Christopher L. Eisgruber, President

Princeton’s academic outreach across New Jersey.

Invaluable partners as we work together to extend our state’s educational system, and they are advise community college students.

Initiative where Princeton instructors teach and Princeton graduate students and community college instructors to attend Princeton classes; the College Faculty Program allowing community college partnerships to offer unique teaching, learning, professional development workshops with faculty and staff. They also made connections with current Princeton undergraduates, including transfer students.

Riker Chaudhuri, a second-year student at Mercer County Community College and member of Air Force ROTC, said in the homepage story that TSI opened his eyes to the strengths of the central New Jersey region, which he wants to apply. “TSI is designed to help community college students in our own student body, TSI is our response to the needs we see.”

Princeton expands research and education in quantum science and engineering

Princeton University is expanding its commitment in quantum science and engineering research and education, with plans for a new building, a new graduate program, and a broader leadership structure for its initiative. These expanded programs, along with ongoing recruitment of top faculty, graduate students and postdoctoral researchers, reflect the University’s recognition of the transformative potential of quantum science and technology to benefit society in the decades ahead.

The University established the Princeton Quantum Initiative in 2019 and named Andrew Houck, professor of electrical and computer engineering, as director. Now, as Princeton builds towards establishing a permanent institute for quantum science and engineering, as described in the trustees’ recent strategic planning update, the initiative adds Ali Yazdani, the Class of 1909 Professor of Physics, as co-director alongside Houck.

This endowment-enabled initiative will be guided by an executive committee of faculty from four departments across engineering and the natural sciences. The vision for the new institute is to bring together and support faculty and students across science and engineering who are pushing the boundaries of discovery around quantum information, particularly in the areas of quantum computing, communication, and sensing. “Quantum information continues to be an exciting area with deep, fundamental impacts on science and transformative technological innovations,” said Houck.

$50M announced over five years for municipality, programs, residents

The University has announced plans to contribute more than $50 million over five years to the Municipality of Princeton, community organizations and lower- and middle-income residents to support mutual community interests including college access, sustainability and resiliency, socioeconomic diversity and equity, safety and emergency services, mass transit, and municipal infrastructure.

“ar financial contributions to the municipality, local nonprofit organizations and residents reflect the University’s long-standing commitment to strengthening the vibrancy of the Princeton community that we call home,” President Christopher L. Eisgruber said.

For decades, the University has made steady increasing voluntary contributions to the municipality. This is in addition to property taxes paid by the University.

The new framework outlines contributions to the municipality totaling $39.5 million over five years, which includes $28.2 million in unrestricted cash contributions and $11.3 million dedicated to specific municipal projects and programs. The University

Princeton’s new initiative brings together faculty and students across science and engineering to push the boundaries of discovery around quantum information. Artwork by Adobe Stock

Continued on page 2

Save the date!
Porchfest Saturday, April 27
Noon to 6 p.m.
All are welcome!
Hosted by the Arts Council of Princeton.

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Electric bus fleet

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The new EV buses accommodate wheelchairs and passengers with a variety of other accessibility needs, from the class onboard technology, including automated wheelchair positioning, said Charlie Tennyson, Princeton's director of Transportation & Parking Services.

The Xcelsior battery electric buses (XE35), manufactured by New Flyer, have a range of 120 to 200 miles per charge and can run for 12 hours without recharging. They seat 26 passengers and accommodate another 18 standing, and they have 14 USB outlets to power passengers’ devices.

Ridership on the new buses is up, even over pre-pandemic levels. September 2023 saw 60 percent more riders than September 2019. Tennyson credits the ridership increase to many factors, including better vehicles, a streamlined service plan that includes robust public engagement, and better tools and information for riders, such as publication of transit schedules to GoTo, better maps and real-time arrival screens at 13 stops around Princeton.

The buses are part of a University-wide plan to achieve net-zero carbon emissions that is serving as a template for other universities and municipalities across the country. Princeton will be the first Ivy League university and one of very few transit or shuttle operations in the country to operate only emissions-free vehicles.

"A year ago, this was gravel, tumbleweeds and a couple of storage containers," said Tennyson, looking out at the charging station, located at 755 Alexander Street in Princeton. "Today, it’s the largest electric transit vehicle charging facilities in the country."

Newark’s University and regional transit authorities have begun electrifying their bus fleets, but most decommission current generations for a few direct buses at a time. As Princeton was set to decommission its diesel fleet, the University had the unique opportunity to electrify its entire fleet in a single effort.

Tennyson and WeDiveLU, which operates the TigerTransit shuttle system, convened a summit a week before the grand opening so Princeton’s transportation team could help shorten the learning curve for others considering the transition.

The summit brought together 70 representatives from more than 20 utilities, transit operators and universities from across the country, including Montclair State University, Lehigh University, NJ Transit, WeDiveLU, Joint Base McGuire-Dix-Lakehurst and the Southeastern Pennsylvania Transportation Authority (SEPTA).

"Everyone underscored the collaborative vision and effort that enabled the University’s electric bus fleet and charging stations to become a reality," said Tennyson. "This progress is the result of a remarkable collaboration between campus and regional partners, other universities, public transit agencies and private companies," he said.
possibilities," Houch said. "Princeton is playing a leading role in this, and we are ramping up efforts across campus to remain the leading place in the world for this kind of science and engineering for many decades." 

You can find that Princeton’s work in this area stands apart from quantum research at other institutions due to the University’s inclusive approach across disciplines and across the spectrum from foundational science to innovative development. "What we have done to constructing a building to house the institute, we have the opportunity to connect our research and teaching to so many disciplines under one roof," Yazdani said. "It allows us to build a cohesive effort that has a core but touches many other areas of science and engineering."

The new building will be within easy reach of scholars in engineering, physics and chemistry, Yazdani said. The initiative also benefits from a growing number of collaborations with scientists at the Princeton Plasma Physics Laboratory (PPPL), a U.S. Department of Energy national laboratory managed by Princeton University, including work to develop quantum materials, such as diamonds and superconducting magnets that are needed for quantum experiments and technologies. 

The newly established executive committee includes Waseem Bakr, professor of electrical and computer engineering; the Cyrus Fogg Brackett Professor of Physics; Nathalie de Leon, associate professor of electrical and computer engineering; Ran Raz, professor of computer science; Leslie Schoop, associate professor of physics; and Jeff Thompson, associate professor of electrical and computer engineering.

New graduate program

In parallel, the University is launching a new graduate program in Quantum Science and Engineering, which began taking applications this fall. This new program will be one of the first few Ph.D. programs in quantum science and engineering, building on the global leadership role Princeton has already established in quantum education, said de Leon, the inaugural director of graduate studies.

"The field of quantum information science is emerging from disparate disciplines, and almost none of the current practitioners have training across the combined areas. As researchers, we are charged with helping to learn what we need to push into new territory," said de Leon, noting that the new Ph.D. program will build on an existing curriculum to address these gaps.

"Princeton faculty have been very forward-looking in developing a new curriculum in this space over the past 15 years, from a pioneering undergraduate course on quantum information accessible to students in engineering and math, to a graduate research and master's program and now into a new full course on experimental methods of quantum computing," de Leon said.

Andrew Houck (left), Nathalie de Leon and Ali Yazdani. Photos of Houck and Yazdani by Denise Applewhite, Office of Communications; photo of de Leon by Samerse A. Khayat/Fotobuddy.

"Princeton’s "full-stack" approach, which trains students across all levels of science and technology, is playing a leading role in this, and we are making them even lower, putting people in a building together and having a graduate program together so faculty can prepare their students to work in this cross-disciplinary mode as well, creating future leaders."

Broadly speaking, quantum research at Princeton seeks to understand and harness the strange behaviors of particles at and below the atomic scale, both to understand how the universe works and to develop useful technologies. The outlines of quantum science emerged throughout the early 20th century, often led by Princeton scientists, with the discovery that the smallest particles do not obey the classical laws of physics and that energy moves in small, indivisible quantities, or quanta. This understanding has been incorporated into a wide range of common technologies, from GPS and atomic clocks to lasers and LEDs.

Further oddities emerged as scientists found phenomena such as one particle that could be in two places or two states at once, or particles that could behave as one even though separated by many miles, in what scientists sometimes call the "second quantum revolution." These fundamental insights are combining with the revolutions in information technology that fueled the growth of computing and communications. This convergence is driving rapid progress toward new realms of computing, sensing and communications, as well as new insights into the underlying physics.

Andrea Goldsmith, dean of the School of Engineering and Applied Science and the Arthur LeGrand Doty Professor of Electrical and Computer Engineering, said this enhanced vision for quantum science and technology will position Princeton as a leader in this area long into the future.

"Quantum information science is at an inflection point similar to the dawn of the semiconductor era, when universities led the way to discovering enabling the communication and computing devices and networks that underpin so many aspects of our lives today," Goldsmith said. "The information devices and networks of the future need significant leaps forward in performance, security and resilience, which quantum technology could provide," she said. "Princeton’s expanded vision ensures we will play a critical role in developing the foundations of these future technologies."

James Osen, chair of the Department of Physics and professor of physics, also welcomed the new commitments.

"Establishment of a dedicated quantum institute at Princeton is an opportunity to strengthen and expand existing vibrant collaborations across our engineering and science communities," he said.

Steve Schultz for the Office of Communications.

PPPL apprenticeships program for training highly skilled technicians is a national model

After serving in the U.S. Army for one-and-a-half years as an electrician, Steve Armstrong trained to work in heating, ventilation and air conditioning. That’s when he learned about the Princeton Plasma Physics Laboratory’s four-year apprentice program, in which apprentices receive on-the-job training and classroom instruction.

Armstrong is one of the apprentices enrolled in PPPL’s four-year nationally recognized apprenticeship program that now serves as a model for other programs. In November 2023, four apprentices became the first graduates of PPPL’s program in a ceremony at the lab. The program now has 14 apprentices in a variety of fields, from traditional trades such as welding and HVAC to fields like information technology, cybersecurity and human resources.

PPPL was named an apprenticeship ambassador by the U.S. Department of Labor (DOL) as part of an initiative aimed at providing training for high-paying jobs in various industries. Robert Asaro-Angelo, commissioner of the New Jersey Department of Labor and Workforce Development, attended the November graduation, noting that Gov. Phil Murphy has made apprenticeship programs a priority to train highly skilled workers throughout the state.

Armstrong said he applied to PPPL when the program launched in 2018. “I was eager to brag that apprentices are playing a role in fusion energy research,” he said. "I talk about this during almost every speech I give up and down the state, and everywhere. Apprentices are important in every field every day."

The program, started by PPPL Director Steve Cowley, is based on a similar initiative at Culham Centre for Fusion Energy in the United Kingdom. Apprentices spend 6,000 to 8,000 hours of paid on-the-job training and 576 hours of technical instruction.

“Our apprentices are an enormous benefit to the lab, the state of New Jersey and the Mojinder said. They are committed to our mission of developing fusion, a source of clean, safe, and abundant energy, and they bring such vitality to the lab."

Andrew Zwicker, head of strategic relationships, said the laboratory is looking for apprentices from a range of backgrounds. "The success of our laboratory depends on the best people we can find and that means finding a diverse group of people," he said. A list of the various apprenticeships offered is at https://www.pppl.gov/apprenticeship-job-descriptions.

Sheehan Twomey, who went to vocational school after high school and then worked as an electrical technician, is one of the recent graduates. He was hired as a power systems technician at PPPL and is pursuing an electrical engineering associate’s degree at Mercer County Community College. ("PPPL has a lot to offer," he said. "It was more than a place to work; it was a place to learn and to grow.”

Andrew Houck (left), Nathalie de Leon and Ali Yazdani. Photos of Houck and Yazdani by Denise Applewhite, Office of Communications; photo of de Leon by Samerse A. Khayat/Fotobuddy.

Diana Adel, the apprenticeship program administrator, said the program not only trains a highly skilled and motivated workforce of the future but will also allow for a transfer of knowledge from PPPL’s seasoned professionals.

Abby Felzlin, a second-year apprentice who works with Twomey, said she had been “a little unsure of what I wanted to do with my life before I started this apprenticeship. I came to the realization that I like to work with my hands. I like to work hard, but I also like to think. This is an excellent opportunity for people who want to work and learn at the same time.”

Mike Kozic, a motor generator engineer who is Felzlin's mentor and mentored Twomey and another apprentice, said the experienced technicians have enjoyed teaching the early-career apprentices.

"Each of them brings their own characteristics and skills to the group. They’re the next generation.”

Jeanne Jackson DeVoe, Princeton Plasma Physics Laboratory.
Princeton is creating opportunities for small businesses, including diverse-owned firms, to grow through campus construction projects

Princeton is using a new model for campus construction projects that partners large design and construction firms with smaller ones to help increase the number of businesses, including those that are diverse-owned, that have the needed experience and scale to bid on future capital projects at the University and elsewhere.

The joint venture partnerships are the latest example of how Princeton is increasing its spending with diverse-owned suppliers and creating business opportunities that have impacts well beyond campus.

Two major capital projects now underway — Hobson College and the new School of Engineering and Applied Science complex — are utilizing joint venture partnerships. To ensure meaningful engagement, the partnering firms create a new legal entity to contract with the University, which allocates percentages of work across the firms. The model allows smaller firms to build capacity, gain experience at Princeton and grow.

The hope, according to Associate Vice President for Capital Projects Don Ibeh, is to increase competition and opportunities across the design and construction field.

AI hub for N.J.

Continued from page 1

collaborators to advance research and development, house dedicated accelerator space, advance the use of ethical AI for positive societal impact, and promote workforce development to support new technology development, in collaboration with other New Jersey universities, community colleges and vocational schools.

“With this hub, we have the potential to realize the collaborative promise of the new initiative, which he said will build on the University’s ‘strong partnerships with and proximity to many of New Jersey’s other leading higher education institutions,’ including Rutgers University, and ‘will bring together AI researchers, industry leaders, start-up companies and other collaborators to foster AI innovation in central New Jersey.”

He also announced that Princeton and the state will co-host an AI conference on April 11 to convene “leaders from academia, industry, and government to discuss the most pressing AI issues of the day.”

Also speaking at the hub announcement were Princeton Provost Jennifer Rexford, NJEDA CEO Tim Sullivan, and Beth Noveck, also speaking at the hub announcement.

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Information from a news release issued by the office of Gov. Phil Murphy was used in this article.

Campus farmers’ market returns

“Fresh ingredients, proper baking time and method — and whatever else, don’t forget to put your heart into it.” That’s the secret to Catalina Empanadas, which have become a popular offering at the Princeton University Farmers’ Market, said proprietor Jimena Hajek. She and her husband, Mikl Hajek, have been perfecting the art of the empanada for more than a decade in area farmers’ markets. They and other vendors will return to the Princeton University Farmers’ Market this spring. The market is open to everyone in the community. It will run Wednesdays, April 3 to May 31, 11 a.m. to 3 p.m., on Firestone Plaza.

Pride Enterprises working on Princeton’s new complex for Environmental Studies and the School of Engineering and Applied Science. Photo by Nicole Guglielmo

Pride Enterprises is working on Princeton’s new complex for Environmental Studies and the School of Engineering and Applied Science. Photo by Nicole Guglielmo

$50M contribution

Continued from page 1

also expects to provide $10.8 million over five years to local agencies and lower- and middle-income residents.

The dedicated funding to the municipality includes:

- $7.5 million to improve and repair municipal sewer infrastructure.
- $1.5 million to support the municipal shared services.
- $3 million over five years to support career fire department personnel in the Princeton Fire Department.
- $1 million to support the municipality’s purchase of a new fire department tower truck and high-water rescue vehicle.
- $250,000 toward the construction of a new cold-storage facility for the Department of Public Works.
- $100,000 to the municipality’s Department of Human Services to help provide emergency housing for individuals and families experiencing homelessness.

Additionally, the University intends to provide funding to nonprofits for programs that aid lower- and middle-income residents, including:

- Up to $10 million over five years to a nonprofit organization to provide property tax relief for lower- and middle-income Princeton homeowners. Eligible households will be based on income limits set by the New Jersey ANCHOR Program.
- $500,000 over five years to the LEI Fund to support scholarships for low-income students who graduate from Princeton High School.
- $300,000 over three years to Housing Initiatives of Princeton, to support a rental assistance program for residents and families facing housing insecurity.

Council President Mia Saks, Council members Michelle Pierno Lambros and Eve Niedergang, and Municipal Administrator Bernard Hozdovic, who represented the municipal agencies with the University, stated, “We welcome this significant increase in financial support from Princeton University that will benefit all residents of Princeton. These planned contributions reflect our mutual commitment to addressing the urgent challenges of affordability, sustainability, and equity within the community we share.”

In addition, the University announced last March it planned to contribute more than $14.6 million over five years to the Princeton Public School District.

The University is the largest taxpayer in Princeton and the second largest taxpayer in Mercer County. In calendar year 2023, the University paid a total of $7.7 million to the municipality in property and sewer taxes.

Mark your calendars!

Highlights of upcoming and performing arts on campus

Princeton University Concerts (concerts.princeton.edu)

- March 3, Dance for PD* (Parkinson’s Disease), a Mark Morris Dance Group Program
- March 7, Hagen String Quartet
- March 16, Adventures in Chamber Music, curated for kids ages 6-12
- April 3, Jonathan Bliss, piano, and Mitsuko Uchida, piano
- April 8, Golda Shultz, soprano, and Jonathan Ware, piano

McCarter Theatre Center (mccarter.org)

- June 24, “Dreamgirls” (musical)
- March 26, Hubbard Street Dance Chicago
- April 17, Les Ballets Trockadero de Monte Carlo, 50th anniversary
- May 6-8, “Cavalleria” (opera)
- May 28, Violinist Joshua Bell, soprano Larisa Martinez and pianist Peter Dugan

University Art Museum (artmuseum.princeton.edu)

- Feb. 24-April 8, “Christina Fernandez: Multiple Exposures,” Art on Hulfish

Mikl and Jimena Hajek of Catalina Empanadas. Photo by Dennis RedaBwada

Princeton University’s Office of Community and Regional Affairs is pleased to send this publication to our neighbors with information about the many ways the University and the local community interact. Questions? Email us at pucra@princeton.edu or call 609-258-3204.