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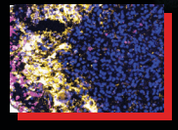
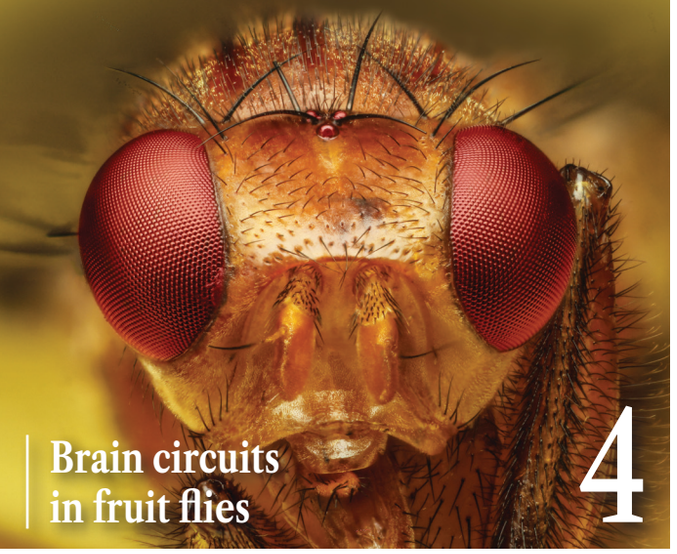
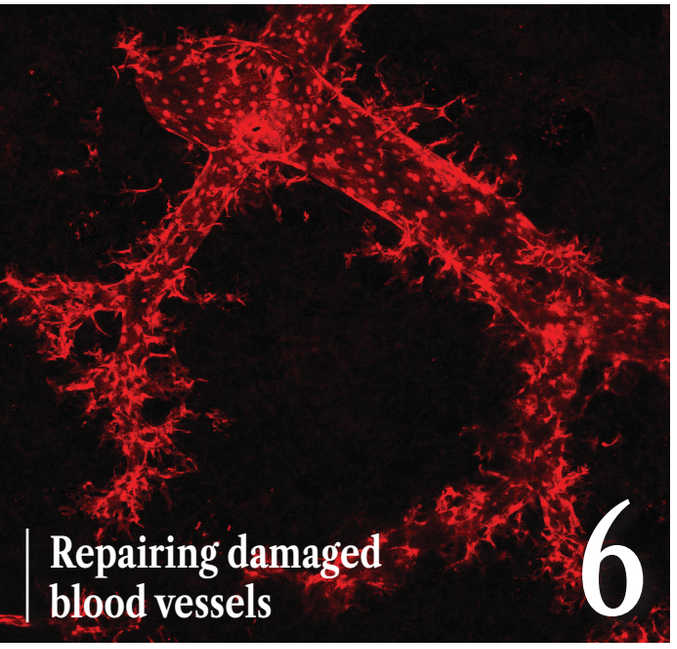
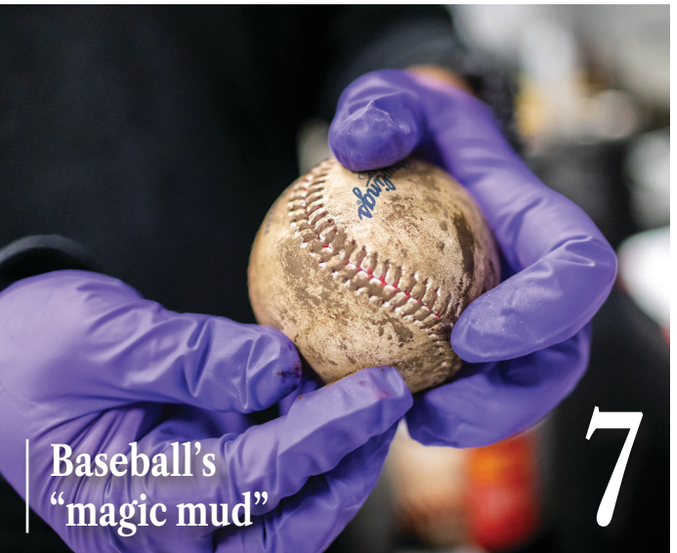
Research at Penn









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Penn
University of Pennsylvania

What's inside

At Penn, research doesn't just push boundaries—it changes the world. Across disciplines from medicine and technology to the natural and social sciences, business, and the humanities, Penn researchers tackle the most pressing challenges of our time, creating lasting impact both locally and globally.

Each day, in every school at Penn, from labs to libraries and field sites to clinics, researchers are making strides to cure diseases, improve lives, and better understand our world.

The scope of this research is as varied as it is powerful. Inside, discover some of the latest breakthroughs and discoveries shaping the future—from pioneering cancer treatments and the design of new materials to understanding search behavior and unearthing an ancient city. These discoveries are made possible by the vibrant research community at Penn.

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HEALTH & MEDICINE

Efforts to surveil and stop bird flu in its tracks

Since a strain of the H5N1 virus—a type of avian influenza—was introduced to North America in 2021, it appeared in U.S. dairy cattle for the first time in March 2024 and has affected more than 990 livestock herds over the past year. The virus has infected dozens of people in the country and this January killed one, a person who had been exposed to sick birds. There has yet to be any reported human-to-human transmission.

Human infections have mostly been relatively mild, "and that's because this H5N1 virus doesn't bind well to human cells," says Scott Hensley, a professor at the Perelman School of Medicine. "The problem is flu viruses change all the time, and we know that the virus is only one or two mutations away from being able to latch onto human cells much more effectively."

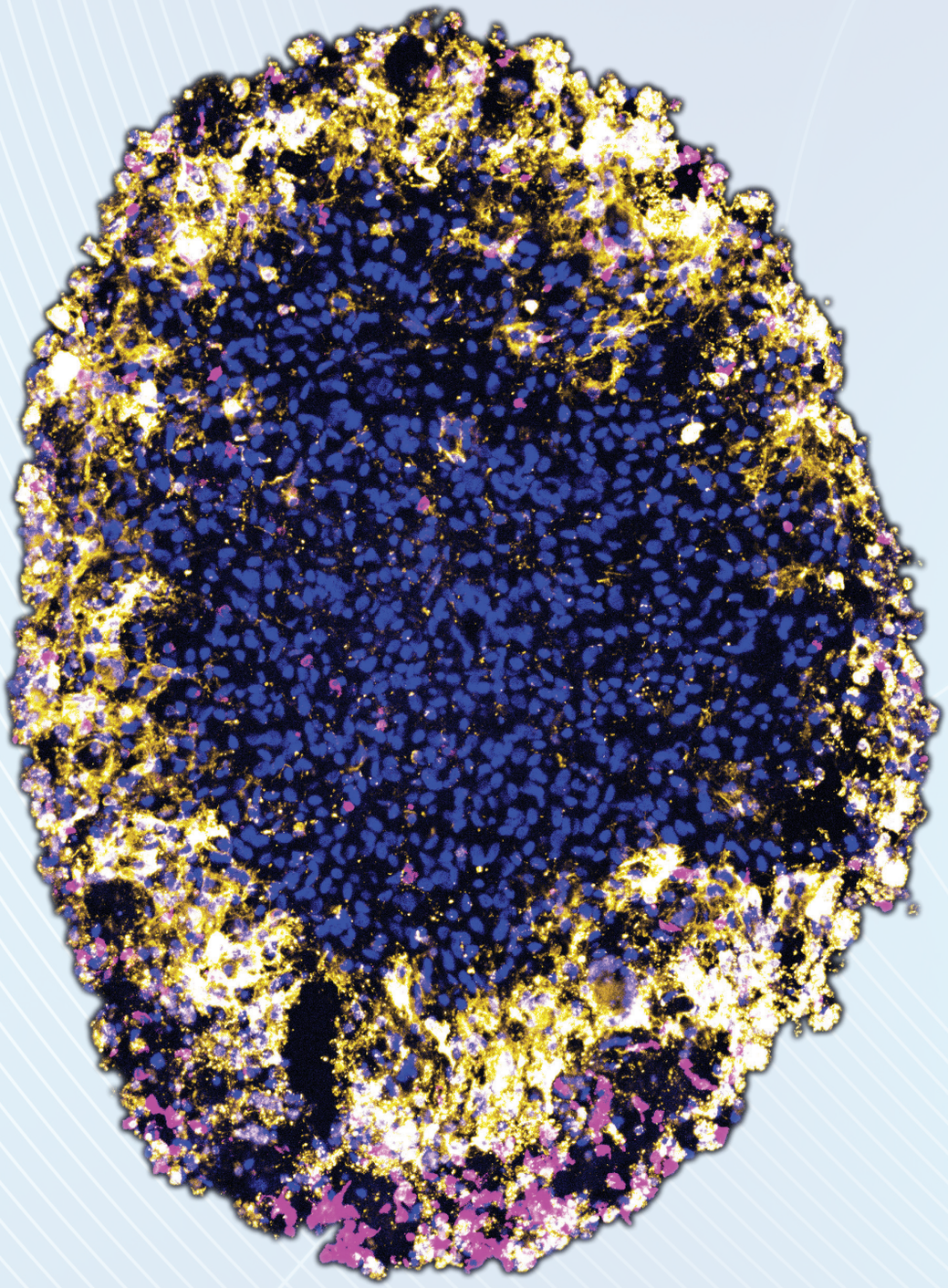
He and Drew Weissman, a Penn Medicine professor and a Nobel Prize winner, have developed a vaccine against the virus, using the same mRNA technology as the COVID-19 vaccines, while School of Veterinary Medicine faculty and students are researching transmission dynamics and assisting the Pennsylvania Department of Agriculture and the Pennsylvania Game Commission with disease surveillance.

Hensley and Weissman are now testing their vaccine in chickens and dairy cattle with Penn Vet's Gary Althouse, a professor of reproduction and swine health, at the New Bolton Center in Kennett Square. "If we can reduce the amount of virus in birds and cattle, we're ultimately reducing the chance that this virus has of infecting humans," Hensley says.

In addition to working on vaccine development, Penn is a partner in the Pennsylvania Animal Diagnostic Laboratory System (PADLS), along with the Pennsylvania Department of Agriculture and Penn State. The PADLS lab at the New Bolton Center has tested more than 20,000 samples from domestic birds, wild birds, and wild mammals since the highly pathogenic avian influenza outbreak began in the United States, says Penn Vet Assistant Professor Eman Anis.

"The implications of this outbreak extend beyond animal health," Anis says. "The economic impact of this virus on the poultry and dairy industries is particularly concerning. This virus has been circulating in the U.S. for over three years, leading to the culling of millions of birds. Also, the disease has been associated with decreased milk production in infected dairy cattle."

Bottom » In Scott Hensley's lab, researchers are studying viral infections.



HEALTH & MEDICINE

Brain tumor organoids accurately model patient response to CAR T cell therapy

Glioblastoma (GBM) is the most common—and most aggressive—type of cancerous brain tumor in adults. Individuals with GBM usually can expect to live just 12–18 months following their diagnosis. Despite decades of research, there is no known cure for GBM, and approved treatments—such as surgery, radiation, and chemotherapy—have limited effect in prolonging life expectancy.

Now, in a new study published in *Cell Stem Cell,* researchers from the Perelman School of Medicine have—for the first time—used lab-grown organoids created from tumors of individuals with GBM to accurately model a patient's response to CAR T cell therapy in real time. The organoid's response to therapy mirrored the response of the actual tumor in the patient's brain. That is, if the tumor-derived organoid shrunk after treatment, so did the patient's actual tumor.

"It's hard to measure how a patient with GBM responds to treatment because we can't regularly biopsy the brain, and it can be difficult to discern tumor growth from treatment-related inflammation on MRI imaging," says Hongjun Song, a professor at the School of Medicine and co-senior author of the research.

CAR T cell therapy reprograms a patient's T cells to find and destroy a specific type of cancer cell in the body. While this therapy is FDA approved to fight several blood cancers, researchers have struggled to engineer cells to successfully seek out and kill solid tumors, like in GBM.

"One of the reasons why GBM is so difficult to treat is because the tumors are incredibly complicated, made up of several different types of cancer cells, immune cells, blood vessels, and other tissue," says study co-senior author Guo-li Ming, a professor at the School of Medicine and associate director of the Institute for Regenerative Medicine. "By growing the organoid from tiny pieces of a patient's actual tumor rather than one type of cancer cell, we can mirror how the tumor exists in the patient, as well as the 'micro-environment' in which it grows, a major limitation of other models of GBM."

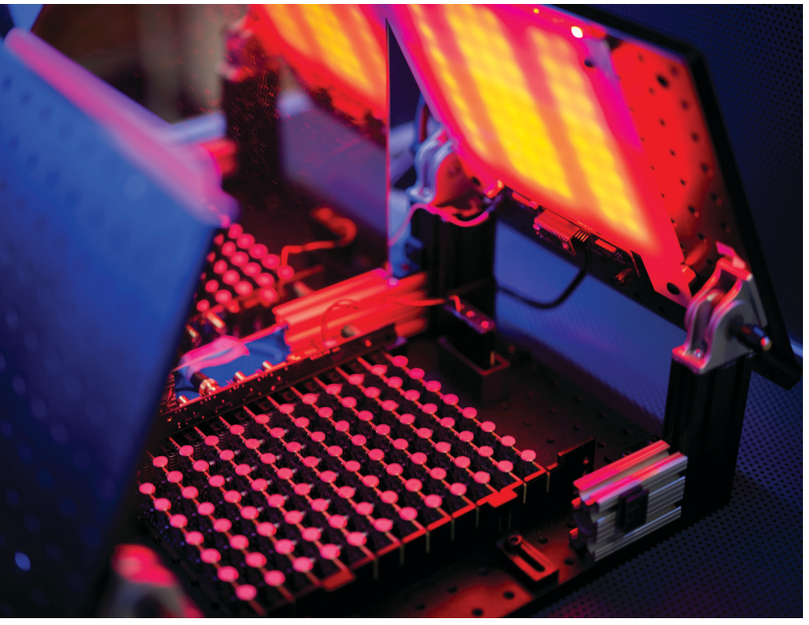
> *"This research shows that our [glioblastoma] organoids are a powerful and accurate tool for understanding what exactly happens when we treat a brain tumor with CAR T cell therapy.*
>
> Donald M. O'Rourke
> Director of the Glioblastoma Translational Center of Excellence at the Abramson Cancer Center

The first line of treatment for GBM is surgery to remove as much of the tumor as possible. For this study, researchers created organoids from the tumors of six patients with recurrent glioblastoma participating in a Phase I clinical trial for a dual-target CAR T cell therapy.

Two to four weeks following surgery, the CAR T cell therapy was administered to the organoids and the patients at the same time. The researchers found that when a patient's organoid demonstrated cancer cell destruction, the patient also exhibited a reduced tumor size.

"This research shows that our GBM organoids are a powerful and accurate tool for understanding what exactly happens when we treat a brain tumor with CAR T cell therapy," says study co-senior author Donald M. O'Rourke, a professor at the School of Medicine and director of the Glioblastoma Translational Center of Excellence at the Abramson Cancer Center. "Our hope is not only to bring these to clinic to personalize patient treatment, but also to use the organoids to deepen our understanding of how to outsmart and destroy this complex and deadly cancer."

Opposite page » A patient-derived glioblastoma organoid treated with dual-target CAR T cells. T cells (magenta) infiltrate the tumor organoid and kill tumor cells (blue; yellow indicates dying cells).



Bottom » The researchers utilized a custom-built, 96-channel recording system called "Song Torrent," developed by Yun Ding and collaborator Steven Sawtelle. Described as a film set or recording studio for flies, Song Torrent captures synchronized audio and video across multiple courtship interactions in *Drosophila* species.

Opposite page » *(L to r)* Minhao Li, Dawn Chen, and Yun Ding.

Front cover » Chen, a postdoctoral researcher, in the Ding lab.

NATURAL SCIENCES

Brain circuits drive social behaviors in fruit flies

In the game of evolution, key behavioral adaptations that confer fitness in survival and reproduction—paying dividends for an individual's progeny—may seemingly arise from thin air. Even familiar species like the humble fruit fly can surprise biologists.

In a paper in *Nature Communications,* Yun Ding's lab in Penn's School of Arts & Sciences discovered a novel courtship behavior Ding calls "wing spreading" in female *Drosophila santomea,* a fruit fly species native to the island of São Tomé off the coast of West Africa.

"When it comes to courtship," says Ding, an assistant professor, "most studies of fruit fly species focused on how male behaviors such as courtship songs lead the interaction, with females playing a more passive role." But the team's work on *D. santomea* found that the females take the lead, signaling their receptivity by spreading their wings, actively engaging with the male song, and driving the courtship rhythm.

The discovery of this newly evolved novel behavior is particularly exciting to Ding's evolutionary neurobiology lab because they now have a system to understand where behavioral novelty comes from in the nervous system.

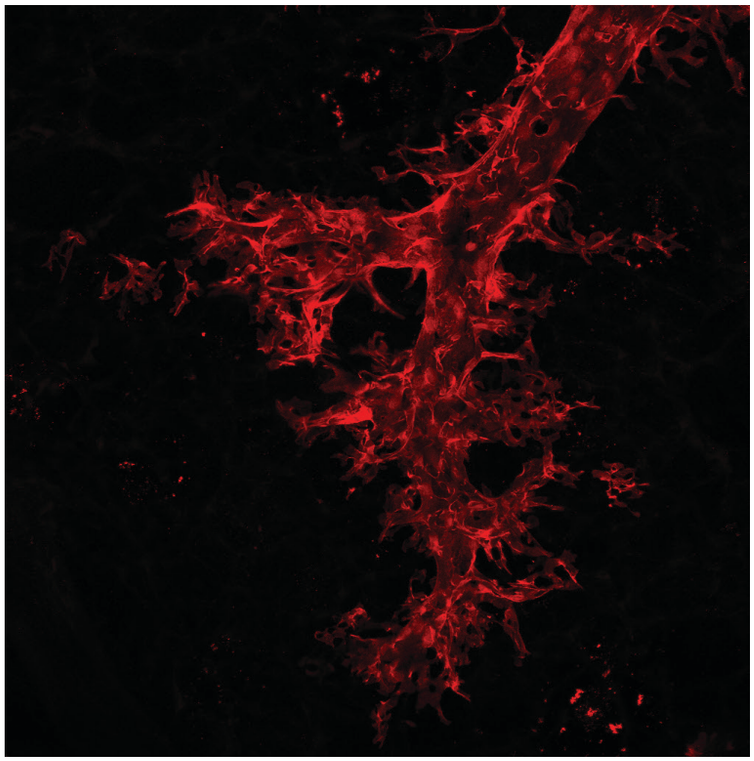
To understand what encodes this behavior, Dawn Chen, co-first author and postdoctoral researcher in the Ding lab, says the team undertook a blend of comparative behavioral and neural techniques, spanning both physical manipulation and genetic approaches.

"We first mapped the neural circuits of *D. santomea* females to identify which neurons triggered wing spreading in response to the male song," Chen says. "Then, we used optogenetics, a technique that uses light to activate specific neurons, and applied it across *D. santomea* as well as its close relatives, *D. yakuba* and the popular model species *D. melanogaster*."

Eventually, the scientists found that evolution has reused a pair of neurons that regulate a conserved female abdomen behavior to also control wing spreading in *D. santomea* females.

Chen points to the implications of these findings in understanding how neural circuits drive social behaviors. "The fact that a subtle change of neurons can spark new, socially interactive behaviors like wing spreading suggests that evolution might lean on existing circuits to develop new forms of communication."

This phenomenon, where existing pathways or circuits adapt to serve new functions, is known as neural co-option and may offer a powerful lens for understanding how behaviors evolve, Ding suggests. "There's more to nervous systems under the surface," she says. "They have remarkable potentials to encode new behaviors, and sometimes these potentials can be actualized during evolution to produce novel behaviors."



Above, right, inside front cover » Veins branch out into the capillary bed after lung injury from influenza.

> *Trying to figure out ways to promote the regeneration of [a patient's] vascular bed or lungs in general would advance modern medicine and patient care.*

Joanna Wong
Doctoral student in the lab
of Andrew E. Vaughan at Penn Vet

HEALTH & MEDICINE

Fixing damaged blood vessels in the lungs

Veins in the lungs, or pulmonary veins, play a critical role not only in lung functioning but also in maintaining sufficient oxygen in tissue throughout the body. When a person sustains pulmonary injury from an illness like influenza or COVID-19, repair of blood vessels and the creation of new ones is vital to meet oxygen demands.

Now, in a paper published in *Nature Cardiovascular Research*, researchers from the School of Veterinary Medicine, Perelman School of Medicine, and collaborators show that pulmonary venous endothelial cells (VECs) can help fix damaged blood vessels in the lungs.

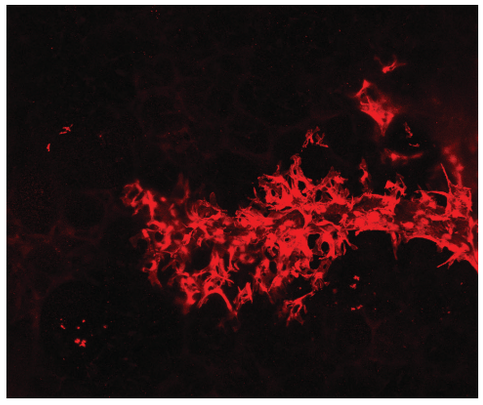
The researchers found that following influenza, COVID-19, and hyperoxia injury, VECs proliferate into the adjacent capillary bed—a network of blood vessels facilitating gas exchange—and contribute to its regeneration.

They also show that VECs can form into capillary cells and that this remodeling is a response to lung injury, not one that occurs during normal lung development after birth.

"A lot of patients who encounter respiratory viruses, especially if they're immunocompromised, can develop something called acute respiratory distress and end up in the intensive care unit," says first author Joanna Wong, a doctoral student in the lab of Andrew E. Vaughan at Penn Vet. "Trying to figure out ways to promote the regeneration of their vascular bed or lungs in general would advance modern medicine and patient care."

Vaughan is co-senior author on the study with David B. Frank, an assistant professor at the School of Medicine and physician at Children's Hospital of Philadelphia. Vaughan notes that most of the people with COVID-19 who died in the ICU died from acute respiratory distress syndrome, which has a mortality rate above 30%.

"Now that we have identified an important progenitor population, we might be able to figure out how to mess around with the cells in those veins and improve their ability to contribute to repair," Vaughan says, making these cells a potential target for therapeutics.



NATURAL SCIENCES

More than luck, 'magic mud' alters baseballs in three ways

Behind the scenes of every Major League Baseball game, a tradition takes place: Baseballs are rubbed with "magic mud." The players have sworn by its effects for decades, and Penn researchers have shown not only that it works but how.

In a study published last fall in the *Proceedings of the National Academy of Sciences*, researchers from the School of Engineering and Applied Science and the School of Arts & Sciences teamed up to quantify the mud's legendary grip-enhancing properties. The study confirmed the mud improves grip through material properties and their interactions with a pitcher's fingers.

The mud, which has been harvested by the Bintliff family at an undisclosed location along the Delaware River for nearly 90 years, "spreads like a skin cream but grips like sandpaper," says Shravan Pradeep, a postdoctoral researcher at Penn Engineering.

Douglas Jerolmack, a professor at the School of Arts & Sciences and Penn Engineering, notes that the material has the right mixture to make three things happen: "spreading, gripping, and stickiness."

Using an apparatus to mimic how human skin elasticity and oils rub mud-treated baseball leather, closely mirroring the friction a pitcher experiences, the researchers found that this mud isn't just a lucky charm; it alters the ball's surface in three crucial ways.

First, it fills in the microscopic pores of new leather, creating a more uniform surface texture by laying down a thin, cohesive film. Then, the clay-rich film makes the surface slightly tacky, roughly doubling the grip (adhesion) between finger and ball. And finally, a sprinkle of tiny sand grains in the mud gets glued to the ball by the clay, creating a studded, abrasive texture that boosts friction like miniature cleats on the ball's hide.

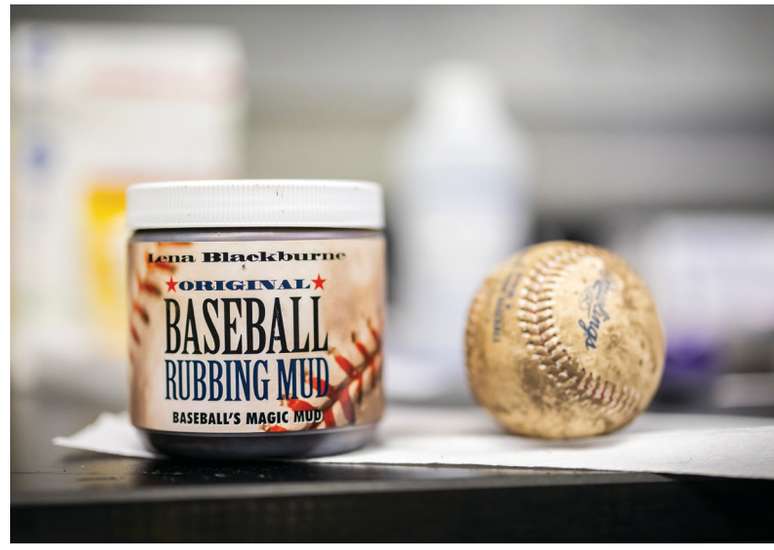
"This unexpected behavior of the mud, especially given its sandy constitution, intrigued us," says Penn Engineering Professor Paulo Arratia.

The researchers' fundamental finding—being able to separate and tune the frictional versus attractive forces in a soil—can open the door to designing new materials with similarly "programmable" properties.

Pradeep notes that the study underscores an emerging research area called Earth-inspired materials science, which explores how naturally occurring materials can outperform synthetic ones.

"We're looking at soil as a material, and it has amazing, gripping properties, which people have been using for years, but they never thought of it that way," says Pradeep. And unlike synthetic alternatives, nature's recipe has sustainability built in "because it comes from nature," he says.

Jerolmack notes how "inherently green" yet challenging it is to synthetically replicate the practice of using the mud. "Nature perfected this formulation long before we began studying it," he says.



Top » Shravan Pradeep analyzes the flow and friction properties of the MLB's "magic mud."

Bottom » Legendary mud has helped MLB pitchers get a better grip for nearly a century.

> *We're looking at soil as a material, and it has amazing, gripping properties, which people have been using for years, but they never thought of it that way.*
>
> Shravan Pradeep
> Postdoctoral researcher at the School of Engineering and Applied Science

Top » A view of the trench with the early Hellenistic mosaic from the northeast. The mosaic features two fighting erotes, or cupids *(above, left),* and two facing goats above a kantharos, a type of drinking cup *(below, right)*.

Bottom » A view of the architectural members of the east facade of the bouleuterion at Teos. Pictured in the foreground, one of the blocks that featured the erased dedicatory inscription. The letters E, Θ and H can be read from the right.

Back cover » An aerial view of the bouleuterion, or city council, at Teos from the south.

ARTS & HUMANITIES

An excavation to understand ancient communities

The ancient city of Teos sits on the western coast of Türkiye, directly across the Aegean Sea from Athens. Today, it is rubble and ruins, but 2,000 years ago, it was a thriving center of Hellenistic and Roman art, culture, and trade. Few people have inhabited the area since the third century CE, and nothing was built atop the site, giving archaeologists like Mantha Zarmakoupi, the Williams Assistant Professor in Roman Architecture at Penn's School of Arts & Sciences, an opportunity for discovery.

Specifically, Zarmakoupi has focused on excavating an ancient city council building called the bouleuterion. "This is the best-preserved building in the city of Teos, and it seems to preserve for us the early history of Teos underneath it," she says.

Peter Satterthwaite, a Ph.D. candidate, emphasizes the bouleuterion's significance as the heart of democratic political decision-making in Teos. "This building is extremely important for understanding the ancient communities that were living here and their institutions," he says.

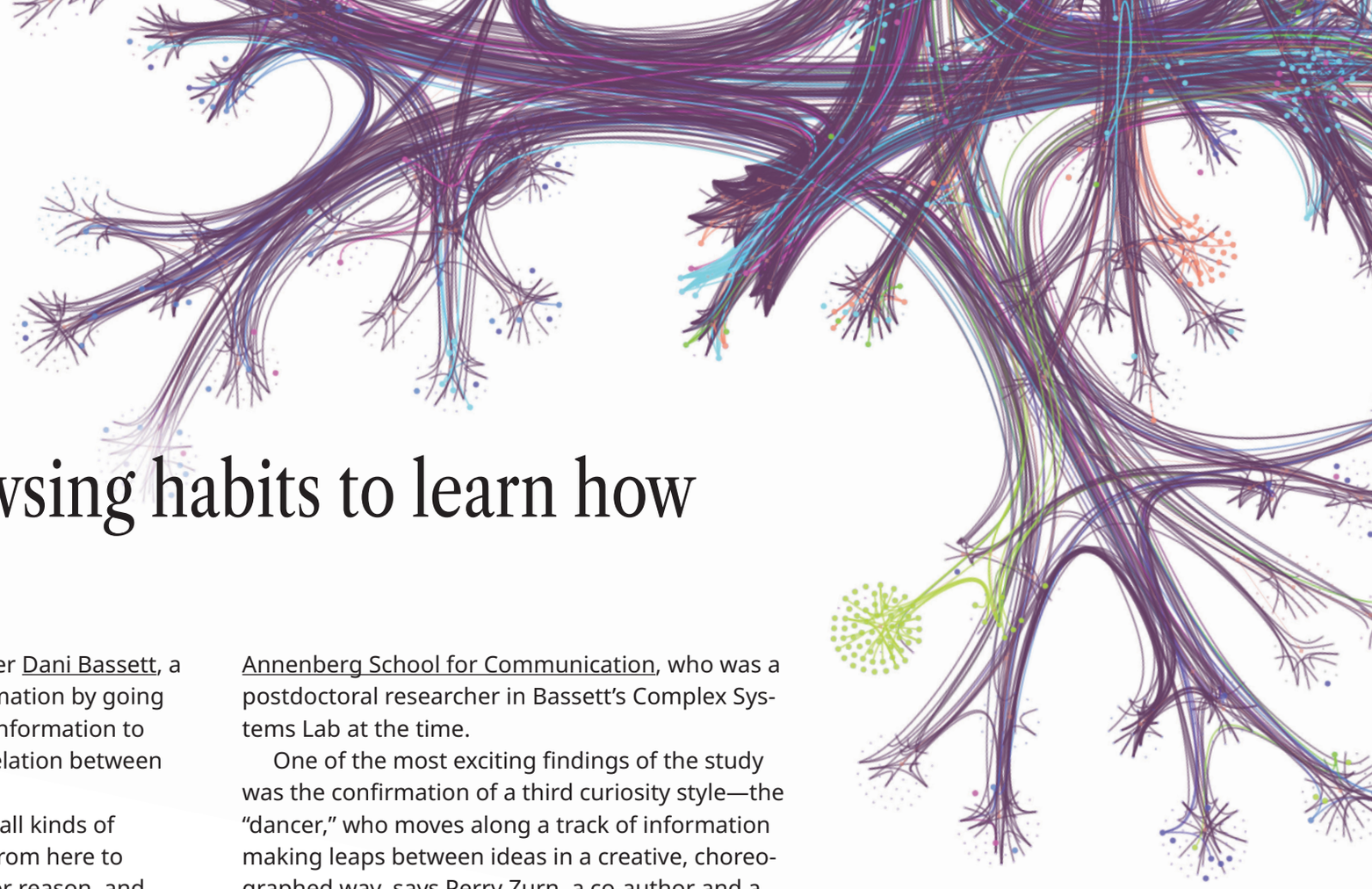
The team pinpointed the timeline: the bouleuterion itself was built during the Hellenistic period, probably toward the end of the third century BCE. The portico was added in the first century CE, during the Roman period.

The work also uncovered at least two mosaics, spread across separate rooms dating back to the third century BCE. One depicted two fighting cupids, figures of Eros, the Greek god of love, whose imagery is related to Dionysos, the Greek god of wine and the patron deity of Teos, with a major temple in the city.

After the first excavation season of 2021, Zarmakoupi's collaborator and the director of the Teos Archaeological Project, Musa Kadıoğlu, was walking around the site in October and noticed the architrave blocks—those that would've sat high on the building, but that were now randomly strewn from previous excavations—appeared to bear a 30-cm high monumental inscription that had been erased. Only in the oblique light of the winter months was the inscription more visible.

Figuring out what those faded letters spelled seemed nearly impossible, but the archaeologists realized each stone block had marks made by their original masons that indicated their position in the building. With the help of masons' marks and advanced 3D modeling technology, Zarmakoupi and her team put the blocks in order so as to reconstruct the building's façade and read the erased dedicatory inscription.

So far, Zarmakoupi has reconstructed all but a small portion. She says she is waiting to finish the excavation to assess the building's development, which, in turn, will help reconstruct the inscription's missing part. She will then publish it in its entirety. In the future, she hopes to home in on the date of the city council building even more precisely and confirm her theories about the significance of the inscription on its façade.



TECHNOLOGY

Look to browsing habits to learn how people learn

According to Penn researcher Dani Bassett, a "busybody" acquires information by going from one idea or piece of information to another—sometimes with little relation between them.

"The 'busybody' loves any and all kinds of newness; they're happy to jump from here to there, with seemingly no rhyme or reason, and this is contrasted by the 'hunter,' which is a more goal-oriented, focused person who seeks to solve a problem, find a missing factor, or fill out a model of the world," says Bassett, a professor at the School of Engineering and Applied Science with secondary appointments in the School of Arts & Sciences and Perelman School of Medicine.

In the research, published in the journal *Science Advances*, Bassett worked with a collaborative team to examine the browsing habits of 482,760 Wikipedia readers from 50 different countries. They discovered differences in browsing habits between countries with more education and gender equality versus less equality, raising key questions about the impact of culture on curiosity and learning.

This work builds on a previous study led by David Lydon-Staley, an assistant professor at the Annenberg School for Communication, who was a postdoctoral researcher in Bassett's Complex Systems Lab at the time.

One of the most exciting findings of the study was the confirmation of a third curiosity style—the "dancer," who moves along a track of information making leaps between ideas in a creative, choreographed way, says Perry Zurn, a co-author and a professor at American University.

This curiosity style shows a degree of creativity and interdisciplinary thinking that's less about randomness and more about seeing connections where others might not, Bassett says.

"What this tells us is that people—and likely children—have different curiosity styles, and that might affect how they approach learning," Bassett says. "Understanding these styles could help us tailor educational experiences to better support individual learning paths."

Top » A hyperlink network from English Wikipedia, with only 0.1% of articles (nodes) and their connections (edges) visualized. Seven different reader journeys through this network are highlighted in various colors. The network is organized by topic and displayed using a layout that groups related articles together.

> ***What this tells us is that people—and likely children—have different curiosity styles, and that might affect how they approach learning.***
>
> Dani Bassett
> Professor at the School of Engineering and Applied Science

SOCIAL SCIENCES

Absent students lead to low teacher morale

Michael Gottfried, a professor at Penn's Graduate School of Education, co-authored a study in *Education Researcher* showing that as student absenteeism increases, teacher morale steadily declines.

"The core of being a teacher is instruction and helping kids grow and develop," Gottfried says. "Absenteeism pulls teachers away from that core purpose." The study, which focused on kindergarten teachers, found that higher student absenteeism led to lower satisfaction, reduced feelings of usefulness, and diminished belief in the teaching profession.

The findings underscore that the effects of absenteeism are cumulative, with each missed day contributing to what Gottfried calls growing classroom "chaos." Teachers maintain instructional practices but experience declining morale and satisfaction, reinforcing the need to address absenteeism not only for students' academic growth but also for teacher well-being.

BUSINESS & LAW

Why the most successful companies are scalable

New Penn research challenges a core assumption in economics: that the most successful companies achieve their dominance purely through superior productivity. Instead, the researchers highlight the important role of scalability—how well firms can grow as they add resources—in explaining why the largest companies stay on top.

By focusing on differences in how companies scale, Sergio Salgado, an assistant finance professor at the Wharton School, Joachim Hubmer, an assistant economics professor at the School of Arts & Sciences, and coauthors shed light on the varied ways that firms produce goods and expand.

"In the traditional view, we think of large companies like Amazon as simply more productive than others. But that doesn't quite capture it," says Hubmer. "Amazon is unique because it's scalable, and that's something that seems built into their technology."

The researchers analyzed data from more than 4.3 million records of Canadian firms from 2001 to 2019—over 90% of the country's private sector output. Their findings were further validated by comparing similar data from U.S. firms, which confirmed the scalability edge seen in the Canadian context.

While productivity grows with revenue, it plateaus for the largest firms, whereas scalability keeps climbing.

Companies that achieved high scalability tended to spend more strategically on various intermediate inputs like raw materials or outsourced labor, leading to stronger growth outcomes.

Even within the same industries, the researchers observed that companies vary widely in their scalability.

The implications of this study are far-reaching. For investors, the scalability factor can guide better investment strategies by focusing on companies with growth-oriented production methods. For policymakers, it raises questions about how to structure taxes, incentives, and financing policies to support scalability, especially for companies that might struggle under traditional financial limits.

SOCIAL SCIENCES

Violent language in film has increased

A recent study from the Computational Social Science Lab at the Annenberg School for Communication, the School of Engineering and Applied Science, and the Wharton School—published in *JAMA Pediatrics*—has analyzed a massive number of English-language films to examine if the portrayal of violence in movies has changed over time. The study analyzed dialogue from more than 166,000 films over the last five decades and found that violent language has increased in movies over time. While other studies have shown increases in film violence, the value of this analysis is its huge dataset. "We focused exclusively on murderous verbs in our analysis and avoided discussions about what constitutes violence and what does not," says Amir Tohidi, a postdoctoral researcher at the Computational Social Science Lab. "Including less extreme forms of violence would result in a higher overall count of violence."

HEALTH & MEDICINE

A tool that can lead to healthier lives

With the goal of helping individuals, communities, and professionals identify how to promote people's ability to be healthy and flourish, a new article from Jennifer Prah, professor at Penn's School of Social Policy & Practice and Perelman School of Medicine, and published in the *Journal of Epidemiology and Community Health,* presents a methodology applied to major causes of death in the U.S. and other pressing public health issues.

The methodology relies on the health capability profile (HCP)—developed by Prah and comprised of 15 interrelated components of an individual's ability to achieve and maintain health.

Together, these factors represent "dynamic, interactive, cumulative, lifelong individual abilities and societal conditions that together enable optimal health," the authors write.

Analyzing hypothetical case studies, the authors identify shortfalls between the observed and optimal levels of each health capability, as well as detrimental or enabling interactions among capabilities. The case studies illustrate how individuals, communities, public health agencies, and policymakers can use the HCP to identify and prioritize changes that are necessary to promote health. Says Prah, "Clear and enforced ethical standards of conduct transform detrimental social norms, social networks, and group membership influences."

SOCIAL SCIENCES

The impact of driverless cars on an urban landscape

For Xiaoxia "Summer" Dong, an assistant professor of city and regional planning at the Weitzman School of Design, Philadelphia is central to his work. "My research focuses on the travel behavior and mode choice impacts of driverless cars," says Dong. In a recent paper in the journal *Transportation Research,* Dong's team surveyed 1,000 residents in the Seattle and Philadelphia metro areas, asking if people would jaywalk more often knowing that driverless cars will stop for them. "The majority of respondents supported reducing the speed of driverless cars in urban areas and even disabling driverless features or driverless functions in areas with heavy pedestrian traffic," says Dong. While they found that some pedestrians would feel safe sharing the road with driverless cars, Dong notes one of his biggest concerns is the anticipation of driverless cars drowning out tried-and-true strategies to keep a transportation system safe and efficient, including "promoting transit, building high-quality pedestrian and cyclist infrastructure, [and] reducing speed on urban streets."

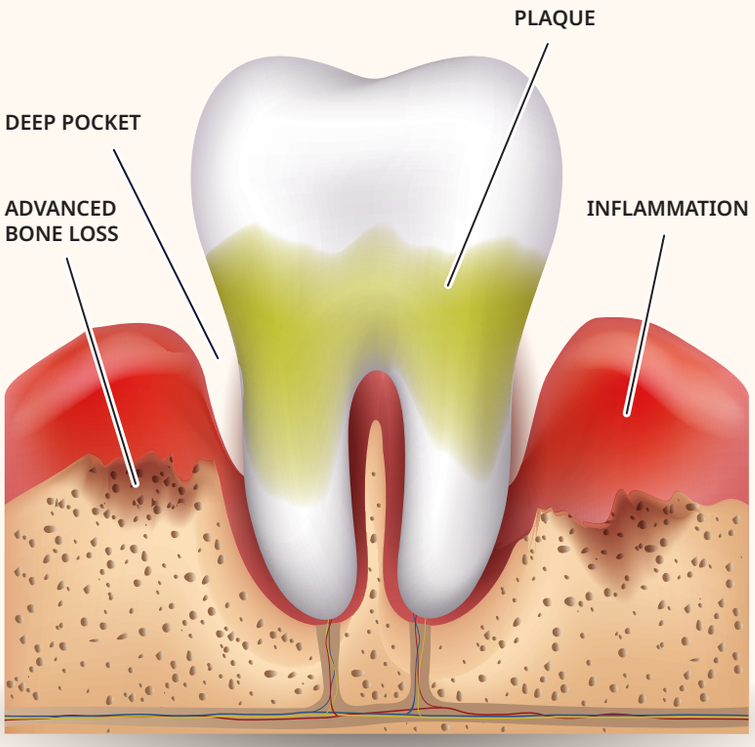
HEALTH & MEDICINE

Saliva kits for gum disease

Measuring levels of key proteins in patients' saliva may be a relatively easy way for dentists and even patients to track the progression of gum disease (periodontitis), suggests a new study led by Flavia Teles, an associate professor at Penn's School of Dental Medicine.

In the study, published in the *Journal of Clinical Periodontology*, the researchers found that on average, patients who experienced progression of periodontitis showed substantially more elevated levels of nine inflammation-related signaling proteins in saliva when compared to those who did not.

"One can imagine a saliva test kit, based on such findings, that dentists could use and even periodontitis patients could use at home—it could be a very useful personalized-dentistry tool for assessing risk and tailoring care delivery," says Teles.



Above » If untreated, periodontitis—a serious bacterial infection and inflammation of the soft tissue surrounding teeth—can destroy the bone that anchors teeth, which can cause teeth to loosen or lead to tooth loss.

HEALTH & MEDICINE

A key brain circuit in the fight against cocaine use disorder

A new study published in *Science Advances*, led by School of Nursing Professor Heath D. Schmidt, has identified a critical brain circuit that plays a pivotal role in regulating cocaine-seeking behavior.

At the heart of this discovery lies the role of glucagon-like peptide-1 (GLP-1), a hormone known for its involvement in regulating food intake and blood sugar. The study revealed that chronic cocaine use is associated with reduced GLP-1 levels, effects that suggest that increasing central GLP-1 signaling could reduce cocaine-seeking behavior.

Further investigation pinpointed a key brain region involved in reward and motivation. By manipulating this neural circuit, researchers were able to significantly reduce cocaine-seeking behavior in animal models.

"This research provides exciting new insights into the brain mechanisms underlying cocaine seeking," says Schmidt. "By understanding how GLP-1 signaling influences brain activity in this context, we can potentially develop new GLP-1-based treatments to treat cocaine use disorder."

BUSINESS & LAW

Court no-shows are a systemic problem

Failure-to-appear in court, or FTA, has recently been seen as a problem of criminal defendants and bail systems. But a research team of Penn Carey Law School Professor Sandy Mayson, School of Arts & Sciences Professor Aurélie Ouss, Penn Carey Law Quattrone Center Fellow Lindsay Graef, and former Quattrone Fellow Megan Stevenson found that the other parties necessary for a criminal proceeding—witnesses and lawyers—actually fail to appear in court more frequently than defendants.

In research published in the *University of Pennsylvania Law Review* and summarized in a recent white paper, the authors write that an essential police officer, civilian witness, or lawyer misses court in 53% of cases, with police officers missing required hearings twice as often as defendants. Victims fail to appear in 70% of domestic violence cases.

"Each time an essential party fails to appear, the hearing must be rescheduled, wasting time and money for all involved. Moreover, when witnesses fail to appear, cases are more likely to be dismissed or withdrawn. Our results show that failure-to-appear is a systemic phenomenon, one that is playing a central role in criminal case processing in Philadelphia," they write.

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