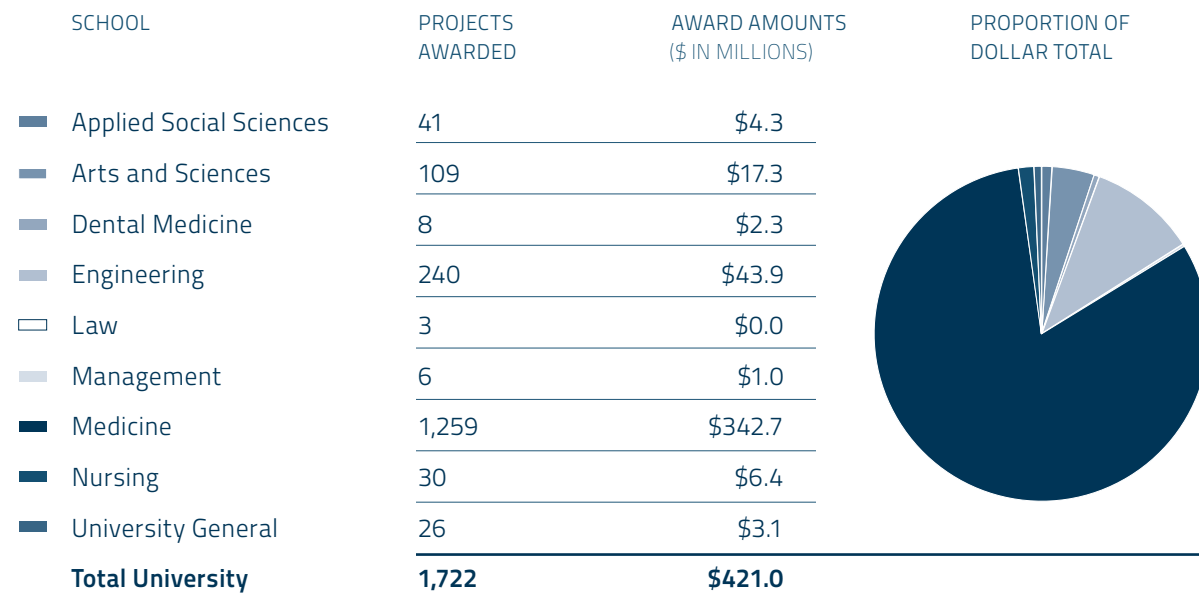


RESEARCH AND TECHNOLOGY HIGHLIGHTS

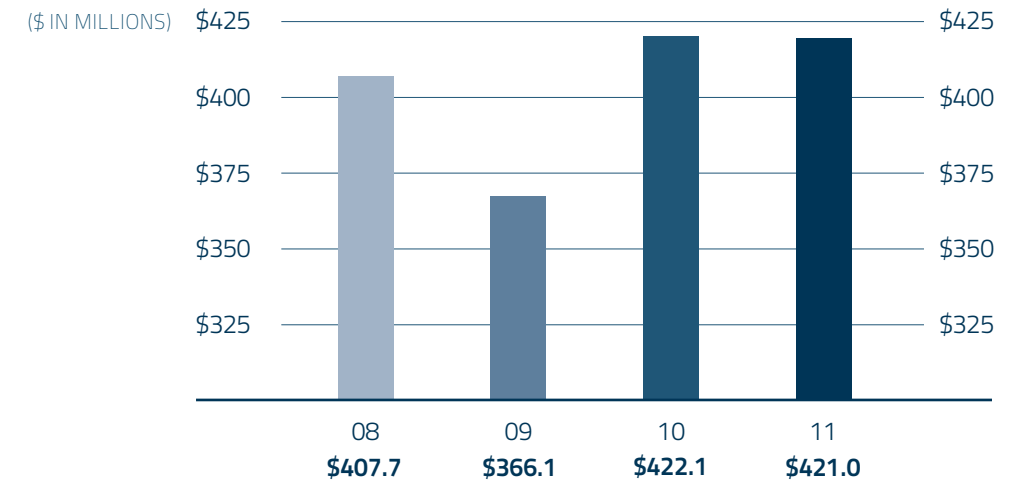
JULY 1, 2010-JUNE 30, 2011

RESEARCH Sponsored research projects **1,722**
Sponsored research project awards **\$421 million**

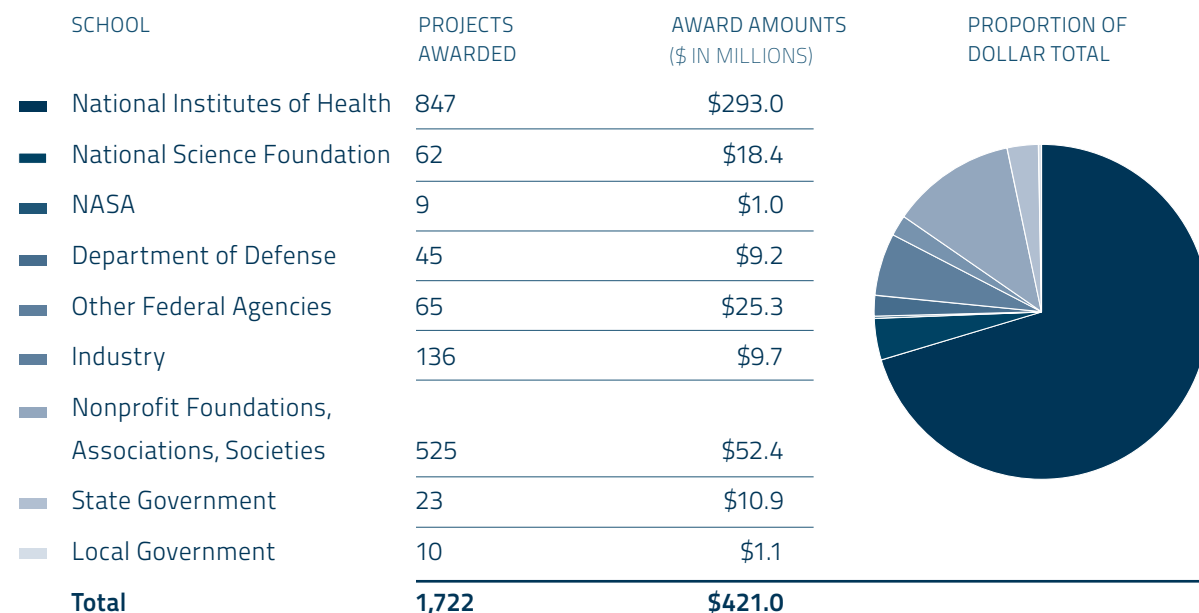
2011 COMPETITIVE SPONSORED RESEARCH PROJECTS BY SCHOOL



COMPETITIVE SPONSORED RESEARCH AWARDS FISCAL YEARS 2008-2011



2011 COMPETITIVE SPONSORED RESEARCH PROJECTS BY SPONSOR



All figures rounded

2009 CASE WESTERN RESERVE UNIVERSITY RESEARCH RANKINGS

	TOTAL EXPENDITURES	RANKING
Among All Universities	R + D	40th
	Federal R + D	26th
Among All Private Universities	R + D	16th
	Federal R + D	13th

Source: National Science Foundation, Division of Science Resources Statistics, Survey of Research and Development Expenditures at Universities and Colleges, FY 2009. (Most current data.)

TECHNOLOGY TRANSFER		
New intellectual property deals with industry		35
Licensing revenues		\$7.3 million
New inventions		145
New patent applications		137
Active commercial intellectual property agreements		270

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