UNIVERSITY OF PENNSYLVANIA

Almanac

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Title VI Training–Strengthening Our Campus Community

January 30, 2026

Dear Penn community members,

As part of the University's efforts to strengthen our commitment to a respectful campus environment, Penn community members–staff, faculty, and students–are encouraged to complete a new civil rights nondiscrimination and anti-harassment training module.

This training offers a clear overview of Title VI of the Civil Rights Act of 1964, the University's relevant policies, how they apply across our campus, and the protections they provide against discrimination on the basis of race, color, and national origin. While the training is optional, I am certainly encouraging all staff to participate as part of our shared responsibility to foster a connected, respectful, and supportive community.

The training is available through Workday and can be accessed here: https://www.myworkday.com/upenn. We ask that you complete the training by March 6.

Thank you for your attention to this important initiative and for your continued commitment to fostering a respectful environment at Penn. Please direct any questions to the Office of Religious and Ethnic Interests (Title VI).

—Felicia A. Washington, Vice President and Chief Human Resources Officer

Penn Engineering Launches Master of Science in Engineering in Software Systems and Cybersecurity

The University of Pennsylvania School of Engineering and Applied Science (Penn Engineering) has announced a new master's degree program that responds to a defining challenge of modern software engineering: Systems have grown so complex, and the threat landscape so demanding, that organizations need dedicated experts who can design strong defenses into a system's very architecture.

The Master of Science in Engineering in Software Systems and Cybersecurity (MSE-SSC) prepares engineers for exactly that role. Integrating advanced training in software systems and cybersecurity into a single, rigorous degree, the program is offered in both online and residential formats and equips graduates to build and defend the systems that power modern life, from cloud infrastructure and financial networks to electronic medical records.

"The MSE-SSC reflects Penn Engineering's commitment to addressing real-world challenges at the technology infrastructure level," said Boon Thau Loo, the RCA Professor in Computer and Information Science (CIS) and Senior Associate Dean for Graduate Education and Global Initiatives in Penn Engineering. "By integrating software systems and cybersecurity, this program prepares engineers not just for technical roles, but for the strategic leadership required to protect the digital foundations of our global economy."

The program is co-directed by Michael Hicks, the Cecilia Fitler Moore Professor in CIS, director of the Schlein Center for Cybersecurity, and an Amazon Scholar; and Andreas Haeberlen, a professor of CIS, who has received two honors for teaching, Penn Engineering's Ford Motor Company Award for Faculty Advising and Penn's Lindback Award for Distinguished Teaching.

"This program helps students move beyond surface-level understanding to develop a deep, foundational knowledge of both systems and security," said Dr. Hicks. "You're not just learning how to respond to threats, you're learning how to build secure systems from the ground up."

Too often, cybersecurity is treated as a downstream concern, something to be addressed after systems are built and deployed. The MSE-SSC emphasizes a different approach, elevating systems thinking and security-by-design.

"Security isn't something you wrap around a finished product–it's something you design into the system from the start," said Dr. Haeberlen. "Today's engineers are working against motivated, resourceful adversaries who are constantly developing novel attacks. Designing effective defenses against them requires the deep expertise offered by the MSE-SSC program, which is far more than typical programs in computer science or cybersecurity alone can provide."

The job market for engineers with combined expertise in software systems and cybersecurity continues to expand. According to the U.S. Bureau of Labor Statistics, employment of information security analysts is projected to grow at a substantially faster rate than other occupations over the next decade, resulting in about 16,000 job openings per year, on average.

As AI-driven technologies and large-scale digital infrastructure become more deeply embedded in everyday systems, the attack surface of these systems expands, increasing the risk that small design flaws and implementation mistakes can snowball into serious security failures. Yet few graduate programs are structured to prepare engineers for the hybrid role of blending software systems and cybersecurity.

The MSE-SSC addresses this gap, serving professionals working in compliance or operations roles as well as engineers who are seeking to design large-scale, secure systems with real-world impact. The program will prepare graduates for roles such as security engineer, incident response specialist, cybersecurity architect, cybersecurity consultant, and secure software or systems engineer across industries including technology, finance, healthcare, defense, and crit-

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Ryan Richard Ruff: Division Chief of Community Oral Health at Penn Dental Medicine

Penn Dental Medicine has named Ryan Richard Ruff the new division chief of community oral health. His appointment to this leadership role took effect on February 1. The division of community oral health in the school's department of preventive & restorative sciences is responsible for didactic and community-based experiential and clinical education in the DMD degree and promotes community and public health.

Ryan R. Ruff

"We are thrilled to be welcoming Dr. Ruff to Penn Dental Medicine," said Mark S. Wolff, Penn Dental Medicine's Morton Amsterdam Dean. "He brings a wealth of community-based work to this role to help us build upon the care we are providing in the community and the public health experiences and understanding of our students."

Dr. Ruff comes to Penn Dental Medicine from New York University (NYU) College of Dentistry, where he served as an associate professor and director of the biostatistics core, as well as director of the master of science program in clinical research. He was also an associate professor at the NYU School of Global Public Health and a recurring instructor at the Columbia University Epidemiology & Population Health Institute. Additionally, Dr. Ruff serves as an adjunct associate professor at the Uniformed Services University of the Health Sciences.

As an epidemiologist and public health professional with an interest in school health, Dr. Ruff's research, as principal investigator, involves designing pragmatic clinical trials and community-based participatory research studies to increase access to oral healthcare and to improve child development. He has received over $22 million in research funding as a principal investigator from the National Institute on Minority Health and Health Disparities, the National Institute of Dental and Craniofacial Research, and the Patient-Centered Outcomes Research Institute.

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INSIDE

Netter Center's ABCS Course Development Grant Proposals Due April 17

The Barbara and Edward Netter Center for Community Partnerships announces ABCS Course Development Grants to create academically-based community service (ABCS) courses that integrate research, teaching, learning and service. ABCS students and faculty work with public schools, communities of faith, and community organizations in West Philadelphia/Philadelphia to help solve critical campus and community problems in a variety of areas such as the environment, health, arts, and education. ABCS courses are a form of community-engaged scholarship. Over 250 ABCS courses have been created and taught in total, and over 80 undergraduate and graduate ABCS courses are currently offered each year. Click here to see a list of current ABCS courses.

Funded by the Netter Center, ABCS Course Development Grants are designed to assist faculty in developing or substantially restructuring undergraduate and graduate courses. The grant intends to fund course supplies and/or time spent on course development. This may include funds for graduate and undergraduate students and/or a summer salary for course development time. (Please note that the amount you request for this is inclusive of employee benefits. Calculate the cost of employee benefits here.) Grants provide up to $10,000 to be spent over two years.

The Netter Center also provides a set of ongoing resources for all ABCS courses. These include teaching assistants, transportation to sites, background checks for students as necessary, and support with developing community partnerships. Grantees would have access to these resources in addition to receiving course development grant funding. Proposals should not request funding for food or for resources already provided. Please review the full list of resources available to all ABCS courses here.

Proposed ABCS courses should be intended to be taught on an ongoing basis.

We ask that all instructors who receive course development grants:

- Add the term "Academically-Based Community Service (ABCS)" to their course descriptions on Courses@Penn as well as add the "ABCS Courses" course attribute to their course via Curriculum Manager.
- Attend the annual Academically-Based Community Service Summit at the end of April.
- Request that their students complete the end-of-semester ABCS survey distributed by the Netter Center Evaluation Team.
- Submit a brief report on successes, challenges, and reflections, due at completion of the grant period.

The following criteria will be used to evaluate proposals:

- Academic excellence
- Integration of research, teaching and service
- Democratic partnership with schools, community groups, service agencies, etc.
- Focus on Philadelphia, especially West Philadelphia
- Evidence as to how the course will engage undergraduate and/or graduate students in local real-world problem-solving activities
- Potential for sustainability

Please format proposals as follows:

- Cover page
  - Name, title, department, school, mailing address, proposed semester of the first course
  - Title of the proposal
  - Total amount of funding requested
  - 100-word abstract of the proposal (include a description of how the course will involve collaboration with the community and benefit the community)
- A one-page biographical sketch of applicant
- A two-to-four-page proposal
- Budget detailing how you intend to use the requested funding

To submit your final proposal:

- Please upload proposals to Box using this link.
- Please upload proposal materials as a single PDF
- File name format: LastName_FirstName_2026CDG.pdf

Final proposals for grants should be submitted by April 17, 2026. The Netter Center would be pleased to provide feedback on draft proposals before final submission. Please direct questions and drafts to abcscoordinator@sas.upenn.edu.

—Dennis DeTurck
Robert A. Fox Leadership Professor
Professor of Mathematics
School of Arts & Sciences
University of Pennsylvania
Netter Center Faculty Advisory Board Co-Chair
Provost's Senior Faculty Fellow at the Netter Center

—Matthew Hartley
Professor and Board of Advisors Chair of Education
Graduate School of Education
University of Pennsylvania
Netter Center Faculty Advisory Board Co-Chair

—Terri H. Lipman
Professor Emerita, School of Nursing
Researcher, Children's Hospital of Philadelphia
Netter Center Faculty Advisory Board Co-Chair

—Loretta Flanagan-Cato
Associate Professor, Psychology
Co-Director, Undergraduate Neuroscience Program
Director, Graduate Certificate in Community-Engaged STEM
University of Pennsylvania

—Ira Harkavy
Barbara and Edward Netter Director
Netter Center for Community Partnerships
University of Pennsylvania

Deaths

Jillian Flanagan, Penn GSE and Penn Carey Law School

Jillian Flanagan, an MSEd student in the Graduate School of Education and an administrative coordinator in the Penn Carey Law School, died on February 1. She was 25.

Born in Bellevue, Washington, Ms. Flanagan attended Great Valley High School in Devault, Pennsylvania, where she served as senior class president and was a member of Future Business Leaders of America, the National Honor Society, the National Hispanic Honors Society, and the school's track and field team, debate club, and television studio. She then earned a BA in anthropology and environmental studies at the University of Wisconsin-Madison, graduating in 2023. While at UW, Ms. Flanagan performed research on the use of civic participation to restore sand dunes in Puerto Rico and on tribal food sovereignty and was an active member of the Filipinx American Student Organization.

Jillian Flanagan

After graduating, Ms. Flanagan took a job at the Penn Carey Law School as an alumni relations and gift processing coordinator. Concurrently, she was also pursuing a master of science in education in school and mental health counseling at Penn's Graduate School of Education. As part of her graduate degree, she was completing a clinical practicum at the Children's Hospital of Philadelphia in the eating disorder assessment and treatment program. She aimed to become a licensed professional counselor.

She is survived by her mother and father, Paulette and James; her brothers, Peter (Jackie Wittich) and Michael (Cian Halloran); and her grandparents, Pedro and Prespedina Lucina; and many aunts, uncles, cousins, and friends.

In lieu of flowers, please donate to a mental health program such as the Children's Hospital of Philadelphia or Barnstone Art for Kids.

New CCTV Cameras

The CCTV Monitoring Committee has approved the installation of new cameras located in the parking lot at 3808-3810 Sansom Street, the courtyard and exterior steps of The Radian at 3925 Walnut Street, and the alley between Cinemark (4012 Walnut Street) and the Rotunda (4014 Walnut Street) that connects Walnut and Locust Streets.

Ryan Richard Ruff: Division Chief of Community Oral Health at Penn Dental Medicine

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Dr. Ruff holds a PhD in research, statistics, and evaluation from the University of Virginia, a MPH in epidemiology from Harvard University, and a MPhil in education from the University of Cambridge.

He was named a fellow of the American College of Epidemiology in 2022.

Penn Engineering Launches Master of Science in Engineering in Software Systems and Cybersecurity

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ical infrastructure.

Designed for engineers at various career stages, the MSE-SSC supports both research-focused students pursuing advanced academic and technical depth and working professionals seeking flexible, applied training to deepen their expertise and advance their careers.

The availability of both online and residential formats allows students to pursue advanced training while balancing professional and personal commitments. "We designed this program for people who want to elevate their careers," said Dr. Hicks. "The MSE-SSC prepares you to design, defend, and lead with the confidence of a Penn Engineer."

The program is supported by Penn Engineering's Schlein Center for Cybersecurity—located in Amy Gutmann Hall, Penn's hub for AI and data science—which focuses on developing science- and engineering-based solutions informed by data and policy and on delivering practical, high-impact defenses for a safer digital world.

"We established the Schlein Center to bring together world-class faculty and practitioners to educate and enable the next generation of cyber talent," said Ted Schlein, C'86, the center's namesake and a leading venture capitalist, cybersecurity expert and Penn Trustee. "This program will engage some of the best and brightest students in the country and equip them to build and protect our most critical infrastructure."

The widespread adoption of generative AI tools has only made security-by-design, and those trained to apply it, more essential. "Generative AI tools are remarkably capable," said Dr. Hicks. "But they can only help you build a secure system, not do it for you; they can't reason about how all the pieces fit together and the sometimes subtle interactions between them, which is where vulnerabilities often emerge. Meanwhile, these same tools may help attackers find new vulnerabilities. In short: Deep security expertise is more needed than ever."

Through partnerships with Penn Engineering's ASSET Center for Trustworthy AI and the Schlein Center, the program connects students to cutting-edge research in AI-enhanced security tools and defenses and will continue to respond to emerging threats.

As software systems evolve, so do the threats they face. "This is a field that's always changing," said Dr. Haeberlen. "Every time a new defense is built, attackers find new ways to challenge it. The best engineers embrace that challenge, and the MSE-SSC program prepares them to do exactly that."

Penn Engineering Launches Michael and Jennifer Ternoey Glassman Penn Scholars Program for K-12 Youth

Penn Engineering will establish the Michael and Jennifer Ternoey Glassman Penn Scholars (GPS) program, a pre-college initiative for academically gifted rising high-school seniors in the School District of Philadelphia who are interested in science, technology and mathematics (STEM).

The program, part of Inveniam Outreach, which provides local K-12 youth with high-quality STEM training and enrichment opportunities, is made possible through a gift from Michael A. Glassman, CHE'85, a member of Penn Engineering's Technical Advisory Board, and Jennifer Ternoey Glassman, W'92. "We believe in the potential of Philadelphia's students," they said. "By providing advanced STEM preparation, we hope to open doors for young people who have the talent and drive to excel in science and engineering."

Participants will experience a rigorous curriculum designed by Penn Engineering faculty and veteran high-school STEM educators, featuring advanced instruction in math, physics, artificial intelligence and computer science. Administered by the Cora Ingrum Center (CIC) for Community Engagement and Outreach, the program will welcome its inaugural cohort this summer.

"This generous gift will enable Penn Engineering to provide talented Philadelphia students with the academic foundation, mentorship and confidence they need to succeed in STEM," said Vijay Kumar, the Nemirovsky Family Dean of Penn Engineering. "By investing in these students before they start college, Penn Engineering is empowering them to see themselves as future engineers."

"Strong preparation in math, science and AI can change the course of a young person's life," added Robert Ghrist, the Andrea Mitchell University Professor and Associate Dean for Undergraduate Education in Penn Engineering. "We are deeply grateful for the Glassmans' partnership."

In addition to advanced STEM education, the program will offer a robust support system to guide students through post-secondary school decision-making, including resume building, leadership development and the college application process.

"Programs like this change what students believe is possible for themselves," said Chanda Jefferson, Penn Engineering's director of community engagement and outreach. "By giving Philadelphia students access to rigorous STEM instruction and a supportive academic community, we're helping them build the skills and confidence needed to thrive in the next stage of their education."

To learn more about the Glassman STEM Scholars, please visit the program's webpage.

The application period for the first cohort closes March 31, 2026.

Division of Finance: Penn's FY2025 Financial Report

The Division of Finance has released the University of Pennsylvania's Annual Financial Report for the fiscal year ending June 30, 2025 (FY2025). The report is available on the Division of Finance website.

Amid a year of uncertainty across higher education and healthcare, Penn concluded FY2025 in a position of financial strength. Total net assets increased by $2.9 billion to $33.9 billion, while net assets from operations grew by $857 million, resulting in a 5% consolidated operating margin. These results reflect the resilience of the University's academic and clinical enterprises, as well as the value of disciplined and forward-looking financial stewardship.

This year's Annual Report is organized around the theme *Illuminating the Endowment*, offering deeper insight into one of Penn's most significant and enduring financial assets. The report highlights the importance of thoughtful governance, long-term planning, and sustainable spending in supporting the University's mission over time.

Questions or comments regarding the FY2025 Financial Report may be directed to Interim Vice President for Finance and Treasurer Trevor Lewis at lewistc@upenn.edu.

One Step Ahead

Security & Privacy Made Simple

Another tip in a series provided by the Offices of Information Security, Information Systems & Computing and Audit, Compliance & Privacy

View, Validate & Voice Your Concern

In an era where artificial intelligence's capabilities grow, scammers are employing increasingly sophisticated techniques to deceive you into sharing your financial data or login details. These include voice cloning, deepfake videos, fake profiles and images, AI-generated websites and listings, fake banking or school websites, fraudulent emails and texts, and romance scams through social media and dating apps.

To protect yourself and Penn from these scams, follow these three essential rules:

1. View. Carefully examine messages and thoroughly read any message before acting. If it seems urgent, if it contains typos, or if the message is from an unknown number or source, discard it without responding.

2. Validate. Confirm the sender's identity. Contact the official agency, bank, or individual directly—using verified contact information—to confirm whether they reached out to you. Be cautious if you think it is law enforcement, the IRS, or a law firm following up on a scam, or if a familiar voice asks for help. Always confirm before responding. Remember, law enforcement and the IRS will never ask for information or fees via calls or emails. For purchase offers, verify with the seller before clicking any links, and do not click on unverified ads or on tracking emails or text messages.

3. Voice your concerns. Notify your Penn IT support or phone plan provider about suspicious emails or texts. Enable two-step verification and use two different forms of validation—such as a password and a code—to safeguard your financial information.

Most scams depend on quick action to prompt voluntary sharing of sensitive details. Taking time to read, assess, and verify messages is key to avoiding fraud.

For additional tips, see the One Step Ahead link on the Information Security website: https://isc.upenn.edu/security/news-alerts%23One-Step-Ahead.

The 2026 Dr. Martin Luther King, Jr. Community Involvement Recognition Award Winners

The 2026 Dr. Martin Luther King, Jr. Community Involvement Recognition Awardees were honored at the annual MLK Interfaith Program and Awards Commemoration on January 22, 2026.

The 2026 Dr. Martin Luther King, Jr. Community Involvement Recognition Awardees are:

Dr. Judith Rodin Community Education Award

Cheryl Jones, known as "poet ci," is recognized for her dedication to uplifting others through art and faith. She has founded many artistic enterprises, "cj speaks LIVE" radio show, founded July 2022 accompanied by the "cj speaks" editorial column in the *Philadelphia Sunday Sun* newspaper since 2015, and the multi-state enterprise "Spoken Word of Mobile" founded in 2001 and "Spoken Word of Philly" founded in 2022. She obtained a dual Bachelor's level degree in Early Childhood/Elementary Education from Temple University and her Master's Degree in Special Education from an HBCU, Alabama State University.

Community Involvement Recognition Award-Community Member

Keith Henderson has spent 41 years at PECO. He is committed to adult education and workforce equity that is not only evident in his professional role at PECO, but also in his broader advocacy and leadership across the energy and education sectors. As Manager of Technical Operations, Workforce Development and President of the American Association of Blacks in Energy (AABE) Delaware Chapter, Mr. Henderson has been instrumental in creating pathways to success for underrepresented and marginalized communities. Beyond his work with PECO, his collaboration with the Energy Coordinating Agency's Knight Green Careers Training Center further underscores his dedication to workforce equity. He actively engages in policy discussions at local and national levels, elevating the role of adult education in shaping inclusive economic growth.

Community Involvement Recognition Award-Penn Faculty or Staff

Jean-Marie Kouassi, founder and executive director of Palms Solutions, stewards initiatives that align academic knowledge with community voice and public purpose. During the COVID-19 pandemic, Palms Solutions played a critical role in community-based vaccination outreach, rebuilding trust in underserved neighborhoods, and advancing public-health equity through culturally responsive engagement. His leadership includes TIMBA, Women Peace Cup International (WPCI), and PACONP (Philadelphia African Cup of Nations for Peace) initiatives that deploy education and sports as platforms for cultural diplomacy, youth leadership, and social cohesion, with PACONP recognized by the United Nations for advancing intercultural dialogue and community unity.

At Penn, Jean-Marie serves as the Community Development and Partnerships Coordinator of FERBS (First Exposure to Research in Biological Sciences) and is the architect of the FERBS Triune Nexus Model (FTNM), aligning universities, communities, and policy systems, to develop civically grounded and socially responsible leaders. He holds degrees from the Wharton School and the School of Social Policy & Practice, with additional professional training from the United Nations Institute for Training and Research (UNITAR) and is a Fellow of the Institute for Cultural Diplomacy (Berlin).

Student Award-Graduate

Izzy Kotlowitz is a second-year social work student at Penn's School of Social Policy & Practice. She received a bachelor's degree in Sociology and Women's and Gender Studies from Kenyon College. As a Social Emotional Learning (SEL) Associate at the Netter Center for Community Partnerships, she supports the mental health and well-being of first- through fourth-grade students in the summer and after-school programs at Benjamin B. Comegys School.

Before moving to Philadelphia, Ms. Kotlowitz worked at a non-profit organization supporting survivors of intimate-partner and sexual violence, stalking, and human trafficking, and provided gender-based violence prevention education for K–12 students across Vermont and New Hampshire. She cares deeply about supporting young people, grounded in a strength-based, person-centered, trauma-informed, and harm-reduction approach; she is passionate about creating nurturing, caring, and energizing learning environments for young people. Currently, Ms. Kotlowitz is developing and strengthening her clinical social work skills, with a focus on LGBTQ+ individuals and communities.

Student Award–Undergraduate

Herinah Asaah is a senior studying psychology, minoring in philosophy and music, and pursuing a certificate in Global Human Rights. After graduating, she intends to study international human rights law, focusing on children's rights. In her time at Penn, Ms. Asaah has been deeply involved with the Netter Center for Community Partnerships, which brings together the resources and assets of both Penn and the wider community to help solve community-identified problems. As a Summer 2024 intern in the Penn Program for Public Service, she worked with the Youth-Driven Anti-Violence Program to help high school students become change agents in their communities. Now, as the Chair of the Netter Center's Student Advisory Board, she oversees four committees dedicated to supporting the work of the Netter Center.

Ms. Asaah has served over 700 hours with the DREAM Program, a nonprofit dedicated to closing the opportunity gap for K-12 youth. Through DREAM, she has enriched youth programming by working with partners like the Ginger Arts Center and Penn Athletics. As a research assistant in the Changing Brain Lab at Penn, she is working with Collective Climb, a nonprofit that empowers youth through restorative justice. She is a support services volunteer for the Wardrobe, a nonprofit that combats clothing insecurity, providing career coaching and leading professional development workshops.

Penn AI Announces Discovering the Future of AI Awardees

Penn AI has announced the first four awardees of the Discovering the Future of AI awards. Fifty-four competitive applications were submitted in response to the request for proposals, representing creative and bold ideas in research and education across Penn's schools.

In addition to the four awards totaling $450,000, an additional 31 faculty applicants representing eleven schools received awards for high-performance computing needs that will be supported by the Penn Advanced Research Computing Center for an estimated value of $852,000, bringing the total support to $1.3 million. Access to high-performance computing will give Penn researchers the ability to run state-of-the-art AI models, analyze far larger and more complex data sets, and pursue bold, high-risk ideas, while removing the financial constraints that normally limit experimentation and discovery.

The Discovering the Future award is "designed to catalyze high-risk/high-reward research and education at the intersection of artificial intelligence and domain-specific scholarship for the benefit of society. This program moves beyond incremental advances to support research with the potential to transform a field of study and/or the educational experience through the innovative application of AI."

Congratulations to the following four awardees of grants from this program:

CASPER4D (Computer-Assisted Surgical Performance Evaluation via Reconstruction), led by Daniel Hashimoto of PSOM, is a new collaborative research project that aims to use artificial intelligence to improve surgical quality and patient outcomes. The project will develop AI models that analyze standard surgical video to reconstruct a four-dimensional (4D) representation of the operating field, capturing anatomy, motion, tools, and evolving surgical events over time. By converting routine video into a detailed, interpretable model of surgical activity, the system will be able to assess technical skill and predict clinical risk in real time. The team will initially apply this approach to a high-risk step in pancreatic cancer surgery—pancreaticojejunostomy during robotic pancreaticoduodenectomy—where surgical technique is tightly linked to complications, while designing methods that generalize to other procedures. Unlike existing methods that rely on time-consuming manual video review or specialized equipment, CASPER4D is designed to work from standard monocular video that is available in any laparoscopic or robotic operating room. Ultimately, the project aims to provide scalable, AI-driven feedback to improve surgical training, standardize performance across hospitals, and reduce complications, costs, and disparities in care.

Penn AI Pedagogy Initiative, led by Seiji Isotani of GSE, is a new University-wide project that is designed to support responsible and effective use of artificial intelligence in teaching and learning by directly involving faculty and students in the design and testing of AI-enhanced educational practices. Rather than imposing tools from the top down, the initiative uses a co-design model in which interdisciplinary student teams and faculty partners work together to identify course-based challenges and develop AI-supported instructional strategies grounded in real classroom needs. Each semester, nine student pairs from the Graduate School of Education and from another Penn school will collaborate with faculty to prototype, pilot, and refine AI-enabled learning activities across 18

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courses over the first year. These efforts will span multiple disciplines and all four undergraduate schools, ensuring that AI pedagogy is tested across diverse learning environments. The program will create the Penn AI Pedagogy Repository, a shared digital library that documents and disseminates the tools, materials, and instructional models developed. Together, these activities aim to create a scalable and evidence-based framework for integrating AI into education in ways that deepen learning, preserve the human elements of teaching, and can be adopted by Penn and peer institutions worldwide.

Molecule 3D Structure-Informed Science Agentic LLM (ApexMol), led by Cesar de la Fuente of PSOM, is a new research project that will develop an artificial intelligence system that is capable of reasoning about and designing biomolecules by integrating natural language with three-dimensional molecular structure. Building on the team's prior work with ApexOracle, which demonstrated the value of combining textual and biological data for antibiotic discovery, this project will move beyond one-dimensional representations to incorporate explicit 3D molecular geometry. The project will create and release a large open data set, BioChemInstruct, containing over 12 million paired examples linking molecular structures with scientific text drawn from sources such as the Protein Data Bank, PubChem, UniProt, and AlphaFold predictions. Using this data set, the team will train a unified large language model that treats text and 3D molecular information as a single sequence, enabling the system to answer questions, predict molecular properties, and design new compounds. The model will be evaluated on tasks such as molecule generation, binding-pose estimation, and drug-repurposing using established scientific benchmarks. By open-sourcing the data and tools, the project aims to accelerate drug discovery, support research against emerging health threats, and broaden access to advanced AI for molecular science.

EchoMFM, led by Julio Chirinos Medina of PSOM, is a new research project that will develop a unified, multi-modal artificial intelligence system to support the clinical interpretation of echocardiograms by integrating imaging, electronic health records, cardiology reports, electrocardiograms, and cardiac MRI data. The project will train a foundation model that learns shared representations across these data sources, allowing it to understand both the visual and clinical context of cardiac ultrasound exams. Using these representations, the system will be adapted to perform key echocardiography tasks such as disease classification, anatomical segmentation, and quantitative measurement, including support for rare cardiac conditions with limited data. The model will then generate both structured and narrative draft reports, which can be reviewed and finalized by a cardiologist rather than written from scratch. To promote transparency and clinical trust, the system will also highlight the specific images and views that support each reported finding. By automating initial reporting and providing consistent, quantitative analysis, EchoMFM aims to improve diagnostic accuracy, reduce variability, and increase efficiency in cardiac care, with planned integration into clinical systems like Epic to support real-world adoption.

Three Penn Carey Law Professors Law Faculty Among Top 40 Authors in the Social Science Research Network in 2025

Three Penn Carey Law faculty members placed in the top 40 of the Social Science Research Network's (SSRN) 2025 author rankings by total new downloads, reflecting the global reach and influence of their scholarship.

Cary Coglianese, the Edward B. Shils Professor of Law and a professor of political science, ranked 19th; Elizabeth Pollman, the Perry Golkin Professor of Law, ranked 32nd; and Herbert Hovenkamp, the James G. Dinan University Professor, ranked 36th on the list, which measures authors by the total number of new downloads of their papers over the past 12 months.

"These rankings reflect what we are privileged to see every day at Penn Carey Law—faculty who are brilliant scholars, producing work that shapes the legal landscape," said Penn Carey Law Dean and Bernard G. Segal Professor of Law Sophia Z. Lee. "Professors Coglianese, Pollman, and Hovenkamp represent the breadth and depth of expertise that defines the law school and establishes our position as a global leader in legal scholarship. Their work doesn't just sit on the shelf—it impacts legal doctrine, informs regulatory policy, and advances critical conversations in corporate governance and antitrust law."

SSRN is an open access research platform intended for scholars to share early-stage research, evolve ideas, measure results, and connect scholars around the world. It provides a real-time measure of scholarly impact across disciplines including law, economics, and the social sciences.

Dr. Coglianese is the director of the Penn Program on Regulation and is a leading scholar of administrative law and regulatory processes. The author of more than 300 articles, book chapters, reports, and essays, his recent work has included examination of climate change policy, federal rulemaking practices, and the use of artificial intelligence by government agencies, among other topics. He is a senior fellow of the Administrative Conference of the United States and an elected member of the American Law Institute and the National Academy of Public Administration.

An expert in business law, Professor Pollman serves as co-director of the Institute for Law and Economics. Her scholarship focuses on corporate law and governance, startups, venture capital, and entrepreneurship. Her work has been recognized multiple times as among the Top Ten Best Corporate and Securities Articles of the year, with recent scholarship on topics including ESG (environmental, social, and governance), start-up failure, and the Supreme Court's treatment of corporate rights. She serves on the Corporate Laws Committee of the American Bar Association and is a research member of the European Corporate Governance Institute.

Dr. Hovenkamp is widely regarded as the leading authority on American antitrust law. He is co-author of the 22-volume treatise *Antitrust Law*, the most-cited antitrust legal authority in the United States. A fellow of the American Academy of Arts and Sciences, he received the Justice Department's John Sherman Award in 2008, the highest honor in antitrust law and policy. His scholarship has addressed digital markets, vertical integration, and the principles of antitrust law.

The rankings underscore Penn Carey Law's continued leadership in producing scholarship that shapes legal thinking among practitioners, academics, and policymakers worldwide.

Update

February AT PENN

EXHIBITS

11 *Collecting the New Irascibles: Art in the 1980s: Tours With Penn Students*; explore, ask questions, and connect with the lived experiences and social forces that shaped this pivotal period; 4 p.m.; Arthur Ross Gallery, Fisher Fine Arts Library (Arthur Ross Gallery). *Also February 14 and 15,* noon.

FITNESS & LEARNING

12 *"What is Love?" Conversation and Cookies with Religious Studies Faculty*; a conversation between four professors who, between them, have expertise in affect theory, history of emotions, Islam, Buddhism, Christianity, and secularism; 3:30 p.m.; room 402, Cohen Hall (Religious Studies).

16 *Playing with Digital History: Making Interactive Maps*; undergraduate history students are invited to explore and interpret research topics in history from a spatial perspective; 5:15 p.m.; room 209, College Hall (History).

Center for Undergraduate Research & Fellowships
Various locations. Info: https://curf.upenn.edu/events.

10 *Schwarzman Scholars Information Session*; learn about a fully-funded, one-year master's degree program in global affairs at Schwarzman College, Tsinghua University in Beijing, China; noon; room G08/09, College Hall.

11 *PURM Information Session*; freshmen and sophomores are invited to learn about a great opportunity to get deeper into a field that might interest them, and to get a taste of what academic research is all about; 3 p.m.; room G08/09, College Hall.

Graduate School of Education
Online webinars. Info: https://www.gse.upenn.edu/news-and-events.

12 *Penn Chief Learning Officer Virtual Information Session*; noon.

Health Professions Education Certificate Virtual Information Session; 5 p.m.

Penn Libraries
Various locations. Info: https://www.library.upenn.edu/events.

12 *What's New in Canvas for Spring 2026?*; will introduce and explore the new tools, features, and updates in Canvas for spring 2026; noon; online webinar.

17 *Grad Cafe: Zotero 101*; will demonstrate a basic overview of the organizational and annotation features of the application, a citation manager and developer; 3 p.m.; room 241, Van Pelt Library.

(continued on page 7)

Division of Public Safety
University of Pennsylvania Police Department Crime Report

About the Crime Report: Below are the crimes against persons and/or crimes against property from the campus report for **January 26-February 1, 2026**. The crime reports are available at: https://almanac.upenn.edu/sections/crimes. Prior weeks' reports are also online. *–Eds.*

This summary is prepared by the Division of Public Safety (DPS) and contains all criminal incidents reported and made known to the Penn Police, including those reported to the Philadelphia Police Department (PPD) that occurred within our patrol zone, for the dates of **January 26-February 1, 2026**. The Penn Police actively patrol from Market Street to Baltimore Avenue and from 30th Street to 43rd Street in conjunction with the Philadelphia Police.

In this effort to provide you with a thorough and accurate report on public safety concerns, we hope that your increased awareness will lessen the opportunity for crime. For any concerns or suggestions regarding this report, please call DPS at (215) 898-7297. You can view the daily crime log on the DPS website.

Penn Police Patrol Zone

Market Street to Baltimore Avenue and from 30th Street to 43rd Street

Crime Category	Date	Time	Location	Description
Aggravated Assault	01/27/26	12:07 AM	4200 Chestnut St	Domestic aggravated assault
Assault	01/29/26	9:23 PM	3925 Walnut St	Subject made threats with implied firearm toward restaurant staff/Arrest
Auto Theft	01/29/26	12:43 PM	400 S 40th St	Theft of electric scooter
Other Offense	01/28/26	12:11 PM	4042-4044 Chestnut St	Domestic (verbal) dispute
Retail Theft	01/26/26	2:51 PM	4233 Chestnut St	Retail theft of alcohol
	01/28/26	11:04 AM	4233 Chestnut St	Retail theft of alcohol
	01/28/26	8:34 PM	4233 Chestnut St	Retail theft of alcohol
	01/29/26	12:35 PM	4233 Chestnut St	Retail theft of alcohol
	01/29/26	10:31 PM	3604 Chestnut St	Retail theft of consumable goods
	01/29/26	9:21 AM	3744 Spruce St	Retail theft of consumable goods
	01/31/26	7:03 PM	4233 Chestnut St	Retail theft of alcohol/Arrest
Robbery-Retail	01/28/26	6:55 PM	3600 Market St	Retail robbery with implied firearm; offender fled the area
Theft from Building	01/26/26	3:09 PM	3604 Chestnut St	iPhone stolen
	01/26/26	5:19 PM	3131 Walnut St	Theft of boots from complainant's front door area
	01/29/26	8:18 AM	3600 Civic Center Blvd	Handgun stolen
	01/29/26	5:54 PM	200 S 33rd St	Unknown person(s) removed credit card and used the card for fraudulent charges
	01/29/26	11:44 PM	3935 Walnut St	Complainant reported that her purse was stolen from inside location
	01/30/26	7:57 PM	3417 Spruce St	Theft of a wallet from common area
	01/31/26	1:30 PM	3900 Chestnut St	Theft of a package from apartment common area
Theft from Vehicle	01/26/26	11:29 AM	3910 Filbert St	Theft from a vehicle in the parking garage

Philadelphia Police 18th District

Schuylkill River to 49th Street & Market Street to Woodland Avenue

Below are the crimes against persons from the 18th District: 2 incidents were reported for **January 26-February 1, 2026** by the 18th District, covering the Schuylkill River to 49th Street & Market Street to Woodland Avenue.

Crime Category	Date	Time	Location
Aggravated Assault	01/29/26	10:22 PM	3925 Walnut St
Robbery	01/28/26	7:13 PM	3600 Blk Market St

The Division of Public Safety offers resources and support to the Penn community. DPS has developed a few helpful risk reduction strategies outlined below. Know that it is *never* the fault of the person impacted (victim/survivor) by crime.

- See something concerning? Connect with Penn Public Safety 24/7 at (215) 573-3333.
- Worried about a friend's or colleague's mental or physical health? Get 24/7 connection to appropriate resources at (215) 898-HELP (4357).
- Seeking support after experiencing a crime? Call Special Services (support and advocacy resources) at (215) 898-4481 or email an advocate at specialservices@publicsafety.upenn.edu.
- Use the Walking Escort and Riding services available to you free of charge.
- Take a moment to update your cell phone information for the UPennAlert Emergency Notification System.
- Download the Penn Guardian App, which can help police better find your location when you call in an emergency.
- Access free self-empowerment and defense courses through Penn DPS.
- Stay alert and reduce distractions. (Using cell phones, ear buds, etc. may limit your awareness.)
- Orient yourself to your surroundings. (Identify your location, nearby exits, etc.)
- Keep your valuables out of sight and only carry necessary documents.

Update
February AT PENN

(continued from page 5)

MUSIC

13 *The Excelano Project and The Inspiration A Cappella Present: Love Talk and Slow Jams*; a groovy, sultry evening of sweet melodies and romantic harmonies; 8 p.m.; Bodek Lounge, Houston Hall; tickets: $9-$12 (Platt Performing Arts House).

ON STAGE

13 *PENNaach Presents Once Upon a Naach*; Penn's premier South Asian women's dance troupe presents self-choreographed pieces fusing South Asian and Western dance styles; 5:30 p.m.; Iron Gate Theater; tickets: $9-$11 (Platt Performing Arts House). *Also February 14*, 6:30 p.m.

Theatre Arts Council Presents: One Acts; a festival of five student-written, directed, and performed short plays ranging from abstract comedy to Western drama; 6 and 8:30 p.m.; Class of 1949 Auditorium, Houston Hall; tickets: $4-$8 (Platt Performing Arts House). *Also February 14*, 1 p.m.

West African Vibe (WAVe) Presents Afia in Afroland; an African adaptation of *Alice in Wonderland* through the dances of the African diaspora; 8 p.m.; Iron Gate Theater; tickets: $10-$12 (Platt Performing Arts House). *Also February 14*, 4 p.m.

READINGS & SIGNINGS

Kelly Writers House

In-person events at Kelly Writers House. Info: https://writing.upenn.edu/wh/calendar/0226.php.

17 *But Company*; readings by Siyona Bordia (C'29), Lauren Cho (C'26), Ben Hornung, Karen Panckeri, Kristen Rice, Magda Andrews-Hoke, Sara Davis, and Kristina Garcia; 6 p.m.

SPECIAL EVENTS

12 *Seollal Janchi (Korean Lunar New Year Celebration)*; discover traditional Korean new year customs and enjoy Korean food; 5:30 p.m.; suite 310, 3600 Market Street (Korean Studies).

17 *Vietnamese Lunar New Year Open House*; enjoy crafts, games, and activities and some Vietnamese refreshments and celebrate the year of the horse; 1-5 p.m.; room 642, Williams Hall (Center for East Asian Studies).

TALKS

10 *Multiscale Biomechanics and Mechanobiology of the Aortic Aneurysm, or How I Learned to Stop Worrying and Enjoy a Life of Stress and Failure*; Victor Barocas, University of Minnesota; 10:15 a.m.; Wu & Chen Auditorium, Levine Hall (Mechanical Engineering & Applied Mechanics).

F-Block Photocatalysts for Inert Carbon-Element Bond Transformations; Polly L. Arnold, University of California, Berkeley; 4 p.m.; Carolyn Hoff Lynch Lecture Hall, 1973 Chemistry Building (Chemistry).

11 *Toward Intelligent Metamaterial Machines*; Katia Bertoldi, Harvard University; 10:30 a.m.; Glandt Forum, Singh Center for Nanotechnology (Laboratory for Research on the Structure of Material).

Biomaterial Solutions for Immunotherapy and Trauma Medicine; Suzie Pun, University of Washington; noon; room 10-146AB, Smilow Center (Bioengineering, CT3N).

Large-Scale Pretraining on Neural Data Allows for Transfer Across Individuals, Tasks and Species; Eva Dyer, bioengineering; noon; room 414, Gutmann Hall, and Zoom webinar; join: https://upenn.zoom.us/j/93936800903 (Bioengineering, ASSET Center).

Gender as a Prediction Problem; Joel Mittleman, sociology; 3 p.m.; room 403, McNeil Building (Population Studies Center).

On Supermoduli Space with Punctures; Tianyi Wang, mathematics; 3:30 p.m.; room 4C6, DRL (Mathematics).

The Physics of Climate Change; Michael Mann, earth & environmental science; 3:30 p.m.; room A8, DRL (Physics & Astronomy).

Towards Data Sets and AI/ML Models for All of Chemistry and Materials Science; Zack Ulissi, Meta FAIR; 3:30 p.m.; Wu & Chen Auditorium, Levine Hall (Chemical & Biomolecular Engineering).

Marital Privilege: Marriage, Inequality, and the Transformation of American Law; Serena Mayeri, Penn Carey Law; 4:45 p.m.; room 240B, Silverman Hall; register: https://tinyurl.com/mayeri-talk-feb-11 (Penn Carey Law).

Reflections: Looking Forward > Through the Present < Looking Backward; Stephen Kieran and James Timberlake, architects; 6:30 p.m.; Plaza Gallery, Meyerson Hall (Architecture).

12 *Taming High Energy Intermediates with Macromolecular Catalysis*; Cole Sorensen, Princeton University; 10:30 a.m.; Carolyn Hoff Lynch Lecture Hall, 1973 Chemistry Building (Chemistry).

Fast Convergence of High-Order ODE Solvers for Diffusion Models; Jiaoyang Huang, statistics & data science; noon; room 414, Gutmann Hall (IDEAS Center, Penn AI, Statistics & Data Science).

Periodic Maps of Surfaces and Wright's Question; David Futer, Temple University; 3:30 p.m.; room 4C8, DRL (Mathematics).

13 *Properzia de' Rossi in the Archive: Methods for Rewriting the History of Women's Sculpture in Italy*; Emanuele Lugli, Stanford University; 10:30 a.m.; room 627, Van Pelt Library (Francophone, Italian & Germanic Studies).

Protest In the Provinces: Coming to Terms with Capitalism in Russia's Company Towns; Allison D. Evans, University of Nevado Reno; noon; forum, PCPSE (Russian & East European Studies).

Sustaining Ethnic Studies As It Grows; Emily Penner, University of California, Irvine; noon; room 259, Stiteler Hall (Graduate School of Education).

Creative Conservation as Anti-Fascism (1920s-1940s); Miguel Caballero, Northwestern University; 4:30 p.m.; room 543, Williams Hall (Spanish & Portuguese).

16 *Becoming Dangerous: Ecologies of Personhood in the Chimerican Jitsuverse*; Jay Schutte, University of Colorado, Boulder; noon; room 345, Penn Museum (Anthropology).

Comparative Radiology of Fractures; Jason Syrcle, Penn Vet; noon; room 130, Hill Pavilion (Global Health).

Smallpox, Slavery, and Medical Myth-Making in the Spanish Empire; Farren Yero, Lehigh University; 3:30 p.m.; room 392, Cohen Hall (History & Sociology of Science).

17 *From Rogue Waves to Origami: Energy Focusing and Dissipation in Mechanical Metamaterials*; Jinkyu Yang, Seoul National University; 10:15 a.m.; Wu & Chen Auditorium, Levine Hall (Mechanical Engineering & Applied Mechanics).

Economics

In-person events. Info: https://economics.sas.upenn.edu/events.

11 *Customer Competition in Credit Card Markets*; Kenneth Eva, economics; noon; room 200, PCPSE.

16 *Separation of Powers or Division of Labor: What Patent Interference Disputes Show Us About the History of the Administrative State, 1836-1940*; Naomi Lamoreaux, Yale University; 3:30 p.m.; room 100, PCPSE.

Korean Studies

In-person events at suite 310, 3600 Market Street. Info: https://korea.sas.upenn.edu/events.

12 *Defining the Computer: Project Memocall and the Politics of Computer Import and Localization in South Korea*; Jina Ji Youn Hyun, history & sociology of science; noon.

This is an update to the February AT PENN calendar, which is online now. To submit events for future AT PENN calendars or weekly updates, email almanac@upenn.edu.

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Pink Noise Reduces REM Sleep and May Harm Sleep Quality

Pink noise—often used to promote sleep—may reduce restorative REM sleep and interfere with sleep recovery. In contrast, earplugs were found to be significantly more effective in protecting sleep against traffic noise, according to new study published in the journal *Sleep* from the Perelman School of Medicine.

The findings challenge the widespread use of ambient sound machines and apps marketed as sleep aids.

"REM sleep is important for memory consolidation, emotional regulation, and brain development, so our findings suggest that playing pink noise and other types of broadband noise during sleep could be harmful—especially for children whose brains are still developing and who spend much more time in REM sleep than adults," said study lead author Mathias Basner, a professor of sleep and chronobiology in the department of psychiatry in the Perelman School of Medicine.

Researchers observed 25 healthy adults, ages 21 to 41, in a sleep laboratory during eight-hour sleep opportunities over seven consecutive nights. The participants reported not previously using noise to help them sleep or having any sleep disorders. Participants slept under different conditions, including being exposed to aircraft noise, pink noise, aircraft noise with pink noise and aircraft noise with earplugs. Each morning, they completed tests and surveys to measure sleep quality, alertness, and other health effects.

When we sleep, we cycle multiple times through periods of deep sleep and REM sleep. Deep sleep is important for physical restoration, for memory consolidation, and for clearing toxins from the brain. REM sleep, also called dream sleep, is important for emotional regulation, for motor skills, and for brain development. This way, deep and REM sleep complement each other, and collectively guarantee that we wake up restored in the morning, ready for the next day.

Pink noise is a type of broadband noise—a continuous sound spread across a wide range of frequencies—that sounds uniform and static-like. Broadband noise also includes the well-known white noise and other noise colors like brown and blue noise. The different noise colors differ in their energy content across the audible spectrum which determines whether they sound high-pitched or low-pitched. Nature sounds like ocean or rainfall sounds are also broadband sounds, and many household appliances like air conditioning units and fans produce broadband sounds.

Exposure to aircraft noise—compared to none—was associated with about 23 fewer minutes per night spent in "N3," the deepest sleep stage. Earplugs prevented this drop in deep sleep to a large extent. Pink noise alone at 50 decibels (often compared to the sound of a "moderate rainfall") was associated with a nearly 19-minute decrease in REM sleep.

If pink noise was combined with aircraft noise, both deep sleep and REM sleep were significantly shorter compared to noise-free control nights, and time spent awake was now also 15 minutes longer, which had not been observed in aircraft noise only or pink noise only nights.

Participants also reported that their sleep felt lighter, they woke up more frequently, and their overall sleep quality was worse when exposed to aircraft noise or pink noise, compared to nights without noise—unless they used earplugs.

The results, the researchers said, suggest not only that earplugs—which are used by as many as 16 percent of Americans to sleep—are likely effective, but also that the overall health effects of pink noise and other types of broadband noise "sleep aids" need to be studied more thoroughly.

Millions of people play back broadband noise during sleep every night. For example, white noise and ambient podcasts accounted for three million daily hours on the Spotify platform, and the top five videos YouTube returned when prompted with "white noise" have each been watched more than 700 million times. Even so, research on the effects of broadband noise on sleep remains scarce and inconclusive, according to a recent review by Dr. Basner and colleagues.

REM sleep disruption is a common feature of disorders such as depression, anxiety, and Parkinson's disease. Dr. Basner noted that young children, compared to adults, spend much more time in REM sleep—and thus may be particularly vulnerable to the ill effects of pink noise. Yet, it is common that parents place sound machines next to the bed of their newborns or toddlers, with the good intention to help them fall and stay asleep.

"Overall, our results caution against the use of broadband noise, especially for newborns and toddlers, and indicate that we need more research in vulnerable populations, on long-term use, on the different colors of broadband noise, and on safe broadband noise levels in relation to sleep," Dr. Basner said.

Adapted from a Penn Medicine news release*, February 2, 2026.*

Why Are Icy Surfaces Slippery?

Winter Storm Fern, a rare convergence of arctic cold and southwest moisture, brought arctic weather to many parts of the U.S. on January 25. With it, storm warnings included familiar messages: slow down, watch for black ice, and assume the sidewalk is plotting against you.

But the true issue isn't the storm itself: it's the molecular "deal" ice strikes with everything it touches. Unlike most solids, ice refuses to act like a rigid crystal. Instead, it behaves as a self-made lubricant—especially as temperatures hover near freezing.

To help us understand why we lose our grip in icy conditions, *Penn Today* sat down with Robert Carpick, the John Henry Towne Professor in the School of Engineering and Applied Science. An expert in tribology— he study of friction, wear and lubrication—Dr. Carpick analyzes what happens when surfaces meet at the atomic scale. He also happens to be an avid curler, a sport where mastering the "slip" is the difference between a win and a wipeout.

Why is ice slippery?

Ice has an unusual property: it can melt when you apply pressure to it, whereas most materials behave the other way around—pressure usually makes liquids become solid. For a long time, people thought pressure caused slipperiness. But pressure-induced melting only happens in a very narrow temperature range, while ice remains slippery well outside those limits.

Others suggested that friction from sliding—think rubbing your hands in the cold to stay warm or a shoe making contact with ice—heated the ice enough to create a melt layer. But that's sort of a chicken-and-egg problem: generating enough heat requires some extended sliding with high friction—ice is slippery when it hardly slides at all.

Eventually researchers realized that ice has another funny property: its surface can pre-melt, meaning it naturally has a thin layer of water on top of it, well below the melting temperature. The layer gets thicker as the temperature gets closer to the melting temperature. However, this idea—based on ice being self-lubricated—doesn't explain why some materials have lower friction against ice than others; if the water layer is always there, everything should be equally slippery. It's an oversimplification, but that's the basic argument.

Recently, researchers in Germany used simulations to show that when something touches ice, the water molecules at the surface rearrange from an ordered crystal into a disordered, amorphous structure. This isn't caused by pressure or friction, but by microscopic electrical charges. Water molecules have positive and negative ends, and when they touch another surface, they react to the atoms in that material. They believe this electrical "push and pull" disrupts the ice's rigid structure, creating that slippery, disordered layer, which would explain why ice is slippery across different temperatures and why some materials slide on it better than others. But in short, we don't yet know for sure. As many have observed, despite the commonality of water and ice, their physical properties are remarkably unique.

Your research focus is tribology. Could you explain what that means, and has how it's made you think differently about curling?

Tribology comes from the Greek *tribos* (rubbing or sliding) and is the study of interacting surfaces in motion: adhesion, friction, lubrication, and wear. Ice friction is complex, but with curling, you add a spin on the material: a granite rock sliding over it. The spin causes the rock to "curl"—to follow a path that's not straight.

Adding to the fun, the ice is deliberately textured (pebbled), and this helps the rock curl even more. Sweeping in front of the ice makes it curl less, to let players "steer" the curling rock a bit, ultimately getting the rock to be exactly where you want it to be to score points.

How far away are scientists from engineering a "nonslip" ice?

I recently went skating at an indoor rink made of "glice," which are slabs of a polymer whose friction is so low that it almost feels like skating on ice—but not quite. You get a lot of little shavings that scrape off from the contact of the skates that stick to your clothes and are annoying, but overall, it's not bad, especially given that it works at room temperature. So, an interesting challenge would be to engineer synthetic "ice," meaning a material that has friction as low as ice but without needing any cooling.

As far as nonslip ice goes, I don't know if we can ever tame water and ice to do what we want.

However, ice friction increases if you move slowly or stand still. Cross-country skiers know that while waxed skis are slippery, standing still provides initial traction. Recent curling research shows this increase in friction at low speeds is very strong. So, the best way to avoid slipping is to be patient. On an icy sidewalk, we walk slowly partly for balance, but also to avoid the drop in friction that occurs as soon as you start to slide.

Adapted from a Penn Today *story by Nathi Magubane, January 23, 2026.*