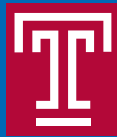


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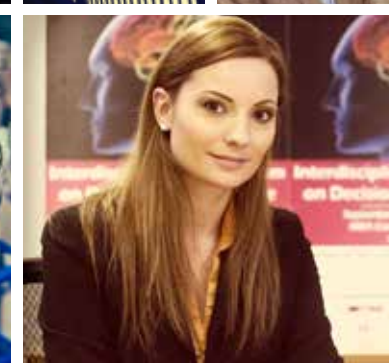
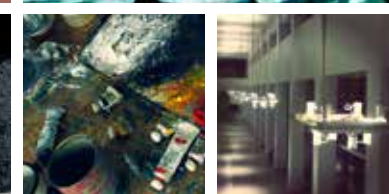
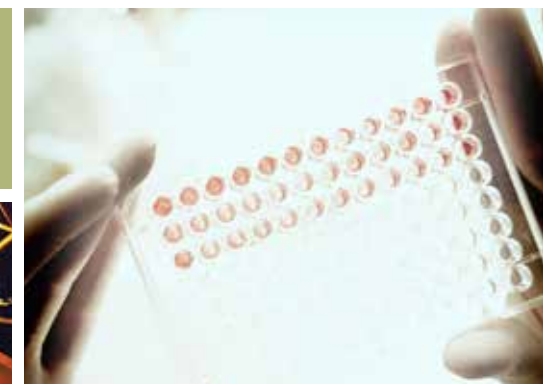
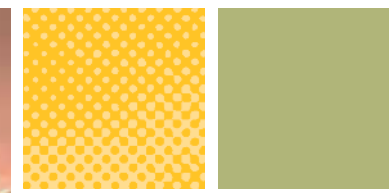
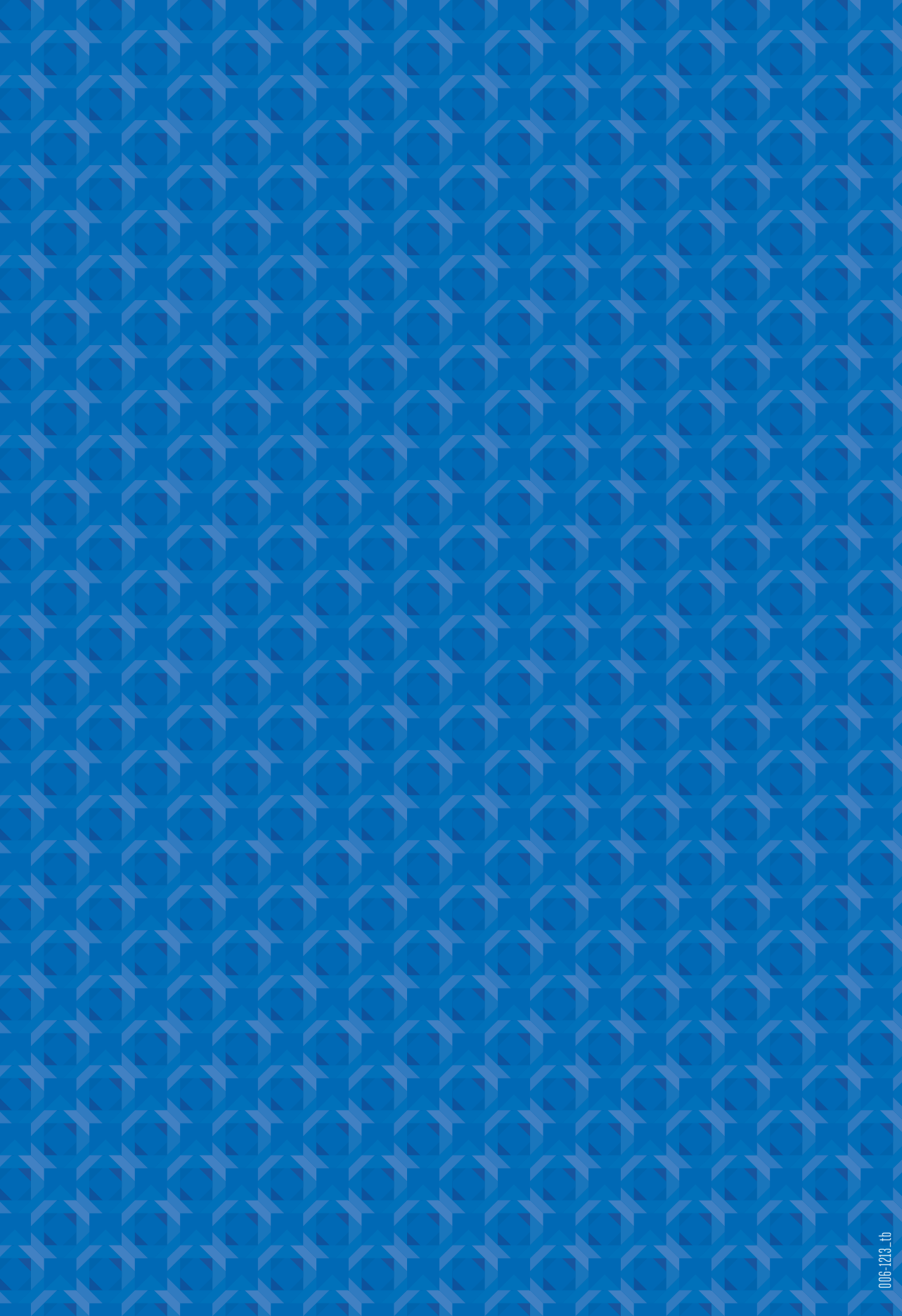


RESEARCH WITH  
RESULTS

TEMPLE MADE



Sustainably designed and printed to reflect Temple University's commitment to environmental stewardship.



# IDEAS MADE. BREAKTHROUGHS MADE. ACHIEVEMENTS MADE.

New advances in research discovered by distinguished scholars. Practical solutions to real-world problems. Research that improves lives. Changing the way we understand the world.

Creative bounds stretched. Horizons expanded. A place where today's students are solving tomorrow's problems.

Research that matters. Research with results. TEMPLE MADE.

## ABOUT TEMPLE UNIVERSITY

1884

founded

17

schools and colleges

28<sup>TH</sup>

largest university  
in America

9

campuses (Main Campus  
in North Philadelphia, six throughout  
Pennsylvania, plus Rome and Japan)

4<sup>TH</sup>

largest provider of professional  
education (dentistry, law, medicine,  
pharmacy, podiatry)

399

academic  
degree programs

### 38,648 TOTAL STUDENTS

29,024

undergraduate  
students

6,433

graduate  
students

3,191

professional  
students

RU/H CARNEGIE FOUNDATION CLASSIFICATION: RESEARCH UNIVERSITIES (HIGH RESEARCH ACTIVITY)

# SPONSORED RESEARCH

## \$130,567,206

Sponsored research in 2012

## \$13,000,000

Technology transfer generated revenue in Fiscal Year 2012-13

More than

# 150

Clinical trials under way

School of Medicine  
**\$60.6 million**

College of Health Professions and Social Work  
**\$15.2 million**

College of Science and Technology  
**\$15.5 million**

College of Liberal Arts  
**\$14.8 million**

College of Education  
**\$9 million**



# RESEARCH WITH RESULTS: TEMPLE MADE

## Technology. Ideas. Healthcare. Solutions.

Faculty and students at Temple University address real-world problems head-on. They identify innovative approaches to longstanding challenges such as cancer treatment; they patent new technologies like high-efficiency nanotubes; they establish new businesses; they collaborate with their communities and with corporations to bring their ideas to market, and to people who need them.

Temple is a public four-year research university, classified by the Carnegie Foundation as a "high research activity institution." Its research enterprise encompasses externally sponsored grants and contracts, distinguished scholarly projects, and creative works, with a focus on use-inspired, fundamental and interdisciplinary research activities that address significant issues affecting society today.

Situated in the heart of Philadelphia and with nine campuses worldwide, Temple's urban location and global mindset inspire research designed to improve lives.

## Research with results: Temple Made.

### An Economic Engine

\$3.7 billion yearly economic impact on Philadelphia

3rd largest private employer in Philadelphia

1 in 7 college graduates in Philly has a Temple degree

\$6.2 billion yearly economic impact on Pennsylvania



# TECHNOLOGY PRODUCED

- Ultrasound waves passing through industrial wastewater to break up pollutant molecules and turn it into clean water.
- Mobile apps that transform vacant city lots into urban gardens, or allow health systems to remotely monitor, 24/7, an at-risk patient's heart condition.
- Hand-held lasers that can detect bombs in cargo containers or IEDs on the side of a remote road.
- A new kind of nanotube, integral to flat-panel displays, filtration systems and solar cells, that is cleaner, can be produced six times faster and is 530 times less expensive.
- An oral drug that delivers a novel molecule that can "turn off" cancer cells in a leukemia patient's blood.

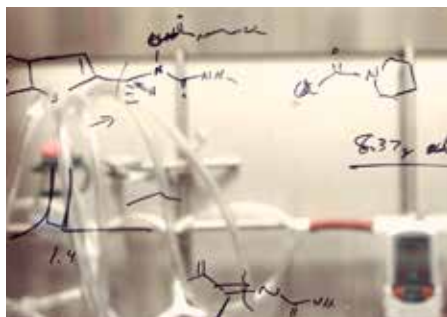
In 2012, the amount of money Temple and its researchers received from patents and licensing Temple-developed technologies more than doubled over the year before—and it is nearly seven times what it was three years ago.

In collaboration with government agencies, industrial partners, peer collaborators and others, Temple patents or licenses about 30 new technologies per year, a number that is expected to double in the near future. These are the next cancer drugs, the next water treatment technologies.

Each discovery has the capacity to create jobs, improve communities, save lives.

## This is Temple Tech, and this is right now.

At Temple, use-inspired research is conducted with an eye for how a new technology can be created, a new intellectual property put into the world, a new drug brought to market, a new company or non-profit spun off. Researchers come to Temple to make things that make a difference.



# TECHNOLOGIES. TEMPLE MADE.

—  
25

new technologies patented or licensed in 2012

30

estimated new technologies patented or licensed in 2013

2ND

in the nation:

Temple's rank among public universities in America for license revenues as a ratio of total research expenditures. It ranks as 10th in the nation among all universities.

## LICENSING REVENUE

\$378  
THOUSAND

\$1.2  
MILLION

\$2.5  
MILLION

\$13  
MILLION

FY10

FY11

FY12

FY13

(minimum projected)

# TOP RANKINGS

## U.S. News & World Report 2011–2012

### 13<sup>TH</sup>

in the nation:

#### TYLER SCHOOL OF ART

- #3 Ceramics
- #9 Sculpture
- #10 Painting/Drawing
- #10 Printmaking
- #20 Photography

### 47<sup>TH</sup>

in the nation:

#### SCHOOL OF MEDICINE

### 52<sup>ND</sup>

in the nation:

#### FOX SCHOOL OF BUSINESS

### 58<sup>TH</sup>

in the nation:

#### BEASLEY SCHOOL OF LAW

- #2 Trial Advocacy
- #7 Part-time Law
- #9 Legal Writing

#### OTHER TOP PERFORMERS

(Among top 100 in the nation)

- Chemistry
- Clinical Psychology
- Criminology
- Education
- English
- Healthcare Management
- History
- Math
- Occupational Therapy
- Pharmacy
- Physical Therapy
- Political Science
- Psychology
- Social Work
- Sociology
- Speech-Language Pathology
- Statistics

# IDEAS AMPLIFIED

From engineering to psychology, history to medicine, art to anthropology, Temple faculty and students erase status quos and explore new ideas that transcend traditional disciplinary lines. Their questions—and their observations—move entire fields forward, open doors for technologies and solutions, contextualize long-held beliefs and create new perspectives.

Each year, Temple researchers publish thousands of books, scholarly articles, peer-reviewed papers, essays and chapters. They present at conferences and symposia. Fulbright and other top scholars from institutions around the world come to work side-by-side with their Temple counterparts as researchers and lecturers.

Through their academic breadth and diverse backgrounds, Temple faculty and students explore, question and fundamentally reshape our understanding of the world.

#### A sample of upcoming or recently published books by Temple faculty

*Pennsylvania in Public Memory: Reclaiming the Industrial Past*  
—Carolyn Kitch, journalism

*China's Regulatory State: A New Strategy for Globalization*  
—Roselyn Hsueh, political science

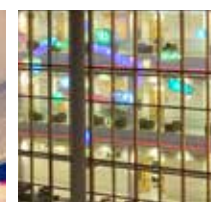
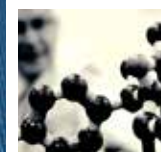
*Jesus, Jobs, and Justice: African American Women and Religion*  
—Bettye Collier-Thomas, history

*You and Your Adolescent: The Essential Guide for Ages 10–25*  
—Laurence Steinberg, psychology

*Rapidly Evolving Genes and Genetic Systems*  
—Rob J. Kulathinal (editor), biology

*The Timeline of Presidential Elections*  
—Christopher Wlezien, political science

*Planning Ideas That Matter*  
—Christina Rosan (editor), geography and urban studies



# HEALTH EMPOWERED

Research, education and clinical care converge at Temple to empower dedicated students to become health providers and community leaders, and to empower physicians to give patients and families the services, technology and information they need to heal, recover and thrive.

Temple's health enterprise includes its School of Medicine, four hospitals and a network of community-based physician practices, research institutes and clinical care providers. More broadly, it also encompasses Temple's health-related professional schools and colleges: Dentistry, Pharmacy, Podiatric Medicine, and Health Professions and Social Work. It is a multi-billion dollar enterprise, and a keystone academic medical center in the city of Philadelphia, the state of Pennsylvania and the entire region.

Through faculty, students and programs, Temple Health provides care to underserved communities, conducts research on public policy and healthcare disparities, and takes on challenging and critical clinical work.

Temple graduates, from surgeons to community physicians, apply their skills across the state, region and beyond, taking their passion, work ethic and commitment to patients along with them.

### Temple University School of Medicine

Among the **top 10** most applied-to medical schools in the nation

**3rd** in Pennsylvania in research funding from the National Institutes of Health—and **5th** in the nation in NIH funding per faculty member



# A VITAL HEALTH SYSTEM

210

medical students and approximately 24 graduate students admitted per year

More than

10,000

applications for admission

A core of more than

6,500

physicians, nurses, faculty and staff

45,000

inpatient admissions per year

440,000

outpatient and accompanier visits per year

83

Temple physicians named to *Best Doctors in America* list (2012–2013)

32

Temple physicians included in *Philadelphia* magazine's 2012 "Top Doctors" list

## COMMUNITY DRIVEN

Many of Temple's more than 300 community engagement programs center on spearheading solutions to real-world problems. A sample:

**COMMUNITY-DRIVEN RESEARCH DAY:** Bringing Temple researchers and students

together with local nonprofits, community groups, and public sector partners to

address pressing community issues. **CENTER FOR SOCIAL POLICY AND COMMUNITY**

**DEVELOPMENT** (Shirley Moy, Director): Committed to actively addressing social

injustice and strengthening the community. **CENTER FOR OBESITY RESEARCH AND**

**EDUCATION** (Gary Foster, Director): Facilitates interdisciplinary research on treatment

and prevention of obesity with a focus on minorities of lower socioeconomic status.

**CENTER FOR INTERVENTION AND PRACTICE RESEARCH** (Larry Icard, Director):

Develops and disseminates solutions to health and social problems to improve the

lives for vulnerable and at-risk populations. **CENTER FOR PREPAREDNESS RESEARCH,**

**EDUCATION AND PRACTICE** (Alice Hausman, Director): Created to establish nation-

ally relevant policies, programs and practices that enhance emergency preparedness,

response and recovery. **CENTER FOR ASIAN HEALTH** (Grace Ma, Director): Dedicated

to reducing cancer and other health disparities among Asian Americans.

## SOLUTIONS FOUND

"Students in public schools in Baltimore are falling behind their peers—is there a better way we can train teachers there?"

"Hydraulic fracturing is creating potential public health issues in communities across the Marcellus Shale region—what can we do?"

"Local journalism is dying off with printed newspapers—how can we make sure that residents still get the community and neighborhood reporting they need to stay informed?"

"Haiti is suffering a critical shortage of quality dental care—can we help?"

Research begins by asking questions. At Temple, those questions aren't just academic. They're suggested by the problems and opportunities that surround us in the communities we live, work, and grow in. And the answer to these questions, being developed right now at Temple in collaboration with community partners, can change lives.

Temple University's commitment to community is foundational. What began in Philadelphia now spans the globe, and Temple researchers are examining complex societal issues, those that affect real people and real communities here and now, and finding ways we can improve. They are working in urban and rural communities, developing nations, hospitals, classrooms and board rooms, asking how their expertise can help.

Temple faculty and students actively engage in research with a public mission.

### Renewable energy

Temple researchers are heavily focused on exploring renewable energy. Right now, there are labs at Temple devoted to:

- Getting more power generation from wind turbines
- Creating cleaner, cheaper solar cells
- Increasing efficiency of oil pipelines
- Reducing the waste and environmental impact of natural gas drilling
- Exploring the possibilities of geothermal energy as a clean, renewable new resource





# LEADERS MADE

Temple students are some of the biggest drivers of new discoveries. From the day they arrive on campus, they are invited, encouraged and empowered to follow their own passions and interests, and to make their own marks.

Through targeted grants and programs, the university provides undergraduate and graduate students the tools and support they need to innovate, including faculty guidance and mentorship, funding opportunities for the best ideas, and hands-on experience. In research labs and in the field, students at every level work hand-in-hand with Temple faculty, research staff, physicians and visiting professors.

From there, curiosity and determination take over. Students from all disciplines develop businesses based on their innovative concepts, execute their own creative works, lead service activities and uncover new insights.

Temple students are the next generation of intellectual and community leaders.

## A sample of undergraduate student research projects

"Women Making Activist Art in Public Spaces" (art and art education)

"The Investigation Of The Gene Expression Of Nitric Oxide Synthase (NOS) In Larva Lamprey After Spinal Cord Injury" (neurology)

"The Gap between the Real and the Reported: the Role of the Media during the 2011 Chilean Student Movement" (journalism)

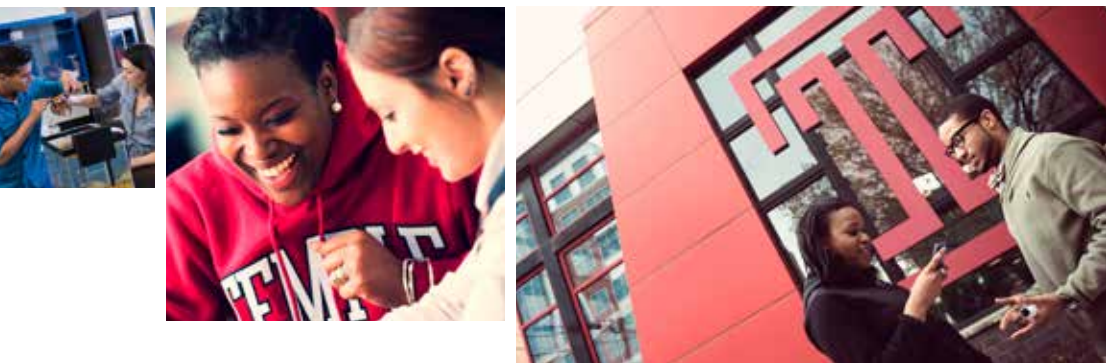
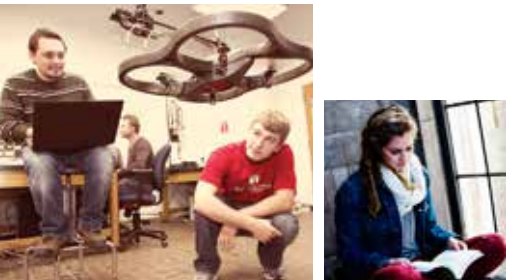
"Tactile and Spectral Sensor for Lesion Identification" (electrical and computer engineering)

"An Epistemological and Critical Approach to Campanology and its Effects on Social Media Theory" (advertising)

"Young Adult Literature, Education, and the Philadelphia Public School System: A Case Study" (English)

"Informational Tools in Insurance Fraud Detection" (management information systems)

"European-American Cooperation Potential: The EU and the US in the Israeli-Palestinian Conflict" (political science)



# THE BEST AND THE BRIGHTEST

## RECORD SETTING

Temple attracts the best and the brightest students. In the last year, these students have met or matched the following university records:

40,000+

most prospective student visits (a new record has been set every year since 2008)

19,000+

most completed student applications

1,109

average SAT score of first-year freshmen

3.8

average GPA of transfers

3.41

average high school GPA of first-year freshmen

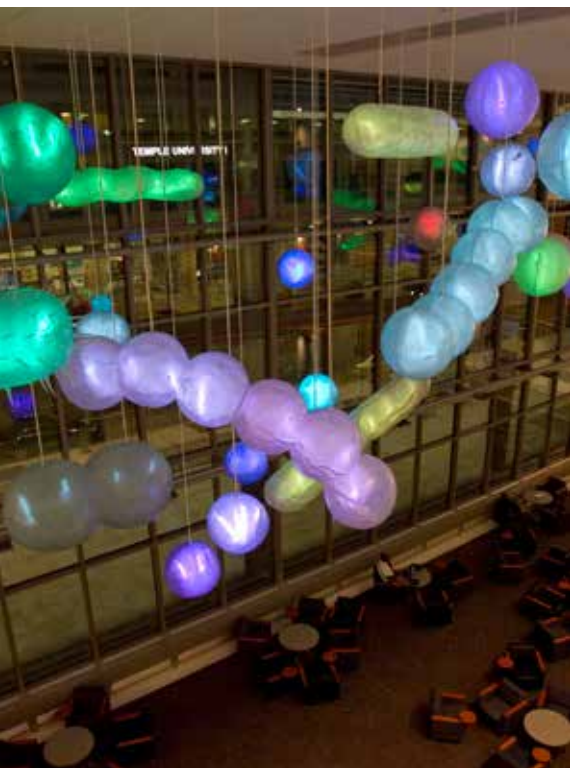


# THE FUTURE. TEMPLE MADE.

The partnership of individuals, corporations, foundations and sponsoring agencies empowers the ground-breaking, life-saving work taking place at Temple University.

Sponsor a project. Endow a professorship or scholarship. Build a lab or research space. Support exploratory research that holds strong potential.

**Minds made. Ideas made. Technologies made. Breakthroughs made. Temple Made.**



Temple University  
TASB/1852 North 10th Street  
Institutional Advancement—  
Research Opportunities  
Philadelphia, PA 19122  
215-926-2500



[giving.temple.edu/research](http://giving.temple.edu/research)

## WORLD READY

“I arrived here 10 years ago, and in that time the explosion in Temple research has been astounding, and people are noticing. When I’m invited to conferences or speak with colleagues and peers, they all know a world-class leader in their field who was recruited to Philadelphia.

*They’ve read a paper from a Temple author that surprised them and made them rethink their own work.*

*They’ve been beaten for funding by a Temple lab.*

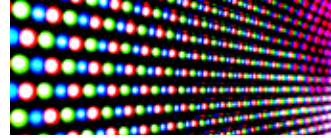
*They’ve licensed a Temple-produced technology.*

Everywhere I go, around the nation, I get one question: ‘Wow. What’s going on at Temple?’”

—Robert J. Levis, Chair, Department of Chemistry,  
College of Science and Technology

TEMPLE MADE





# POTENTIAL UNLOCKED

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## THE CENTER FOR ADVANCED PHOTONICS RESEARCH AND SAVING LIVES WITH LASERS

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For most people, the word “laser” still conjures up science fiction and space-age weapons. But imagine a U.S. soldier holding a device that can safely locate an improvised explosive device (IED) or bomb, or a surgeon able to determine, instantly, if a tumor is malignant. Think that’s science fiction too? Take a tour of Robert J. Levis’ Center for Advanced Photonics Research (CAPR), and think again.

A pioneer in the field of strong field chemistry, which uses laser pulses to instantly detect and analyze molecules, Levis has been developing a dizzying array of incredible technologies like those. His lab has the feel of a tinkerer’s workshop, the energy of a science fair, and the attitude that there is absolutely no limit to what this technology can do.

To take just one example, CAPR researchers have discovered how to cheaply create a laser system able to detect molecules in the air—technology that used to cost up to \$1 million just to replicate in a lab, nevermind to deploy in the field. The breakthrough was so substantial that the Department of Defense has taken notice, investing in Levis’ work with the notion of developing IED or dirty bomb detection.

**“With the technology we’re developing right now, right here on Broad Street, we’re close to commercializing devices that can stop bombs, offer real-time medical diagnoses, solve crimes.”**

—Robert Levis, chairman, Department of Chemistry

Levis has also pushed forward the technology of mass spectrometry—handheld laser devices capable of analyzing ionized molecules. “We can not only say that there is black powder in a container—we can tell you who the manufacturer is.” This technology has wide-reaching implications in any field that seeks to instantly and non-invasively characterize the chemical and molecular composition of targets—such as police forensics or oncology.

“With the technology we’re developing right now, right here on Broad Street, we’re close to commercializing devices that can stop bombs, offer real-time medical diagnoses, solve crimes. Once you get to a place where you can detect and analyze molecules in real-time—and I’m proud to say that our lab, and maybe only our lab, is—there is no end to the possibilities.”

To learn more about the exciting developments in research at Temple, and how you can help, please visit [giving.temple.edu/research](http://giving.temple.edu/research).

MAJOR CENTER FOR ADVANCED  
PHOTONICS RESEARCH SUPPORTERS:

- Defense Threat Reduction Agency
- National Science Foundation
- Office of Naval Research
- Army Research Office
- United States Department of Defense
- Alfred P. Sloan Foundation
- Camille & Henry Dreyfus Foundation Inc.

731

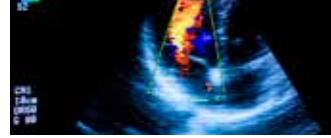
coalition deaths in Afghanistan in the last three years caused by IEDs

500%

increase in Temple's Department of Chemistry research funding over the past ten years

TEMPLE MADE





# HEARTS HEALED

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## THE CARDIOVASCULAR RESEARCH CENTER AND THE FRONTIER OF HEART HEALTH

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Temple Health researchers are always looking for ways to disrupt the status quo—to take conventional assumptions and challenge them, and to look at existing technology and therapies and improve them.

Take heart health. More people than ever before are surviving heart attacks. But there's a hidden cost—those who do survive often develop congestive heart failure (CHF), where the remaining overworked heart muscle cells gradually lose their ability to pump enough blood. CHF, the only still-growing major cardiovascular disorder, affects nearly 5 million Americans and kills about 250,000 per year.

While there has been progress in the treatment of cardiovascular disorders, Temple Health is taking it to the next level—seeking to perfect those treatments to save more and more lives with fewer side effects and risks.

Temple University research is homing in on a way to reverse CHF by getting weakened heart muscle to pump again. Such are the promises of the extraordinary medical studies—including gene- and stem-cell-therapy investigations—currently under way at Temple University.

Coming together to create one of the nation's foremost cardiovascular research efforts, two of the university's laboratories brought in millions in new National Institutes of Health (NIH) funding for such research at Temple in just the first half of 2012.

Walter J. Koch, PhD, School of Medicine pharmacology professor, directs the new Center for Translational Medicine (CTM), which includes a focus on the role of a particular enzyme, GRK2, that is found in elevated levels in CHF patients. Using a harmless virus to target heart muscle cells and deliver genetic material that inhibits GRK2, Koch's team has actually reversed heart failure in pre-clinical studies. Koch anticipates launching clinical trials in 2013.

Koch is part of a wave of recent recruits coming over from other nearby cardiovascular programs in the last few years, owing to Temple's growing reputation as the regional center for cardiovascular research and clinical care.

Steven R. Houser, PhD, FAHA, the chair of the School of Medicine's Physiology Department and the director of Temple's

**"We're uncovering the roles of various molecular mechanisms to help develop new heart failure therapies for patients. And we will take our work in genetically targeted therapy even further."**

—Walter Koch

Cardiovascular Research Center since its founding in 1998, has likewise investigated heart health, and is building on his research to investigate the potential of drug, stem-cell and gene therapies to repair the effects of heart attacks. He recently received an \$11.5 million NIH grant to further his work.

To learn more about the exciting developments in research at Temple, and how you can help, please visit [giving.temple.edu/research](http://giving.temple.edu/research).

## MAKING CURES. MAKING CURES BETTER.

One downside of some miracle cancer drugs introduced since 2001: their indiscriminate attacks on healthy heart muscle cell proteins can cause extremely serious congestive heart failure.

Thomas Force, MD, the Center for Translational Medicine's associate director, first alerted physicians to the cardiotoxicity of these cancer drugs in a 2006 *Nature Medicine* article. With 10 of these protein-attacking drugs already FDA-approved and hundreds more in clinical development, Force's research has highlighted the potential dangers and led to the creation of a new subspecialty—cardio-oncology—dedicated to better managing such patients.

## BEST OF THE BEST

—  
5%

The percentage of all NIH investigators to be awarded the selective and prestigious long-term MERIT Award. The award provides ten years of funding for recipients, who must have at least ten continuous and consecutive years of NIH funding, and the results of each of those years must be better than the last.

Steven Houser, Walter Koch and Yuri Persidsky all received this award recently.

TEMPLE MADE





# WATER PURIFIED

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## THE WET CENTER AND CLEANING THE WORLD'S WATER

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Temple's Water and Environmental Technology (WET) Center is transforming the Delaware Valley into what Director Rominder Suri calls "the Silicon Valley of water treatment."

Hundreds of millions of people throughout the world either don't have enough water or have water that isn't good enough to drink. Tackling this issue has become one of the world's most pressing humanitarian, industrial and environmental problems.

Armed with a two-year National Science Foundation (NSF) grant—only the second NSF grant in the nation devoted to this subject—Temple has established a Water Technology Innovation Ecosystem dedicated solely to taking the already world-class research being done and rapidly speeding up the process of bringing that research to marketable technologies. They're doing so by bringing together such traditionally disparate groups as academic researchers and their students, engineering design firms, construction companies, equipment manufacturers, and water treatment facilities.

The WET Center particularly focuses on developing new technologies to treat emerging contaminants that traditional water treatment methods cannot adequately address. It is Temple's only National Science Foundation-supported Industry/University Cooperative Research Center.

An example: In Brazil, a one-of-a-kind wastewater treatment plant is being planned to employ WET Center technology based on ultrasound waves, which can target contaminants existing technologies miss, and could soon turn the area's industrial waste stream into a source of clean and potable water. It's an innovation that went from Suri's lab straight to South America; from research to direct market application. Similar efforts are being developed for New Jersey and Italy.

Closer to campus, as Pennsylvania legislators debate hydraulic fracturing and its potential impacts—a debate with national implications—the Department of Energy

**"WET is a water treatment technology hub of global prominence, that promises to commercialize advanced technologies in our region, and enhance environmental protection around the world."**

—RoseAnn Rosenthal, president and CEO, Ben Franklin Technology Partners of Southeastern Pennsylvania

has, since 2004, looked to Temple chemistry professor Daniel Strongin as a researcher who might have the answer. Strongin has been researching the use of lipid molecules to suppress the development of sulfuric acid, which creates acid mine drainage. If successful, it would do double duty: clean drainage from the fracking process, and allow that reclaimed water to be re-used in fracking, instead of having to use 3 million gallons of new water per well.

To learn more about the exciting developments in research at Temple, and how you can help, please visit [giving.temple.edu/research](http://giving.temple.edu/research).

8,982

the number of active natural gas wells in Pennsylvania

17 trillion

gallons—the yearly worldwide increase in demand for freshwater, equivalent to the amount of water that flows over Niagara Falls every year

41 million

the number of Americans whose drinking water supply has been found to contain pharmaceuticals (including antibiotics, antidepressants and sex hormones)

WET CENTER COLLABORATORS AND SUPPORTERS:

National Science Foundation

Ben Franklin Technology Partners of Southeastern Pennsylvania

U.S. Department of Defense

Pennsylvania Department of Community and Economic Development

More than 30 industrial partners, including:

- ITT
- Purolite
- Met-Pro

Pharmaceutical companies

Defense contractors

Arizona State University

University of Arizona

Queen's University Environmental Science and Technology Research Center, Belfast, Northern Ireland

TEMPLE MADE







# INNOVATIONS FOSTERED

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## THE MOULDER CENTER FOR DRUG DISCOVERY RESEARCH AND A NEW PHARMACEUTICAL PARADIGM

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One of the biggest health care crises facing the United States is the innovation gap in drug discovery. Every year, fewer and fewer new drugs are being brought to market. Translating the basic research done at academic institutions and pharmaceutical companies into life-saving drugs for doctors and patients is an enormous challenge—one that many companies are less and less inclined to gamble on. This has left a significant gap in research and development efforts.

Temple University is working to fill this gap.

In 2009, the university's School of Pharmacy founded the Moulder Center for Drug Discovery Research, the region's first integrated, multi-disciplinary drug discovery center with the express purpose of facilitating collaborative research efforts to support the discovery and development of novel therapeutic agents. Dr. Magid Abou-Gharbia was recruited to act as the new center's director.

Dr. Abou-Gharbia's background itself represents the new center's mission. As a scientist who spent 26 years in the private sector and holds 350 international patents, Dr. Abou-Gharbia knows what it takes to translate basic science into clinical research and bring discoveries to patients.

In order to achieve its purpose, the Moulder Center for Drug Discovery Research has assembled faculty and staff with extensive industrial experience. The team currently includes 15 researchers who have a combined 130 years of industrial drug discovery experience. The Moulder Center also empowers basic science by offering grants to Temple researchers outside the School of Pharmacy and providing access to cutting-edge drug discovery tools and equipment. An extensive network of academic and industrial partners, including

**“This is the best of both worlds. The Moulder Center for Drug Discovery Research combines the knowledge and passion of academia with the expertise and experience of industry to advance drug discovery programs.”**

—Magid Abou-Gharbia, director, Moulder Center

the legendary Wistar Institute, allows the Moulder Center to accelerate the translation of basic research into potential drug candidates.

The Moulder center is primed and ready to fill the innovation gap between basic science, clinical research and the development of the next generation of life-saving new drugs.

To learn more about the exciting developments in research at Temple, and how you can help, please visit [giving.temple.edu/research](http://giving.temple.edu/research).

## SLOWING TO A TRICKLE:

FDA DRUG APPROVALS

**1996: 56**

**1999: 38**

**2002: 24**

**2005: 20**

**2008: 24**

**2011: 30**

## THE MOULDER CENTER PIPELINE:

GLT-1 modulators as novel treatments for drug addiction and withdrawal

Novel antihypercholesterolemic agents for the treatment of heart disease

Anti-cancer agents for the treatment of malignant glioblastoma

5-Lipoxygenase inhibitors for the treatment of Alzheimer's disease

PET and SPECT tracer ligands for the study of Alzheimer's disease

Novel glucosylceramide synthase (GCS) inhibitors for the treatment of lysosomal storage disorders

TEMPLE MADE





# CANCER PREVENTED

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## FOX CHASE, FELS AND THE EMERGENCE OF A WORLD LEADER IN CANCER BIOLOGY

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Driving up Broad Street in North Philadelphia, you might not realize it, but you have found yourself in a new center of gravity in the fight against cancer. Under the banner of Temple University Health System, a number of resources have converged to create a true hub of oncological research and clinical care.

- The Fels Institute for Cancer Research and Molecular Biology, which brings together an interdisciplinary dream team of Temple University School of Medicine faculty from nine different departments, is already one of the world's leading basic research enterprises in cancer and molecular biology.
- Affiliation with Fox Chase Cancer Center has brought one of the region's most notable clinical oncology centers into the Temple fold.
- A new Center for Translational Research, and the Moulder Center for Drug Discovery, are bringing new discoveries from the bench to the bedside more quickly than ever before.
- And a recently completed Medical Education and Research Building has provided state-of-the-art facilities for research and training the next generation of medical scientists and practitioners.

**“The addition of Fox Chase Cancer Center—one of only 41 National Cancer Institute-designated comprehensive cancer centers in the U.S.—solidifies Temple’s position as a leader in cancer care and translational research.”**

—Larry Kaiser, senior executive vice president for the health sciences, dean, Temple University School of Medicine, president and chief executive officer, Temple University Health System

Fels Director Jean-Pierre Issa, MD, typifies this shift. A renowned epigenetics and leukemia researcher, Issa left a prestigious post as chief of Translational Research at the M.D. Anderson Cancer Center in Houston to come to Temple—bringing with him several ongoing cancer research and drug discovery studies with tens of millions of dollars in funding from the National Institutes of Health and major cancer organizations.

“Temple is a hot spot of incredible growth in cancer research,” Issa says. “The opportunity to come to a health system that so empowers its researchers and has this kind of momentum was too exciting to pass up.”

And the results, in the form of new drugs, new companies, new genetic discoveries and new treatment options, are both prolific and game-changing, to the benefit of current and future cancer patients everywhere.

To learn more about the exciting developments in research at Temple, and how you can help, please visit [giving.temple.edu/research](http://giving.temple.edu/research).

## NEW TOOLS IN THE FIGHT AGAINST CANCER FROM TEMPLE RESEARCHERS

**Rigosertib:** uses a Temple-developed molecule to inhibit cancer cell growth and survival; in phase I–III clinical trials.

**Onconova Therapeutics Inc.:** Pennsylvania-based biopharmaceutical company created by Temple; developing new drugs for treatment of cancer and radiation; 10 drugs on market or in development.

A **new epigenetic drug** for leukemia and dangerous blood disorders; in phase II clinical trials, with industry partners looking to bring it to market.

Discovery of **two new genes** that regulate cellular responses to tumor formation.

A **novel mechanism** that may lead to new targeted drugs to treat retinoblastoma, a childhood cancer that affects the eye.

## DID YOU KNOW

The **65**-year-old Fels Institute for Cancer Research and Molecular Biology at Temple founded the journal *Cancer Research* and the American Association for Cancer Research.

Temple's School of Pharmacy is one of only six in the country that has a cGMP manufacturing facility for the on-site production and testing of pharmaceuticals and clinical supplies.

TEMPLE MADE





# PASSIONS PURSUED

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## UNDERGRADUATE RESEARCH PROGRAMS HELP STUDENTS DRIVE THEIR OWN EDUCATIONS

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The kind of research that changes worlds is the kind a person feels compelled to do. Temple students pursue that impulse every day. They come with interests and leave with passions. And undergraduate research programs empower them to direct their own educations.

College of Liberal Arts student Korin Tangtrakul's parents own a Thai restaurant in New Jersey, which gave her an interest in issues of food security and availability. In the Geography and Urban Studies Department, a professor encouraged her to take that interest and apply to become a Diamond Research Scholar, which funds student-driven research. Soon she found herself looking at agriculture and its impact on food security in Malawi, and was invited by the American Association of Geographers to publish and present her findings at their annual national conference.

The experience electrified her. It also crystalized a passion for urban and agriculture planning. She turned that experience into a Udall Scholarship and then a one-year Fulbright award that took her to rural Thailand—planning for a career, when she returns to Philadelphia, of working with the city to address food security issues.

Katherine Zuk, a political science major from Philadelphia, likewise became a Diamond Research Scholar. What began as simply forwarding articles about

democratic uprisings in the Middle East to her friends via email, turned into spending the summer of 2012 at the Library of Congress and in Paris pondering what the failed civil war in Algeria between 1991 and 2002 says about the chances for success of democracies emerging from the Arab Spring. She now plans to earn a PhD in comparative politics and to ultimately work at a think tank studying the Middle East and North Africa.

The Diamond Research Scholars Program is just one of several programs that make up a robust, university-wide

**“When I was in high school and earlier in college, my papers just involved research on the internet and from library books. This was my first opportunity to actually go into the field, conduct real research, develop my own data and get it published.”**

—Korin Tangtrakul

funded research system for Temple undergraduates, including the College of Science and Technology's Undergraduate Research Program and the Creative Arts, Research, and Scholarship program. Annually, these programs provide nearly \$1 million to students looking to blaze their own trails and find their own passions.

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RECENT UNDERGRADUATE RESEARCH TOPICS:

“Music Composition: Completing Beethoven’s Unfinished Works”

“Natural Gas in PA: The Unique Case of the No-Severance Tax State”

“An Effective Auditing Scheme for Cloud Computing ”

“Analysis of Cognitive Deficits in a Mouse Model of Cerebral Palsy Using Novel Object Recognition”

“Enhanced Stormwater Drainage System Using Rain Water Harvesting”

“The Art Legacy of Philadelphia’s Gilded Age Families”

“Differential Limb Use in Ghost Crabs”

“The Effects of Privatization on Higher Education Efficiency”

“Versions of Dante: Translation and Anthropology”

“Exploring Molecular Differences Among Distinct Monocyte Populations Implicated in the Development and Progression of HIV-associated Neurocognitive Disorders”

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